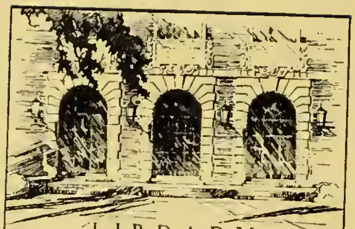


LIBRARY
OF THE
UNIVERSITY
OF ILLINOIS
629.1305
FLI
[redacted]

[redacted]

[redacted]

ENGINEERING

Digitized by the Internet Archive
in 2016

https://archive.org/details/flightinternatio1119roya

F L I REMOTE STORAGE

Supplement to "Flight," January 22, 1920.]

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

An Illustrated Weekly Journal.

VOL. XI.

FROM JANUARY TO DECEMBER, 1919.

London:

ST. MARTIN'S PUBLISHING CO. (LIMITED),
36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

1920.

INDEX TO VOL. XI.

A.B.C. engines, 201, 452, 709, 818, 1049. 1526.
A.B.C. motor scooter, 929.
Accidents, 20, 89, 154, 392, 607, 778, 905, 1062, 1094, 1415, 1506, 1544.
Accidents, fatal, 222, 256, 267, 384, 433, 548, 551, 583, 616, 617, 671, 702, 716, 752, 896, 978, 993, 1009, 1053, 1090, 1096, 1137, 1203, 1238, 1279, 1325, 1431, 1456, 1497, 1517, 1572, 1620, 1646, 1654.
Accidents (leaders on), 1412, 1492.
Accles and Pollock, 753.
Acetylene Equipment Co., Ltd. *See* Dissolved Acetylene Co., Ltd.
Acland, F. E. D., on "Still" engine, 721.
Acland, Capt., P. D., 1331.
Adastral House, 492.
Adam, Grimaldi and Co., 158.
Admiralty, 31, 259, 479, 490, 755, 1004, 1020, 1068, 1099, 1240, 1361, 1393, 1411, 1439, 1451, 1494, 1629, 1630, 1633.
Advertisement by aircraft, 553, 881, 1263.
Advisory Committee on Civil Aviation, 836, 1588.
Advisory Committee for Aeronautics, Reports, 158, 878, 1391.
Aerial defence, 580, 752, 884, 1140, 1290, 1450, 1522, 1630.
Aerial Derby. *See* Derby.
Aerial Lloyds' Registry, 294.
Aerial navigation. *See* Navigation.
Aerial Navigation Act. *See* Air Navigation Act.
Aerial Smuggling (Capt. P. G. Marr), 307.
Aerial Transport, 1291.
Aerial Transport and Travel, Ltd. *See* Aircraft Mfg. Co.
Aero Club, Royal (*see also* Official Notices each week):—
    Annual general meeting, 439.
    Banquets, 735, 847, 1010.
    Golf meeting, 1450.
    Flying Services Fund—weekly reports.
    Jacques Schneider race, 1148, 1180, 1186, 1199, 1279, 1290.
    Records. *See* Records.
    Rules and regulations, 25, 175, 566, 700, 872, 942, 1118, 1148, 1279, 1392, 1532.
    Seaplane competition, 1279, 1291, 1344.
Aero Coverings, Ltd., 619, 1000, 1207, 1208.
Aerodromes, 23, 24, 87, 119, 272, 281, 284, 402, 438, 444, 485, 556, 568, 572, 577, 608, 611, 615, 652, 685, 703, 734, 752, 800, 847, 857, 864, 904, 928, 960, 1020, 1036, 1047, 1068, 1069, 1099, 1144, 1162, 1169, 1170, 1188, 1212, 1256, 1297, 1304, 1367, 1407, 1432, 1459, 1460, 1488, 1505, 1515, 1543, 1565, 1590, 1595, 1601.
Aerodromes for civil use (Air Ministry lists of), 556, 567, 703, 864, 1109, 1130, 1189, 1254, 1317, 1382, 1427, 1472, 1548.
Aerofoil Design, Some Future Prospects of (W. E. Astin), 506, 673.
Aerograms, 593.
Aeronautical Commission, 428.
Aeronautical Intelligence Bureau, 862, 1102, 1518.
Aeronautical Society, Royal, 523, 858, 877, 1130.
Aeronautical Society, Royal (lectures at), 272, 276, 309, 410, 600, 680, 748, 780, 853, 1370, 1388, 1429, 1456.
Aeroparts Manufacturing Co., 325.
Aeroplane General Sundries, Ltd., 619, 753.
Aeroplane in Industrial Development (G. Holt Thomas), 701.
Aeroplane performance chart, 1342.
Aeroplane Structures, 1558.
Aeroplanes *versus* airships. *See* Comparisons.
Affiliated Aero Clubs of the British Empire, 554.
Afghan war, 746, 747, 796, 926, 996, 1433, 1513, 1522, 1564.
Africa (*see also* South Africa), 17, 175, 247, 775, 1136, 1190, 1320, 1616.
Air Committee, Parliamentary, 181, 228, 1522.
Air Council. *See* Air Ministry.
Air estimates. *See* Air Ministry.
Air fights, 591, 1243, 1273, 1333.
Air Force Cross and Medal (*see also* Honours), 975, 1164, 1188.
Air Ministry (*see also* R.A.F.), 10, 76, 109, 200, 228, 248, 267, 322, 339, 416, 417, 428, 467, 509, 703, 716, 734, 749, 871, 885, 894, 926, 941, 975, 1004, 1020, 1082, 1090, 1148, 1169, 1222, 1284, 1290, 1460, 1151, 1552, 1601, 1633, 1654.
    Air estimates, 357, 377, 1239, 1431, 1442, 1621, 1633, 1637, 1663, 1669.
    Airships, 66, 960, 1106, 1020, 1037, 1209, 1210, 1219, 1431.
    Civil Aviation Department, 1, 2, 98, 160, 226, 259, 327, 330, 339, 357, 389, 423, 438, 455, 485, 486, 523, 544, 588, 608, 617, 652, 836, 960, 966, 1002, 1016, 1038, 1068, 1099, 1142, 1170, 1240, 1269, 1431, 1442, 1468, 1491, 1494, 1506, 1569, 1588, 1606, 1625, 1637, 1640.
    Expenditure, 358, 570, 587, 792, 821, 1071, 1083, 1096, 1099, 1103, 1131, 1135, 1358, 1386, 1460, 1516.
    Leaders on, 31, 63, 67, 95, 128, 160, 191, 225, 259, 293, 327, 358, 390, 455, 523, 524, 555, 556, 587, 588, 657, 755, 794, 827, 863, 900, 932, 966, 1002, 1037, 1038, 1071, 1103, 1142, 1210, 1239, 1269, 1412, 1441, 1491, 1492, 1519, 1545, 1575, 1637, 1638, 1640.
Air navigation, instruction, 894.
Air Navigation (Sir A. W. Brown), 500, 546.
Air Navigation (Maj. H. E. Wimperis), 600.
Air Navigation Act, 232, 245, 250, 259, 284, 330.
Air Navigation and Engineering Co., 789, 1208.
Air Navigation Regulations. *See* Regulations.
Air Pie, 574.
Air raids by Allies (*see also* Despatches), 374, 385, 403, 462, 465, 467, 548, 706, 816, 1053, 1130, 1190, 1297, 1322, 1326, 1361, 1374.
Air raids by Bolshevists, 816.
Air raids by enemies, 80, 113, 622, 881, 923, 1153, 1234, 1376.
Air raids, damage and injury (*see also* Insurance), 284, 350, 374, 385, 446, 544, 617, 716, 1099, 1154, 1231, 1328, 1603, 1633.
Air raids insurance scheme, 456.
Air routes, 23, 55, 85, 120, 196, 197, 247, 376, 544, 556, 567, 582, 600, 617, 752, 993, 1032, 1397, 1431, 1588, 1601, 1606.
"Airco" biplanes, 45, 111, 131, 206, 232, 238, 493, 773, 782, 811, 838, 843, 844, 920, 957, 988, 990, 1000, 1014, 1015, 1093, 1116, 1130, 1149, 1267, 1306, 1323, 1340, 1438, 1463, 1484, 1522, 1570 1595, 1611, 1643.
"Airco" milestones, 36, 83, 1162.
Aircraft Disposal Centres. *See* Surplus Government Property.
Aircraft Manufacturing Co., Ltd., 82, 89, 652, 753, 790, 867, 901, 1020, 1023, 1069, 1112, 1522, 1611, 1636, 1645.
Aircraft Production Department, 187, 1460.
Aircraft Supplies Co., Ltd. *See* Motor and Aircraft Supplies Co., Ltd.
Aircraft Transport and Travel, Ltd., 189, 211, 212, 388, 1130, 1267, 1298, 1306.
Aircraft Undercarriages (J. D. North), 1596, 1635.
Airisms from the Four Winds—weekly.
Airscrew Shaft, Whirling of. *See* Morris.
Airscrews. *See* Propellers.
Airship Engineering Progress in the U.S. (J. C. Hunsaker), 1423, 1453, 1474, 1502.
Airship fabrics, 1453.
Airship Officers' Club, 879, 914, 982, 1001, 1009.
Airship Old Comrades' Association, 982, 1344.
Airship records. *See* Records.
Airship services, 22, 60, 86, 144, 190, 195, 230, 263, 690, 986, 1234.
Airship sheds. *See* Hangars.
Airship transport (Maj. S. Nixon), 68.
Airships (*see also* American; British; French; German; Zeppelins), 22, 66, 67, 89, 120, 127, 144, 259, 379, 410, 441, 690, 1002, 1020, 1423, 1548, 1609.
Airships (Wing-Com. Cave-Brown-Cave), 1260.
Airships, gas for, 94, 148, 534, 1261.
Airships, landing stages for, 914.
Alcock, Capt. Sir J., 791, 801, 802, 813, 827, 830, 848, 884, 887, 991, 998, 1458, 1553, 1628. Death of, 1646.
Alexander, Brig.-Gen. W., 269.
Alexandra Rose Day, 884, 885, 886.
Aliens, 194, 1144.
All-steel aeroplanes, 617.
Alliance biplane, 635, 677, 1047, 1093, 1137, 1444, 1484.
Alloys, 928, 1035.
Alps, flying over and landing on the, 433, 463, 509, 571, 1198, 1200.
Altimeter, 139.
Altitude (*see also* Records), 1086, 1191, 1257, 1456, 1498, 1538.
Altitude laboratory, 1378, 1398.
Aluminium, 10. Aluminium paint, 861.
Aluminium Plant & Vessel Co., 1101.
Ambassadors, 259, 1256.
Ambulances, aerial, 384.
America, Aero Club of, 29, 56, 89, 481, 505, 1328, 1392.
American Advisory Committee for Aeronautics, 1367.
American Air Service, 67, 182, 458, 548, 581, 690, 752, 805. 1190, 1442, 1466, 1478.
American airmen, 384, 510, 708, 730, 731, 747, 753, 884.
American airships, 179, 190, 642, 721, 914, 1009, 1028, 1423, 1431, 1453, 1474, 1502, 1522.
American army aeroplanes, 238, 314, 355, 409, 521, 577.
American Aviation Mission Report, 1466, 1478.
American Bureau of Standards, 1509, 1559.
American cross-country flights, 89, 355, 548, 583, 751, 1257, 1370, 1388, 1414, 1422, 1554.
American engines, 201.
American Government, 118, 511, 640, 708, 721, 758, 1009, 1028, 1236, 1343, 1367, 1466, 1478, 1568.
American mail and other services, 209, 548, 577, 642, 1111, 1323, 1414, 1468, 1595.
American Navy flying boats (details), 637, 1024, 1058, 1550.
American records. *See* records.
Amsterdam air exhibition, 384, 715, 799, 884, 922, 982, 993, 1020, 1056, 1082, 1112, 1136, 1155, 1208, 1237, 1310, 1325.
Amsterdam from the air, 1117.
"And It came to Pass," 393.
Anderson, M., 1322.
Andes, flights over, 480, 548, 646, 1047.
Andrews. S. T. G., 257.
Anti-Aircraft Corps and stations, 349, 716, 894, 969, 1100, 1140, 1170, 1515, 1543, 1566, 1569, 1633.
Anti-Bolshevik Leagues, 209.
Anzani engine, 1138.
Aosta, Duchess of, 222.
"Apron screen" defence, 752.
A.R. biplane, 204.
Arc de Triomphe, flying through, 1090, 1136.
Archdale (J.) & Co., 861.
Argentine, 752, 964, 1009, 1238.
Armoured Car Old Boys' Assoc., 650.
Armoured aeroplanes, 1016.
Armstrong-Siddeley engine, 1651.
Armstrong-Whitworth biplane, 990.
Armstrong-Whitworth "Milestones," 434.
Armstrong, Whitworth & Co., Ltd., 82, 238, 356, 417, 488, 929, 1438.
Army Council, 560, 1178, 1552.
Arnott & Harrison, 158, 790, 1518.
Ashmore, Maj.-Gen. E. B., 884.
Aster Eng. Co., Ltd., 688.
Astin, W. E., on Aerofoil Design, 506, 673.
Atlantic flight (*Daily Mail* prize), 10, 84, 181, 190, 222, 247, 286, 373, 402, 440, 476, 485, 503, 535, 583, 594, 605, 639, 652, 678, 694, 736, 740, 780, 788, 801, 827, 847, 848, 857, 1233, 1458, 1628.
Atlantic flight, details of entered machines, 476, 594, 634, 637, 804.
Atlantic flights, 23, 55, 56, 309, 403, 641, 738, 749, 817, 868, 885, 888, 906, 926, 944, 953, 996, 1035, 1278, 1324.
Atlantic flights (leaders on), 228, 392, 426, 490, 660, 661, 689, 690, 723, 791, 792, 897, 931.
Auction sales ,721, 752, 781, 789, 1237.
Austin "Greyhound" biplane, 481.
Austin Motor Co., Ltd., 224, 487, 521.
Austin, Sir H., 1101.
Austin "Whippet" biplane, 1076.
Australia, aviation in, 271, 339, 374, 475, 548, 919, 924, 1094, 1414, 1433, 1485, 1572, 1656.
Australia, flights to (*see* also Australian Government Flight Prize), 88, 271, 433, 913, 928, 1322, 1477.
Australian Government, 548, 580, 1295, 1618.

305
F
V.1

Australian Government Flight Competition, 392, 624, 671, 700, 720, 800, 1118, 1295, 1365, 1382, 1385, 1396, 1397, 1414, 1432, 1444, 1470, 1472, 1497, 1512, 1522, 1558, 1578, 1580, 1605, 1610, 1617, 1619, 1633, 1654.
Austria, 29, 560, 747, 1626.
Aviatik biplane, 237, 1236. " Milestones," 1226.
Aviation & General Insurance Co., Ltd., 143.
Aviation and World Transport (Lord Montagu of Beaulieu), 1570.
Aviation as Affecting India (Lord Montagu) 777.
Aviation in the War Period (L. Bairstow), 853.
Aviation Insurance Association, 330, 745.
Avro air services, 544, 649, 670, 993, 1057, 1097, 1120, 1153, 1225, 1256, 1294, 1321, 1377, 1404, 1428.
Avro " Baby " biplane (details), 830.
Avro biplane, 593, 668, 669, 693, 771, 799, 812, 839, 843, 846, 885, 983, 1015, 1021, 1043, 1115, 1130, 1158, 1162, 1173, 1299, 1350, 1355, 1356, 1405, 1456, 1464, 1549, 1573, 1579, 1597, 1603, 1604, 1661.
Avro " Milestones," 361.
Avro seaplane, 1180, 1182, 1224, 1253, 1405, 1443, 1564.
Ayling and Sons, Ltd., 619.

BADGES (*see also* R.A.F. uniform), 99, 926.
Bagnall-Wild, R. K., Wing Commander, 29, 295.
Baird, Maj. J. L., 21, 29, 33.
Bairstow, L., 1413.
Bairstow, L., on Aviation in War Period, 853.
Ballooning in the R.A.F. (Capt. L. Rushbrooke), 394.
Balloons and ballooning (*see also* Kite Balloons), 294, 416, 820, 886, 1422, 1453, 1485.
Barb, The, 283.
Barber, Capt. H., 330.
Barimar, Ltd., 30, 189, 619, 1035, 1267, 1299, 1355.
Barker, Maj. (V.C.), 650.
Barnwell, Capt. F. S., on Design, 276, 310, 345.
Barograph record of climb, 339.
Bassé-Selve engine, 297.
B.A.T. biplane, 206, 375, 810, 813, 841, 842, 1021, 1113, 1116, 1162, 1340, 1383, 1410, 1438, 1490, 1597.
B.A.T. biplane (details), 494, 662.
B.A.T. " Crow " monoplane flying boat, 1113, 1115.
Batteries, 861.
B.E. biplane, 989, 1596, 1597.
Beacons, aerial, 647.
Beardmore engine, 1050, 1332, 1344.
Beardmore (Wm.) and Co., Ltd., 417, 619, 1238.
Bedford Standard, 781.
Belgian airmen, 267, 509, 1422.
Belgium, Aero Club of, 18.
Belgium, aviation in, 18, 581, 1626.
Belgium, flights to and from, 189, 212, 509, 548, 992, 1212, 1298, 1489, 1636.
Belgium, King and Queen of, 355, 480, 565, 647, 661, 885, 996.
Bellinger, Commander, 730.
Benn, Capt. Wedgwood, 21, 225.
Bennett, Sgt. J. M., 1449, 1620.
Bentley engine, 1049.
Berckman biplane, 409.
Bernard (Adolphe) biplane, 1644, 1645.
Bexhill-on-Sea, 1443.
Biddlecombe, Lt. C. H., 1458.
Birch (J.) and Co., Ltd., 1000.
Bird, Comdr., 1247.
Birkenhead, Lord, 593.
Birkigt, M., 1485.
Birmingham Guild, Ltd., 712, 1489.
Blackburn flying boat, 487.
Blackburn " Kangaroo " biplane, 206, 1113, 1120, 1162, 1208, 1267, 1352, 1470, 1522, 1539, 1558.
Blackburn " Kangaroo " (scale drawings), 1471, 1584.
Blackburn " Milestones," 1581.
Blackburn, Robert, 899.
Blackpool, flying at, 1057, 1097, 1120, 1153, 1256, 1404.
Bleriot biplane, 1056, 1114, 1351, 1485, 1643, 1644, 1645, 1650.
Bleriot, Louis, 1485.
Bleriot Manufacturing Aircraft Co., Ltd., 126.
Bleriot monoplane, 1596.
Bloctube carburettor, 1631.
Blowes, Lt., 131.
Board of Trade, 10, 114, 521, 624.
" Bodensee " airship. *See* Zeppelin.
Boehm, Herr, 1257, 1291.
Bomb-dropping (*see also* Air raids), 19.
Bombs, 247, 482, 1565.
Borden, Miss S., parachutist, 574.
Borton, Gr. Capt. A. E., 140.
Bosch patents, 224.
Boudot, E., 1607.
Boulton and Paul biplane, 503, 504, 1612, 1643, 1645, 1661.
Boulton and Paul " Bourges " biplane, 375, 707, 732 818, 900, 1565, 1597.
Boulton and Paul commercial biplane (details), 1416.
Boulton and Paul, Ltd., 655, 1384.
Boulton and Paul transatlantic biplane, 634, 740.
Bournemouth, 759, 1097, 1232, 1244, 1245, 1256, 1523.
Bournemouth, air service to, 438, 759, 780.
Bournemouth Aviation Co., 780, 1035, 1097.
Bovril, Ltd., 360.
Bowden Wire, Ltd., 421.
Boxing, 75, 440, 482, 1028.
Boy Scouts, 1376.
Boycott, 1302.
B.R. engine, 143, 189, 201.
Brakes, 26.
Brancker, Maj.-Gen. Sir W. S., 55, 98, 129, 238, 382.
Brazil, 118, 149, 577, 581, 752, 1190, 1350, 1377, 1405, 1452, 1517, 1592, 1656.
Bray, Gibb and Co., 1208.
Brean Down acrodrome, 1225.
Breguet biplane, 204, 714, 716, 1158, 1159, 1258, 1539, 1597, 1644, 1645, 1647.
Breguet seaplane, 1644, 1647.
Brewer, Griffith, on Kite-Balloon Experiments, 1533.
Bridges and arches, flying under, 881, 1090, 1136, 1258, 1428.
Bright, Sir Charles, 747, 1231, 1257.
Brighton, flying at, 860, 953, 960, 1153, 1225, 1256, 1294, 1305, 1377, 1389, 1428, 1564, 1579.
Bristol biplane, 118, 206, 238, 553, 573, 582, 607, 675, 753, 869, 990, 1014, 1237, 1406, 1612, 1613, 1643, 1645.
Bristol " Coupe " biplane (details), 1390.
Bristol " Milestones," 100, 155.
Bristol monoplane, 101, 812, 846.
Bristol tourer (details), 1452, 1614.
Bristol triplane, 105, 560, 886.
Bristol works, 355.
Bristow, Lt.-Col. W. A., 572.
British Aerial Transport Co. *See* B.A.T. aeroplanes.
British Air Service, synopsis of War effort, 578.
British Airships, 1603.
British airships, 68, 82, 179, 210, 238, 245, 246, 251, 340, 374, 417, 464, 509, 579, 585, 605, 690, 752, 755, 789, 816, 818, 858, 868, 888, 891, 904, 906, 925, 926, 944, 952, 953, 960, 968, 979, 982, 993, 1023, 1047, 1053, 1063, 1068, 1099, 1121, 1170, 1188, 1219, 1259, 1262, 1361, 1388, 1431, 1504.
British airships (leaders on), 690, 755, 897, 931, 968, 1037, 1106, 1209, 1212.
British Anzani Engine Co., 1138.
British and Colonial Aeroplane Co., Ltd., 355, 861, 1268, 1612.
British army aeroplanes, 206, 527, 625, 652, 792, 989, 990.
British Caudron Co., Ltd., 671.
British Cellulose Mfg. Co., 502, 544, 716, 925, 1119.
British Emaillite Co., Ltd., 619, 952, 1160, 1237, 1355, 1410.
British Engineering Standards Association, 458.
British Government Aircraft Competition (1920), 1106, 1108, 1135, 1139, 1142, 1150, 1176, 1472, 1570.
British Government (debates, etc., in Parliament), 248, 284, 357, 377, 1020. 1663.
British Government (leaders on) (*see also* Air Ministry), 2, 98, 159, 194, 259, 260, 293, 330, 390, 428, 492, 660, 724, 758, 968, 1074, 1106, 1139, 1140, 1272, 1304, 1386, 1575, 1606, 1640.
British Government (Parliamentary Papers), 558, 578, 1506, 1622.
British Government (Questions in Parliament), 284, 322, 349, 383, 416, 485, 502, 544, 617, 752, 685, 716, 749, 789, 894, 925, 960, 982, 1020, 1068, 1099, 1131, 1169, 1431, 1460, 1487, 1515, 1569, 1601, 1633.
British Internal Combustion Engines, Ltd., 1464.
British Lighting and Ignition Co., 224, 998.
British Medical Association, 569.
British Mercedes Motor Co., 61.
British Motor Trading Corporation, 789.
British Navy. *See* Admiralty.
British Piston Ring Co., 487, 1383.
British Scientific Products Exhibition, 1023.
British Society of Trade and Technical Journals, 929.
British War Medal, 975, 985, 1082.
British Wright Co., 1429.
Brock, Commander, 895.
Brock, W. L., 809.
Brooke-Popham, Air-Com. H. R. M., 572, 659, 877.
Brown, Lt. Sir A. W., 791, 801, 802, 827, 830, 848, 884, 887, 998, 1063, 1458.
Brown, Lt. Sir A. W., on Navigation, 500, 546.
Brown Bros., Ltd., 61, 223, 257, 388, 790, 1094, 1383, 1410, 1573.
Bryan, Prof. G. H., 1263.
Buenos Aires, flight to, 884.
Bulgaria, 1284, 1626.
Bullets, anti-aircraft, 881, 895.
Buoying the clouds, 294.
Burberry clothing, 929.
Burbidge, Sir Woodman, 328.
Burton, Griffiths and Co., 1355.
Bussy, Lt. F. E., 489.
Butler, F. Hedges, 747.

C.A.C. biplane, 323. Details, 1285.
Cadets. *See* Royal Air Force.
Calais, bombardments of, 1234.
Calcium carbide, 339.
California-Australia prize, 780.
Cambridge and Paul Instrument Co., 1518.
Cambridge School of Flying, 861, 1153, 1208, 1257, 1294, 1356.
Camera Club, 781.
Canada, aviation in, 55, 89, 189, 200, 247, 344, 438, 458, 548, 549, 580, 590, 607, 646, 650, 674, 820, 895, 1153, 1186, 1199, 1294, 1397, 1405, 1452, 1458.
Canada, gifts to, 110, 115, 194, 209.
Canadian airmen, 593, 718, 964.
Canteen profits, 1036.
Cape-Cairo air route, 17, 175, 247, 775.
Caproni biplane, 182, 204, 237, 684, 1053, 1159, 1160, 1172, 1203, 1645.
Caproni, Sig., 118.
Caproni triplane, 599, 797, 1201, 1512, 1644, 1645.
Captured aeroplanes, 511, 528, 1053.
Carburettors, 93, 1086, 1191, 1383, 1428, 1631.
Carr, Maj. R. H., 811, 1021.
Cartoons, 934, 1165, 1610.
Casale, M., 1252, 1253.
Case, John, on Stresses in Braced Structures, 704, 904.
" Castrol " (*see also* Wakefield), 93, 325, 963, 1138.
Cato engine, 1341.
Cato sporting monoplane (details), 1334.
Cattewater Old Boys, 1603.
Cattle, A. J., 1521.
Caudron biplane, 141, 204, 237, 1158, 1397, 1644, 1645, 1648.
Cave-Brown-Cave, Wing-Com. T. R., on Airships, 410, 441, 1260.
Cellon, Ltd., 926, 1000.
Cellulose acetate, 926.
Cellulose inquiry. *See* British Cellulose Mfg. Co.
Central Aircraft Co., Ltd. (*see also* C.A.C. biplane), 158, 1435, 1513.
Chairs of Aeronautical Engineering, 267, 726, 745, 1082.
Chamberlayne, Capt. P. R. T., 472, 810, 1021.
Chambre Syndicale des Industries Aeronautique, 1383.
Charlton, Air Commodore, L. E. O., 259, 261.
Charlton Rope Works, 1515.
Chart for estimating aeroplane performances, 1342.
Charts. *See* Maps: Curves; Comparative charts.
Chevrons. *See* Badges.
Chevrons Club, 256.
Chili, 55, 640, 646, 1397, 1517.
Chillcott, Commdr., 593.
China, 344, 521, 1336, 1368, 1410, 1458, 1626, 1635.
Chloride Electrical Starting Co., 861, 1299.
Christiaens, J. C. H. (death of), 325.
Christmas biplane, 207, 511.
Chronicles of 55 *Squadron*, 684.
Churchill, Mr. Winston, 63, 179, 225, 269, 615.
Circuit of Britain flight, 633.
Citizen Guard, 1332.
Civil Aerial Transport (C. Grahame-White), 198.
Civil Aerial Transport Committee, 22, 119, 150.
Civil aviation abroad (*see also* Trade, foreign), 1638.
Civil Aviation Department. *See* Air Ministry.
Civil Aviation (Maj. Gen. Sir F. H. Sykes), 571.
Civilian aerodromes, flying at, 211, 339, 492, 544, 549, 550, 607, 633, 649, 668, 771, 880, 920, 1021, 1057, 1097, 1120, 1153, 1225, 1256, 1294, 1321, 1377, 1404, 1428.
Clark, Robert Ingham, and Co., 655, 1355.
" Clarocit," 189.
Classes. *See* Schools.
Claudel-Hobson carburettor, 93, 1383, 1636.
Clement (Louis) aeroplanes, 1643, 1644, 1645.
Clements, Mr., 1458.
Clothing, 351, 753, 963.
Clubs, flying, 458, 726, 860, 864, 914, 993, 1166, 1257, 1280.
Clubs for service men (*see also* R.A.F. Club), 45, 256, 392, 583, 721, 836, 879, 978, 982, 1001, 1324.
Coal, 932.
Coatalen, L., 521.
Cockerell, Capt., 1113.
Coefficient Nomenclature in Aerodynamics (C. H. Powell), 371.
Cole (Wm.) and Sons, 896.
Columbia, aviation in, 782.
Commercial and Pleasure Flying (C. Grahame-White), 272.
Commercial Aviation. *See* Civil Aviation; Civil Aerial Transport Committee; Transport.
Commercial Aviation (S. A. Hirst), 376.
Commercial Aviation (G. Holt Thomas), 701.
Commercial Aviation (Hon. Sir C. A. Parsons), 1234.
Commercial Aviation (Maj. Gen. Sir F. H. Sykes), 84, 571, 701.
Compagnie Générale Transaerienne biplane, 1643.
Company matters. *See* Weekly.
Comparative charts, 201, 204, 237, 238.
Comparisons between aeroplanes and airships, 144, 266, 1234.
Competitions. *See* Prizes.
Conflenti, Sig. R., 1249.
Constantinople, flight to, 79.
Construction and erection. *See* Rigging.
" Consuta " system, 184.
Control of aeroplanes, 447, 496, 625, 664, 856, 925.
Control of the air. *See* Law; Air Ministry (Civil Aviation Dept).
Conway, Sir Martin, 1202.
Cook, Maj., 1011.
Cooper, Sir R. E., 1628.
Copley, S. W., 1074.
Correspondence, 149, 672, 1035, 1069, 1102, 1137, 1382, 1544.
Correspondence courses, 257.
Cosmos engine, 675, 687, 737, 869, 1279, 1651, 1652.
Courtney, Lt. F. T., 732, 1069. On Stunt Flying, 1187.
Courtney, Wing Com., C. L., 814.
Cowley, W. L. and H. Levy, on Performance of Aeroplanes, 13.
" Crime in the R.A.F.," 83, 182, 409, 445.
" Crossing the Coastline," 1609.
Crossley Motors, Ltd., 16, 29, 30.
Crossley, Sir Kenneth, 29.
Crowds, flying over. *See* Danger to Public.
Crown of the Year (H. Massac Buist), 1617.
Croydon aerodrome, 1616.
Curtis, Lt., W. R., 1137.
Curtiss biplane (18-B) (details), 902.
Curtiss flying boat, 35.
Curtiss triplane, 698, 1294.

474506

Curves and graphs, 13, 235, 275, 277, 311, 346, 275, 277, 561, 644, 704, 743, 836, 959, 1052, 1079, 1192, 1498, 1509, 1555, 1559.
Customs duties, 1031, 1456, 1669.
Cypress. *See* Wood.
Czecho-Slovakia, aviation in, 1656.

DAILY EXPRESS, 31, 162, 953.
Daily Express £10,000 prize, 960, 1016.
Daily Herald, 1330.
Daily Mail, 4, 296, 384, 455, 489, 690, 891, 1270, 1330.
Daily Mail Atlantic prize. *See* Atlantic flight.
Daily Telegraph, 130, 160, 1199, 1322.
Damage by aeroplanes, 608, 617, 789, 1100.
Damascus to Baghdad, 1032.
Danger to public, 608, 756, 1056.
D'Annunzio, Capt., 481.
D'Annunzio, Sig. G., 19, 964, 1263, 1290, 1435, 1458, 1513.
Darwin, Sir H., on Static Head Turn Indicator, 1429.
Davis, G. H., 719.
Davis (J.) and Co., 861.
Dawnay (Archibald) and Co., 861.
Dawnay, Gen. G., 1575.
Dawson, Sir Trevor, 887.
Decorations. *See* Honours.
Defence, Ministry of, 96, 192.
Defence of the Realm Act, 428.
De Havilland biplane (*see also* "Airco"), 1273, 1406, 1595.
De Havilland, Capt. G., 1100, 1387.
De Havilland, Commander H., 550.
De Havilland "Milestones." *See* "Airco."
Delag airship. *See* "Bodensee."
De Marcay biplane, 1298, 1643, 1645, 1646.
Demobilisation, 57, 106, 162, 180, 284, 322, 383, 453, 485, 486, 652, 716, 796, 1131, 1169, 1487.
Demobilised men, work for. (*See also* Resettlement of Personnel, 360, 422, 1170.
Denmark, 565, 624, 818, 996, 1000, 1047, 1111, 1119, 1130, 1136, 1202, 1627.
Denny radiator, 779.
Dental surgeons, R.A.F., 919.
Derby, aerial, 774, 796, 806, 827, 828, 837, 852, 881.
Derby, flying to the, 745.
Desert, flights across. *See* Sahara.
Design (*see also* Engine Design), 260, 276, 310, 345, 506, 673, 853, 874, 915, 955, 987, 1013, 1048, 1079.
Desoutter, R. L., 171, 789.
Despatches, mentioned in, 12, 49, 76, 135, 179, 475, 499, 823, 1195, 1350.
Despatches, war, 50, 52; 81, 499, 526.
Deutsch de la Meurthe, H., 923. Death of, 1522.
Deutsch (H.), Cup, 1236, 1368, 1377, 1392, 1397, 1422.
Developments in Aircraft, Design and Application (Lord Weir), 955, 987, 1013, 1048.
Devonshire, Duchess of, 115.
D.F.W. biplane, 1376. Details, 1274.
D.H. aeroplanes. *See* De Havilland.
Dick (W. B.) and Co., 1573.
Dickenson and Boutell on the Altitude Laboratory for Testing Engines, 1378, 1398.
Discharged men. *See* Demobilised men.
Dissolved Acetylene Co., Ltd., 30, 896, 1299, 1355, 1670.
Distinguished Flying Cross (*see also* Honours), 975, 1164, 1188.
Distinguished Service Order. *See* Honours.
Dogs, 82, 549, 716, 746, 789, 894.
Dopes. *See* Varnishes.
Dornier giant flying-boat, 1258.
Douglas, Lt. R., 1444, 1484. Death of, 1497.
Douglas-Pennant, Miss, 293, 382, 486, 544, 749, 789, 959, 1170, 1234, 1488, 1576, 1633.
Dowding (G. W.) and Co., 1267.
"Dragonfly" engine. *See* A.B.C.
Draper, Maj. C., 810, 1021, 1113, 1162, 1383, 1438, 1490.
Drawing Office Data (E. O. Williams), 512, 536, 561, 596, 643.
"Dream-flights," 317.
"Dry Humour," 1165.
Drzewiecki system of propeller design, 1156.
Duckham (Alex.) and Co., Ltd., 487.
Duckham, Sir Arthur, 193, 291.
Dundee Advertiser, 1231.
Dunford and Elliott, Ltd., 1299.
Duralumin, 682, 713, 988, 1257, 1410.
Durrant, Lt. R. F., 945, 1011.
Dutch. *See* Holland.
Duval, Gen. On Aviation in France, 1327.
Dyott, G. M., on aerial transport in Peru, 748.

"EAGLE engine." *See* Rolls-Royce.
East London College, 726, 745, 1056.
East London Rubber Co., 223, 257, 291, 454.
Eastbourne, 1549.
Echo de Paris competition, 456.
Edge, S. F., 19.
Education, 151.
Efficiency tests for pilots. *See* Medical.
Egypt, 135, 260, 322, 408, 428, 775, 913, 1108, 1295, 1412, 1431, 1460, 1515, 1564 1588 1601, 1622.
Election, the general, 21.
Elementary Navigation for Aircraft Pilots (A. W. Brown) 500, 546.
Ellington, Air Vice-Marshal E. L., 391.
E.L.T.A. Show. *See* Amsterdam Air Exhibition.
Emaillite. *See* British Emaillite.
Empire Aspects of Aviation (Maj. Gen. F. H. Sykes), 271.
Engine, a new German, 996.
Engine design, 959, 1048, 1086, 1191.
Engine repairs, 882.
Engine starter, 1042.
Engine superchargers, 1086, 1191, 1555.
Engine, variation of h.p. with altitude, 1559.
Engines, American and foreign, table of Specifications, 201.
Engines, testing of, 1378, 1398, 1559.
Engines :—
  A.B.C., 201, 452, 818, 1049, 1526.
  Armstrong-Siddeley, 1651.
  Bassé-Selve, 297.
  Beardmore, 201, 1050, 1332, 1344.
  Bentley, 1049.
  B.R., 143, 189, 201.
  Cato, 1341.
  Cosmos, 869, 1651.
  Galloway, 201, 1050.
  Gnome, 1049.
  Hispano-Suiza, 199, 201, 1050, 1496.
  Kerner, 1158.
  Liberty, 6, 201, 1191.
  Mercedes, 233.
  Napier, 93, 397, 1050, 1137, 1652.
  R.A.F., 1050.
  Renault, 1049.
  Rolls-Royce, 113, 139, 201, 1050.
  Siddeley, 429, 1049.
  Siemens-Halske, 334.
  "Still," 721.
  Sunbeam, 201, 236, 239, 1035, 1653.
England, E. C. Gordon, 356.
England, W. Cecil, 1604.
English Electric Co., Ltd., 421.
Evening News, 1270, 1290.
Evening Standard, 31, 455, 892, 1291, 1406, 1439, 1450.
Excess profits duty. *See* Taxation.
Exhibition flying, 384.
Exhibition (*see also* Imperial War Museum), 77, 141, 149, 175, 384, 385, 428, 461, 509, 526, 715, 734, 799, 884, 896, 922, 982, 993, 1023, 1056, 1111, 1149, 1154, 1234, 1263, 1264, 1291, 1374, 1433, 1482, 1505, 1513, 1603.
Experimental Design and Testing of Aeroplane Ribs (C. B. Fuller and L. Milburn), 1079.
Experimental manufacture, 10.
Experiments (*see also* Research ; Tests), 390, 816, 1533.
Exports and Imports. *See* Imports.

F. 5 L. flying boat, 1024, 1058.
Fabrics, 222, 374, 413, 481, 485, 486, 830, 1453.
Factories (*see also* National aeroplane factories), 1056.
Fairbairn-Crawford, Capt. I. F., 1039.
Fairey, C. R., 1073.
Fairey seaplane, 409, 478, 535, 607, 987, 1182, 1223, 1246, 1251, 1279.
Farman biplane, 141, 237, 1397, 1452, 1596, 1597, 1644, 1645, 1648, 1649.
Farman "Goliath," 55, 142, 149, 222, 232, 480, 633, 1170, 1234, 1648. Details, 1318.
Farman, Maurice, 816.
Farringdon Propeller Co., 1161.
F.B.A. flying boat, 237.
F.E. biplane, 1014, 1597.
Federation Aeronautique International, 474, 566, 661, 720, 735, 1368, 1414, 1473, 1659.
"Felixstowe Fury," 1096.
Fellows Magneto Co., Ltd., 688.
Fenn, Mr., 1458.
Festing, Brig.-Gen., 1149.
F.F. machines. *See* Friedrichshafen.
Ffiske, Maj. H. G., 1105.
Fiat biplane, 992, 1159, 1644, 1645.
Fiat Co., 292, 1101.
Films, 551, 646, 790.
Finance. *See* Air Force Estimates ; Air Ministry Expenditure : Subsidisation ; Taxation ; Victory Loan.
Finland, 1012, 1111, 1136, 1452, 1517.
Fire, 576, 847, 982, 1236.
Fire brigades, aerial, 182, 673, 820.
Fisher, Lord, 1361, 1439, 1457, 1483, 1629.
Fisher, A., 1628.
Fitzpatrick, Gen., 921.
Flight Aspects of Supercharging (B. Thomson), 1555.
"Flight in the Near Future," 559.
Flying, bad, 1270, *see also* Landing.
Flying boat hulls, 184, 481, 915, 917, 1026, 1059.
Flying boat and seaplane services, 86, 211, 280, 447, 753, 860, 923, 960, 1020, 1097, 1101, 1120, 1202, 1256, 1294.
Flying Boats, Design and Construction of (Capt. D. N. Nicholson), 874, 915.
Flying boats, 5, 35, 89, 113, 114, 115, 165, 237, 379, 384, 417, 573, 583, 637, 716, 874, 894, 915, 926, 934, 1006, 1012, 1024, 1058, 1090, 1096, 1111, 1115, 1185, 1188, 1202, 1223, 1242, 1247, 1258, 1344, 1345, 1550, 1643, 1657.
Flying Services Fund (*see* also Royal Aero Club, 657, 1442, 1465.
Fog, 121, 272.
Fokker, M., 782, 1155, 1300.
Fokker biplane, 577, 1155, 1157, 1328, 1333.
Fokker triplane, 591.
Folkestone, 198, 280, 309, 350, 830, 1178, 1327.
Folland, H. P., 1577.
Foncke, R., 115, 861, 953.
Food by aeroplane, 10, 143, 210, 314, 317, 422, 1067, 1092. "Food Carriers, The," 493.
"Forecast A," 229.
Forward Motor Co., 30.
Fowler, Sir Henry, 425.
France, Aero Club of, 858, 923, 928.
France, civil aviation in, 616, 703, 1190, 1212, 1327, 1625, 1638.
Francis Mond Professorship, 1082.
Fraser, Corpl. G. H., 1445.
Free Ballooning. *See* Ballooning.
Freemasons, 651.
French aerodromes, 847.
French Aerial League prize. *See* Prix de la Ligne.
French Air Service, 88, 571, 581, 852, 858, 1490, 1616.
French airships, 290, 1178, 1315, 1595, 1646.
French army aeroplanes, 204, 205.
French aviators (*see also* Fonck, Nungessor, Lecointe, Vedrines), 115, 953, 948, 1090, 1092, 1158, 1170, 1344, 1355, 1380, 1382.
French competitions. *See* Prizes ; Tour de France.
French Government, 88, 616, 652, 703, 919, 1009, 1212, 1304, 1327, 1414, 1435, 1522, 1538, 1552, 1595, 1625, 1638, 1646.
French mail services, 118, 433, 473, 510, 671, 1638.
French records. *See* Records.
French war losses. *See* War Casualties.
Friedrichshafen biplane, 1055.
Friedrichshafen "Milestones," 1371, 1394.
Fuels, 499, 1104, 1212.
Fuller, G. B., and L. Milburn on Design and Testing of Aeroplane Ribs, 1079.
Fullerton, Col. J. D., 1270.
Fuselages 134, 497, 626, 630, 834, 886, 939, 987, 1058. 1218, 1220, 1230, 1277.
Future, The, 1272.
Future of aviation, 16, 84, 271, 376, 489, 559, 701, 820, 1439, 1450, 1466, 1478.

GALLOWAY engine, 201, 1050.
Gamage (A. W.), Ltd., 963.
Gamblanc, L., 1538.
Gammeter Multigraph, 861. Gammeter valves, 1455.
Gas. *See* airships, gas, for.
Gathergood, Capt. G., 773, 811, 838, 840, 1101, 1553.
Gattie clearing house, 1210, 1230.
General Aeronautical Co., Ltd., 1237.
Gent and Co., 790, 1138.
George, D. Lloyd, 804, 884, 965.
German aerodromes, 1380.
German aeroplanes, 18, 60, 281, 282, 315, 331, 332, 385, 511, 528, 544, 565, 574, 616, 624, 703, 719, 1053, 1055, 1198, 1257, 1258, 1274, 1311, 1343, 1345, 1371, 1376, 1394, 1434, 1460, 1592, 1593, 1638.
German air services, 60, 211, 256, 267, 385, 422, 443, 524, 684, 734, 964, 966, 986, 991, 1236, 1257, 1278, 1380, 1422, 1440, 1517, 1626, 1638.
German aircraft material, 15, 46, 56, 60, 77, 114, 267, 1350, 1375, 1460.
German airships (*see also* Zeppelin), 1038, 1068, 1165, 1175, 1231, 1289, 1508.
German aviators, 118, 1257, 1258, 1355.
German engine, 996.
German Navy, 21, 817.
German records. *See* Records.
Germany and the war, 1375.
Germany, views in, 577.
Giant aeroplanes. *See* Dornier ; Farman Goliath ; Handley Page ; Linke-Hofmann ; Zeppelin.
Gift of engine, 1328.
Gifts of aeroplanes, 16, 110, 115, 194, 198, 209, 758, 789, 792, 913, 1190, 1350, 1414, 1488.
Glazebrook, C. T., 841.
Glazebrook, Sir R., 1628.
Glidden, C. J., 1198 ; Glidden Trophy, 1236.
Gnome engine, 1049.
"Gnu" biplane. *See* Sopwith.
Godefroi, C., 1090.
Goldberg, Y., 1267.
Goldsmiths and Silversmiths Co., Ltd., 487, 521, 861.
Gordon Bennett trophies, 720, 1422.
Gosport Aircraft Co., 189, 481, 963, 1020.
Gosport flying-boats, 1006, 1115, 1657.
Gotha biplane, 15, 282.
Gourdon-Leseurre monoplane, 1472.
Grafton Galleries exhibition, 459-467, 526, 527.
Grahame-White "aero-limousine" (details), 1214
Grahame-White "Bantam" biplane (details), 468, 811.
Grahame-White biplane, 473, 810, 819, 842, 921, 1021, 1340.
Grahame-White, C., 691, 728, 730, 839.
Grahame-White, C., on Civil Aviation, 198, 272.
Grahame-White Co., Ltd., 158, 217, 649, 670, 779.
Grand Prix *l'Avenir*, 751.
Grant, Lady Sybil, 1234, 1264, 1376.
Great Northern Aerial Co., 245, 1437.
Greece, aviation in, 158, 581, 752, 1456, 1554, 1626.
Greenland, Capt., 1011.
Grey, C. G., 923.
Grey, Lt.-Col. Spenser D. A., 1271.
Grieve, Com. K. Mackenzie-, 660, 678, 689, 694, 695, 735, 1458.
Groves, Air Commodore R. M., 865.
"Guardian Angel" parachute, 521, 575.
Gun, anti-aircraft, 1633.
Guns on aircraft, 18, 114, 760, 862.

HAIG, Field Marshal Earl, 81, 499, 526.
Hale, F. Marten, 247.
Halliwell, F. W., on Rigging, 107, 132, 176.
Halton camp, 660,

Hamburg-New York, 60.
Hamel, Gustav, 809.
Hammersley, Capt. H. A., 812, 839.
Handasyde, G. H., 1141.
Handley Page biplane, 17, 56, 79, 140, 238, 290, 291, 319, 351, 408, 433, 444, 478, 486, 504, 511, 521, 522, 544, 549, 575, 607, 633, 668, 684, 708, 720, 780, 794, 816, 884, 885, 905, 952, 957, 989, 992, 1015, 1114, 1115, 1130, 1162, 1340, 1377, 1456, 1464, 1594, 1597, 1615, 1618, 1630, 1635, 1636, 1643, 1646, 1654.
Handley Page commercial flying data, 1554.
Handley Page, F., 236, 525, 1300.
Handley Page, Ltd., 585, 668, 1020, 1101, 1190, 1410, 1438, 1456, 1489, 1592.
Hangars, 292, 486, 891, 1036, 1515.
Hanriot-Dupont aeroplane, 237.
Harris, Capt. Guy, 945, 1011.
Harrrods, Ltd., 328, 487.
Hart Accumulator Co., 487.
Havilland. *See* De Havilland.
Hawker, H. G., 30, 660, 678, 689, 694, 695, 716, 729, 730, 731, 735, 739, 813, 1224, 1253, 1458.
Hawker-Grieve welcomes, 735, 986.
Health. *See* Medical.
Health Aspects of Aeronautics (Capt. T. S. Rippon), 318.
Hearson, Brig.-Gen. J. G., 227.
Heat treatment of engine parts, 221.
Heckstall-Smith, Maj. S., 1303.
Height. *See* Altitude; Records.
Helicopters, 1477, 1661.
Helium gas, 94.
Henderson, Lt.-Col. G. L. P., 810, 1322, 1518.
Henderson, Lt.-Gen. Sir D., 55, 1322.
Hendon, flying at, 649, 670, 727, 728, 771, 779, 819, 880, 920, 985, 1021, 1057, 1092, 1130, 1164.
Hervieu hangar, 1036.
Hervue, Mdlle J., 486.
Hewett, Sq-Ldr. H. E. J., 1511.
Hewlett and Blondeau, Ltd., 209.
Hicks, Lt. G. R., 921, 1021.
Hill, Sq. Ldr. Roderic, pictures by, 229, 393, 493, 559.
Himalayas, 667.
Hirst, S. A., on Commercial Air Service, 376 487.
Hispano-Suiza engine, 199, 201, 1050, 1485, 1490, 1496, 1559.
Historic flights, 828. History, early, 482, 1459, 1485.
Hobbs, Sqdn.-Com., 1247.
Hobson, H. M., Ltd., 487, 805.
Hoffmann Mfg. Co., Ltd., 720.
Holland (*see also* Amsterdam air exhibition), 88, 317, 417, 433, 510, 758, 1117, 1149, 1190, 1212, 1233, 1256, 1267, 1380, 1452, 1464, 1522, 1572, 1592, 1626.
Holt, Lt.-Col., 1199.
Honours, civil, 17, 88, 560, 747, 788, 827, 830, 881, 884, 1085, 1106, 1163, 1654.
Honours and medals, War, 12, 29, 47, 76, 106, 135, 179, 213, 241, 270, 428, 475, 499, 720, 734, 783, 823, 830, 884, 923, 975, 983, 984, 985, 1017, 1028, 1032, 1040, 1082, 1085, 1108, 1136, 1163, 1169, 1188, 1195, 1322, 1350, 1369, 1404, 1414, 1422, 1501, 1542, 1590, 1658.
Hopkinson memorial, 577.
Horse-power Variation with Altitude and Compression Ratio, 1559.
Hotels and the Air Ministry, 492, 509.
Hounslow aerodrome (*see also* A. V. Roe and Co.), 668, 670, 734, 1057, 1120, 1225, 1256, 1294, 1321, 1442, 1543.
Hovering flight, 1603.
Howell, Capt. C.E., 1445, 1578, 1580. Death of, 1621.
H.S. flying boats (details), 1550.
Hubbard, Lt.-Col. T. O'B., 1359.
Hucks, the late Capt. B. C., 403.
Huggins, Brig.-Gen. A., 359.
Hughes, W. M., 919.
Human-driven aeroplane. *See* Man-propelled.
Humber, Ltd., 143, 711.
Humorous pictures, 19, 83, 112, 182, 316, 409, 445, 648, 709, 851, 934, 985, 1165, 1200, 1264, 1291, 1324, 1377, 1433, 1457, 1538, 1563, 1593, 1610, 1641, 1660.
Humphrey, G. H., 125.
Hungarian airship, 1278.
Hunsaker, J. C., on Airship Engineering Progress in the U.S., 1423, 1453, 1474, 1502.
Hunter, G. T. F., 1164.
Hunting *See* Sport.
Hydro-aeroplanes. *See* Flying-boats; Seaplanes.
Hydrogen, 45, 414, 862, 1261.
Hydrophobia. *See* Dogs.

ICELAND, 954, 1542.
Identification marks, 1082.
Ignition (*see also* Magnetos), 126, 224.
Imber petrol tank, 576, 605, 1591.
Imperial Air Fleet Committee, 81, 128, 157, 913, 1488.
Imperial air routes, 1588, 1606.
Imperial War Museum, 444, 886, 1483.
Imports and exports (*see also* Customs duties), 94, 224, 388, 522, 656, 826, 930, 1102, 1238, 1384, 518, 1604.
Imports and exports, prohibited, 232, 521.
Improved Liquid Glues Co., 1161.
" In a Kite Balloon," 19.
Inclined Struts and Wires (C. A. Wright), 913.
Independent Air Force, 32, 52, 814.
India, aviation in, 433, 548, 667, 777, 857, 913, 960, 1047, 1135, 1279, 1320, 1386, 1404, 1414, 1433, 1494, 1522, 1564, 1590, 1616.
India-Australia, 913.
India-Egypt, 913.
India, flights to, 17, 88, 118, 134, 140, 511, 1170, 1297.
Indicators. *See* Sir Horace Darwin.
Industrial League and Council, 247, 433, 499, 593, 701, 758, 1300.
Industry. *See* Civil Aviation; Labour; Trade; Production of aircraft.
Inglis, Prof. C. E., 446.
Inspection of aircraft, 590, 614.
Institution of Petroleum Technologists, 1520.
Instone (S.) and Co., 1383.
Instruments, 87.
Insurance, 114, 143, 209, 223, 281, 284, 322, 330, 339, 344, 392, 422, 438, 454, 456, 467, 485, 502, 617, 721, 745, 749, 872, 1263, 1456.
Inter-Imperial Communication (Sir C. Bright), 1257.
International Air Navigation Convention, 2, 159, 474, 510, 707, 749, 994, 1004, 1029, 1148, 1254, 1388, 1405, 1494.
International Commission for Air Navigation, 995.
International flying, 612, 1056, 1062, 1190, 1233, 1435. Leaders on, 296, 490, 556.
Inventions (*see also* Patents), 322, 383, 385, 416, 752, 862, 895, 963, 1036. Inventors, 615, 879.
Inverforth, Lord, 850.
Ireland, flights to and from, 134, 544, 667, 708, 892, 1397, 1437. Landing grounds in, 402, 1198.
Irish Aerial Derby, 1090, 1130.
Isaac, Bernard, 708.
Isaacs, Godfrey, 754.
Isle of Man, 118, 1097, 1120, 1153, 1377.
Isle of Wight, 1097, 1256.
Italian airships, 184, 1258, 1477.
Italian army aeroplanes, 237, 642.
Italian aviators, 222, 433, 571.
Italian Government, 752, 923, 1656.
Italy, aviation in, 134, 182, 228, 344, 355, 416, 463, 581, 667, 684, 884, 1053, 1242, 1264, 1278, 1323, 1325, 1380, 1414, 1422, 1508, 1522, 1625, 1638.
Italy to Japan, 964, 1256, 1435.
Italy to Spain, 847, 1233.

" JACKALS, The," 1075.
Jacobs, W. A., and R. J., 1355.
Jacques Schneider Cup. *See* Schneider Trophy.
Japan; aviation in, 56, 581, 590, 964, 1188, 1452, 1626. Japan, flight to, 964, 1256.
Janello, Sig., 1249.
Jellicoe, Admiral Lord, 1433, 1563.
Jennings (F. A.), Ltd., 421.
J.N. aeroplane, 238.
Johnson, Claude, 1003, 1004, 1594, 1628.
Johnson, Dr., and aviation, 182.
Jonas, Colver and Co., 158.
Joynson-Hicks, Sir W,, 112, 1085, 1106, 1358.
Junkers monoplane, 1434.
" Jupiter " engine. *See* Cosmos.

KAISER, the ex-, 403, 674, 1238, 1593.
Kay, Sergt. T., 1366, 1385, 1396.
Kenworthy, J., 1639.
Kenworthy, R. W., 1162, 1208, 1310, 1352.
Kerner engine, 1158.
Kerr Steamship Co., 511.
Kilner, Wing-Com., 1263.
King George, 269, 281, 804, 817, 827, 830, 885, 965, 996, 1465.
King, Miss Daisy, 729.
Kipling, Rudyard, 1165.
Kite-Balloon Experiments (G. Brewer), 1533.
Kite balloons, 19, 579, 752, 862, 929, 1144, 1164, 1212, 1273, 1476, 1494, 1573.
K.L.G. sparking plug, 126, 896, 1000, 1158.
Koolhoven, F. (*see also* " Bat " biplane), 819, 1113, 1211.

L. AND P. aerodrome. *See* London and Provincial.
Laboratories. *See* Altitude laboratory; National Physical Laboratory.
Labouchere, Lt., 1158.
Labour in the aviation industry, 124, 932.
Labour outlook (*see also* Strikes), 360, 724.
Laddon, I. M., on Prediction of Aeroplane Performance, 1343.
Lalley, Capt., 1350.
Lambert, Rear-Admiral C. F., 589.
Lamps, 1410.
Lancashire Flying Club, 993.
Lanchester, F. W., 998.
Landing across wind, 935, 1179.
Landing, bad, 795, 1005.
Landing fees, 1035.
Landing gear. *See* Stresses.
Landing grounds. *See* Aerodromes.
Landing stages for airships, 914.
" Land's End," 585.
Lang, Capt., 45, 131.
Lang Propeller, Ltd., 30.
Lansdowne, Lt.-Com. Z., 945.
Large Aeroplanes (B. Thomson), 1292.
" Last Loop, The," 1213.
Latécoère biplane, 1644, 1645.
Law, aerial (*see also* Legal cases; International Air Convention; Regulations), 232, 250, 284, 296, 330. 474, 490.
Law, Mr. Bonar, 81, 142.
Law, Miss Ruth, 780.
Lawson " aerial transport," 1220, 1257.
Lazilite Co., 1383.
League of Nations, 162, 182, 192, 986, 995.
Lecointe, S., 1092, 1236, 1252, 1253, 1325, 1397, 1646.
Lectures and papers, 79, 84, 149, 189, 198, 271, 272, 276, 309, 376, 410, 433, 499, 569, 593, 600, 650, 680, 685, 701, 721, 748, 777, 853, 868, 874, 881, 955, 1199, 1257, 1260, 1297, 1300, 1321, 1429, 1456, 1494, 1520, 1570.
Ledeboer, Maj. J. H., 773, 841.
Lees, Miss Nancy, 1595.
Legal cases, 190, 224, 492, 615, 862, 1375, 1566.
Legh, the late Peter, 616.
Legislation. *See* Laws.
Lepaerial Travel Bureau, 687, 753, 1299.
Lepere aeroplane, 238.
Le Rhone engine, 1328.
Letord biplane, 204.
Letts, W. M., 29.
Levasseur (Pierre) biplane, 1645, 1646.
Leverhulme, Lord, 56.
Levy, H. *See* Cowley and Levy.
" Lewisite " poison, 709.
L.F.G. biplane. *See* Roland.
Liberty engine, 6, 201, 758, 1191.
Licences, 1494, 1506.
Life-saving, 88.
Lift coefficient, 275.
Lighter-than-air Craft (Lt.-Col. Cave-Brown-Cave), 410, 441.
Lighthouses, 294, 1442.
Linen (*see also* Fabrics), 830, 857, 866, 922.
Linke-Hofmann giant biplane (details), 1311.
" Lion " engine. *See* Napier.
Liverpool, flying at, 1022.
Lloyd (A.) and Sons, 1208.
Loch Doone aerodrome, 438.
Lodge, Sir Oliver, 747.
Lodge Plugs, Ltd., 1463.
Log-books, 1494.
Lohner seaplane, 237.
Loire et Olivier flying boat, 1643, 1645.
London aerodrome. *See* Hendon.
London and Provincial Aviation Co., 550, 753, 773, 774, 924, 966, 1002, 1138.
London Flying Club, 458, 860, 864, 1166, 1280.
London-Berlin, 1618, 1630.
London-Paris records, 428, 509.
London-Paris services, 319, 373, 624, 1130, 1149, 1176, 1188, 1233, 1256, 1264, 1298, 1306, 1310, 1328, 1337, 1358, 1376, 1384, 1438, 1456, 1463, 1464, 1489, 1554, 1570, 1601, 1604, 1636, 1654.
London University, 726, 745.
London, views of, 459, 867, 901, 1367.
Londonderry, Marquess of, 99, 293.
Long-distance flights, (*see also* Atlantic; Australia), 17, 79, 89, 118, 134, 313, 344, 355, 548, 624, 650, 684, 751, 753, 847, 852, 858, 992, 996, 1047, 1100, 1136, 1137, 1233, 1242, 1256, 1267, 1618.
Longcroft, Air-Commodore C. A. H., 953.
Longley, Charles, 1237.
Looping, 669, 674, 693, 1041, 1213, 1459, 1565.
Lord Mayor of London, 805.
Luck, Lt. H., 945, 1011.
Lyons, Col. H. G., 1628. On Meteorology, 149.

MACCHI flying boat, 237.
MacEwan, Gen., 17, 134.
Machin, Lt. G. D., sketches by, 19, 83, 112, 182, 316, 409, 445, 648, 709, 851, 934, 985, 1165, 1199, 1200, 1231, 1263, 1264, 1290, 1291, 1322, 1324, 1350, 1433, 1457, 1483, 1511 1538, 1563, 1593, 1610, 1629, 1641, 1660.
Madgwick, Ltd., 126, 1299.
Madrid, flights to and from, 313, 349, 383, 1100, 1137, 1635.
Magnetos (*see also* Ignition), 61, 189, 521.
Mails, 18, 22, 25, 56, 118, 121, 209, 211, 238, 247, 262, 294, 309, 339, 349, 350, 351, 358, 373, 375, 385, 433, 445, 473, 502, 509, 510, 548, 577, 593, 615, 640, 667, 671, 734, 752, 782, 830, 868, 892, 913, 919, 928, 968, 982, 1047, 1111, 1178, 1240, 1278, 1279, 1310, 1320, 1323, 1327, 1330, 1337, 1340, 1357, 1414, 1452, 1465, 1484, 1517, 1543, 1590, 1592, 1601, 1616, 1633, 1640, 1654, 1656.
Maintaining Constant Pressure before Carburettors of Aero Engines (L. Spencer), 1086, 1191.
Maitland, Air-Com. E. M., 161, 906, 945, 996, 1010 1011.
" Making the World Feel Small," 1610.
Man-propelled aeroplane, 1090, 1375.
Manchester aerodrome, 1153, 1595.
Mann, R. F., on Radiator Position, 1338.
Mann, Egerton and Co., Ltd., 258.
Mannock (the late Maj. E.), V.C., 983.
Manton, Marcus D., 356, 734, 811, 1306.
Maps and Charts, 53, 149, 197, 376, 567, 600, 694, 752, 775, 806, 807, 888, 907, 945, 1030, 1110, 1365, 1580, 1619.
Marconi Co., 740, 1161.
Margate, flying at, 1057, 1120, 1225, 1256.
Marr, Capt. P. G., on Aerial Smuggling, 307, 355.
Martin, H. P., 850 1141.
Martin (Glenn) biplane, 271.
Martinsyde biplane, 810, 812, 845, 1013, 1014, 1445, 1578, 1580, 1621.
Martinsyde, Ltd., 998, 999.
Martinsyde Transatlantic biplane, 478, 635, 640, 964, 996.
Mascots, 1206, 1291, 1490.
Mason, Mr., 1458.
Mather (R.) and Son, 790.
Matthews, Capt. G. C., 1366, 1385, 1396, 1414, 1432, 1497.
May, Harden and May, 89.
Mayfair, 223, 790.
Mayne, Lt., 746.
Mayo, Maj., 1224.

McClean, Lt.-Col. F. K., 1224, 1241, 1253.
McCrindle, Sqn. Leader, 1231.
McCudden memorial, 1627.
McGilchrist, J. (drawings by), 1243, 1273, 1333, 1609.
Medals. *See* Honours.
Medical :—
  Air-port doctor, 1284.
  Dental Surgeons, R.A.F., 919.
  Health Aspects of Aeronautics, 318.
  Medical examination of pilots, 633.
  Medical notes, 20, 108.
  Medical Service, R.A.F., 976.
  Oxygen and the Transatlantic flight, 403.
  Physical efficiency tests, 569.
Mediterranean, flights over, 134, 1618.
Memorial services, 198, 269, 1382.
Memorials, 21, 281, 549, 577, 642, 1053, 1144, 1149, 1489, 1513, 1540, 1627, 1656.
Mentioned in Despatches. *See* Despatches.
Mercedes engine (200 h.p.), 233.
" Mercury " engine. *See* Cosmos.
Merriam, Capt. F. W., 960.
Mesopotamia, 135, 286, 667.
Messageries Aeriennes, 1158.
Metal Construction of Aircraft (A. P. Thurston), 680, 710, 741.
Metals (*see also* Aluminium; Duralumin; Steel), 928, 1035.
Meteorology, 24, 25, 86, 109, 131, 149, 152, 153, 181, 264, 272, 390, 392, 641, 778, 836, 871, 886, 890, 1031, 1108, 1130, 1144, 1304, 1310, 1336, 1507.
Mexico, 751, 1136, 1234, 1432.
Meyler, Wing Com., 1483.
Michelin prizes, 1477, 1646.
Midi (Arabia), 466.
Midland Presswork Co., 61.
" Milestones," 35, 36, 83, 100, 155, 163, 198, 434, 760, 971, 1036, 1121, 1226, 1371, 1394, 1581.
Military aviation. *See* War; Royal Air Force; Air Ministry.
Mines, route of floating, 1164.
Ministry of Transport, 330, 350, 456.
" Miralite," 1035.
M.L. magnetos, 257.
Model aeroplanes. *See* Model Section at end.
Models, silver, 1206.
Monaco Seaplane Meeting, 1590.
Monaco, Prince of, 1164.
Money, Sir L. Chiozza, 162.
Monoplanes, 101, 102, 731, 812, 813, 846, 1113, 1115, 1258, 1334, 1434, 1472, 1643, 1645.
Montagu, Brig. Gen. Lord, 868, 1640.
Montagu of Beaulieu, Brig.-Gen. Lord, on Aviation as Affecting India, 777. On Aviation and World Transport, 1540, 1570.
Moore, J. H., 1069.
Moore-Brabazon, Lt. Col. J. T. C., 21, 260, 1177, 1662.
Morane biplane, 204, 1352.
Morane Challenge Cup, 1295.
Morane-Saulnier monoplane, 1645,1446.
Moreau stabiliser, 19.
Morgan, Capt. W., 678, 852.
Morning Post, 1412.
Morocco, 375, 1236.
Morris, J., on Whirling of an Airscrew Shaft, 679.
Moss turbo-supercharger, 1191.
Mosses (Alex.) Radiator Co., Ltd., 929.
" Most Annoying," 1538, 1563, 1593, 1629.
Motor and Aircraft Supplies Co., Ltd., 291, 521, 687, 1237.
Motor boat, 296.
Motor Radiator Mfg. Co. *See* Serck.
Motorless aeroplane. *See* Man-propelled.
Muir, Bedall and Co., Ltd., 553.
Mujica, Lt. A. C., 1268.
Munitions, Ministry of, 10, 34, 194, 349, 660, 850, 866, 881, 1565.
Murder and brigandage, 1136, 1206, 1432.
Murman expedition, 282.
Museums (*see also* Imperial War Museum), 1027, 1513, 1594, 1628.
My War Memories, 1376.

NAPIER (D.) AND SON, LTD., 62, 722, 1237.
Napier engine, 93, 397, 1050, 1101, 1137, 1323, 1652.
National aeroplane factories, 30, 34, 349, 383, 502, 587, 716, 792, 1460, 1563.
National Benzole Co., Ltd., 521.
National Expenditure, Committee on. *See* Air Ministry.
National Physical Laboratory (*see also* Advisory Committee Reports), 879, 1023, 1198.
National Roll of the Great War, 1063.
National War Museum, 141.
Naval warfare, aircraft in, 134, 268, 1457, 1595, 1483.
Navarre, Lt. (death of), 978.
Navarro, J. G., 963.
Navigation. *See* Air Navigation.
Navy, British. *See* Admiralty.
Navy League, 1563.
Naylor Bros., Ltd., 61, 125.
" N.C. 1," flying boat. *See* American Navy.
Nesbit, Mr., 1578.
Nestler, F. C., 819.
New Companies registered. *See* Weekly list.
New machines destroyed, 658, 792, 821, 1412, 1431.
New Pegamoid, Ltd., 1574.
" New Year R.A.F. Frolics," 112.
New York, 510, 1136, 1186, 1422.
New York World trophy, 505.
New Zealand, 256, 580, 646, 792, 1094.
Newall Engineering Co., 223.
Newall, Col., 814.
Nicolson, Capt. D., on Design and Construction of Flying Boats, 874, 915.
Nieuport biplane, 204, 237, 845, 1377, 1643, 1646, 1662.
Nieuport " Nighthawk," 78, 79, 384, 812. Details, 1524.
Nieuport seaplane, 1250.
Night flying, 24, 87, 118, 393, 667, 776, 786.
Nisbet, Lieut. R., 812, 850.
Nixon, Flt-Lieut. S., on Airship Transport, 68.
Nomenclature, 371, 1028.
Norman Thompson Flight Co., 716, 1068.
North and Sons, 61, 1636.
North British Rubber Co., 388, 929.
North, J. D., 1547. On aircraft undercarriages, 1596.
Northcliffe, Lord, 805, 954.
North East Coast Inst. of Engineers, 955.
North Sea, aircraft over, 114, 1188, 1572.
Northolt aerodrome, 880.
Norway, 433, 565, 996, 1012, 1047, 1202, 1203, 1355, 1627.
Norwegian Air Traffic Co., 55.
Nottingham, flying at, 1090, 1120, 1153, 1202, 1321.
" N.S." airship, 72, 952, 993, 1053.
Nungessor, Capt., 819, 953, 1067.

OBSERVATION. *See* Navigation.
Observation balloons. *See* Kite balloons.
Observer, The, 1357, 1485.
Observers, 380, 416.
Obsolete aircraft, 322, 544, 617, 658, 789, 1431.
" Obstruction," 445.
Oddy (W.) and Co., 790.
Odier aero-engine starter, 1042.
Oertz flying boat, 1345.
Offences in the air, 109.
Officers and pilots, groups of, 140, 181, 212, 753, 945, 1011, 1021, 1224, 1449, 1620.
Ogilvie and Partners, 1173.
Ogilvie, Lieut.-Col. A., 454, 658, 1224, 1493, 1628.
Oil, 719, 724, 756, 970, 1104, 1520.
Old Birds' Club, 978.
Old Moore's Almanack, 575.
Olympia Motor Show, 1482.
Order of the British Empire. *See* Honours, civil.
Ordnance Engineering scout, 238.
Orford, W. C. (drawing by), 317.
Out and Away, 1636.
Output of aircraft. *See* Production.
Overseas air traffic. *See* International Flying.
Overseas Club, 648.
Overseas troops, 502, 605, 606, 652.
Owen, Joseph and Son, 291, 1518, 1544.
Oxygen and the Transatlantic Flight (Capt. T. S. Rippon), 403.

PAALSON biplane, 986.
Pacific ocean, flight across, 1149, 1392.
Packing, 126.
Page, Handley. *See* Handley Page.
Paignton, flying at, 1225, 1256.
Paine, Air Vice-Marshal, Sir G. M., 65, 269, 382, 1272.
Palestine, 50, 462, 465, 1032.
Pall Mall Gazette, 1270.
Palladium Autocars, Ltd., 223, 257, 258.
Palmer Tyre, Ltd., 1327, 1355, 1383, 1636.
" Pancaking," 1005.
Papa, Lieut. Brack, 992.
Paper, price of, 622.
Parachutes, 26, 56, 428, 455, 521, 574, 575, 652, 667, 674, 685, 771, 776, 884, 1455.
Paris Aero Show, 1433, 1604, 1611, 1616, 1633.1642.
Paris, bombardment of, 1027, 1062, 1067, 1662.
Paris-Brussels service, 313.
Paris-Cairo, 1062, 1295.
Paris-Melbourne, 928.
Paris-Morocco, 716, 928.
Paris-New York prizes, 780, 1532.
Parliamentary Air Committee. *See* Air Committee.
Parnall " Panther," 988.
Parrott, Mr., 593.
Parseval-type airship. *See* Vickers " Milestones."
Parsons, Hon. Sir C. A., 1234.
Passenger services. *See* Civilian aerodromes; London-Paris services.
Patents (*see also* Weekly List of Specifications published), 224.
Payne, Maj. C. L., 118.
Peace celebrations, 919, 925, 932, 941, 953, 960, 965, 969, 975, 976, 985, 993.
Peace conference, 181, 296, 474, 490, 526, 707, 863, 984.
Peace Treaty, 621, 624, 633, 747, 885, 923, 942, 1284, 1375, 1406, 1459.
Pelterie, R. Esnault, 753.
Pensions. *See* Royal Air Force pay, etc.
" Penguins." *See* Women's Royal Air Force.
Performance of Aeroplanes (Cowley and Levy), 13.
Pernau, harbour of, 427.
Perrin, Com. H. E., 1224, 1253.
Persia, 1487.
" Personals," 57, 90, 116, 183, 217, 244, 286, 319, 352, 385, 417, 447, 480, 505, 545, 584, 651, 715, 822, 858, 925, 1032, 1062, 1085, 1203, 1265, 1295, 1325, 1354, 1370, 1409, 1427, 1489, 1516, 1542, 1569, 1599, 1627, 1667.
Peru, Aerial Transport in (G. M. Dyott), 748.
Petavel, Prof. J. E., 1198.
Peters, J. A., 1137, 1484.
Petersen, E., 921.
Petrol, 1344. Petrol tanks, 532, 576, 605, 1591.
Peugeot prize, 1090, 1375.
Pfalz biplane, 565. Details, 528.
Pfalz triplane, 1343.
Philippines, flying to, 1326.
" Phœnix-Cork " flying boat, 5.
Phœnix Dynamo Manufacturing Co., 61.
Photographs taken from aircraft, 290, 296, 331, 427, 459, 462, 463, 465, 466, 467, 510, 527, 572, 577, 668, 693, 727, 759, 799, 818, 819, 867, 900, 901, 912, 953, 976, 981, 1027, 1117, 1232, 1237, 1245, 1262, 1280, 1305, 1367, 1389, 1443, 1469, 1495, 1517, 1523, 1549, 1573, 1579.
Photography, 580, 677, 781, 816, 1091, 1100, 1370, 1460, 1505, 1515.
Piccio, Lt.-Col., 19.
Pickles, Sydney, 408, 409, 535, 607, 886, 1485.
Pigeons, 1172, 1254.
Pilot and Stunt Flying (Lt. F. T. Courtney), 1187.
Pilotless flight, 447.
Pilots, 149, 162, 181, 212, 380, 408, 446, 590, 810, 935.
Pilots' certificates (*see also* Licences), 613, 633, 960, 1029, 1267.
Pilots' graves, 374.
Pilots, temperament of. *See* Medical Notes.
Pilots, training of, 4, 98, 151, 160, 416, 502, 625, 719, 795, 898, 1005, 1041, 1075, 1107, 1143, 1170, 1179, 1213, 1360, 1368, 1543.
Piston ring meter, 1383.
Platford, 1458.
Plunkett, Admiral, 730.
Poison, 709.
Polar expeditions, 29, 560.
Police and aviation, 20, 182, 447, 642, 721, 1063, 1165, 1264, 1640.
Pomilio biplane, 237.
Pool, Mr., 1435.
Porte, Lt.-Col. J. C., 747. Death of, 1427.
Porte triplane flying boat, 113, 262, 1188.
Portraits, " Flight and the Men " :—
  Acland, Capt. P. D., 1331.
  Bagnall-Wild, Wing Com. R. K., 295.
  Baird, Maj. J. L., 33.
  Bairstow, L., 1413.
  Blackburn, R., 899.
  Boudot, E., 1607.
  Brancker, Maj.-Gen. Sir W. S., 129.
  Brooke-Popham, Air Com. H. R. M., 659.
  Cattle, A. J., 1521.
  Charlton, Air Com. L. E. O., 261.
  De Havilland, Capt. G., 1387.
  Duckham, Sir Arthur, 193.
  Ellington, Air V. Marshal E. L., 391.
  Fairbairn-Crawford, Capt. I. F., 1039.
  Fairey, C. R., 1073.
  Ffiske, Maj. H. G., 1105.
  Folland, H. P., 1577.
  Fowler, Sir H., 425.
  Grahame-White, C., 691.
  Grey, Lt.-Col. Spenser D. A., 1271.
  Grieve, Com. K. Mackenzie, 695.
  Groves, Air Com. R. M., 865.
  Handasyde, G. H., 1141.
  Handley Page, F., 525.
  Hawker, H. G., 695.
  Hearson, Brig.-Gen. J. G., 227.
  Heckstall-Smith, Maj. S., 1303.
  Hubbard, Lt.-Col. T. O'B., 1359.
  Huggins, Brig.-Gen. A., 359.
  Johnson, Claude, 1003.
  Kenworthy, J., 1639.
  Koolhoven, F., 1211.
  Lambert, Rear-Admiral C. F., 589.
  Maitland, Air Com. E. M., 161.
  Martin, H. P., 1141.
  McClean, Lt.-Col. F. K., 1241.
  Moore-Brabazon, Lt.-Col. J. T. C., 1177.
  North, J. D., 1547.
  Ogilvie, Lt.-Col. Alec., 1493.
  Paine, Air V. Marshal Sir G. M., 65.
  Ramsay, A. M., 1467.
  Robinson, Sir W. A., 329.
  Roe, A. V., 623.
  Royce, F. H., 725.
  Shaw, Sir Napier, 1441.
  Short, H. O., 933.
  Siddeley, J. D., 757.
  Sopwith, T. O. M., 557.
  Sykes, Maj.-Gen. Sir F. H., 97.
  Thomas, G. Holt, 491.
  Trenchard, Air Marshal Sir H. M., 793.
  Vane, H. T., 829.
  Weir, Lord, 3.
  White-Smith, H., 456.
Portugal, 222, 780, 1028.
Possibilities of Flying High (Marco Polo), 1498.
Postal service. *See* Mails.
Postcards, photographic, 753.
Potez biplane, 1645, 1646, 1649, 1650.
Poulain " Aviette," 1090, 1375.
Poulet, E., 1382, 1397, 1452, 1477, 1497, 1621.
Powell, C. H., on Coefficient Nomenclature, 371.
Power, J. F., 615.
Powerite Steam Jointing Co., 1383.
Prague-Paris, 1238.
Prance, Maj. H. Waymouth, 929.
Prediction of Aeroplane Performance (I. M. Laddon), 1343.
Premier Lamp and Engineering Co., Ltd., 125.
Press, the, 4, 31, 455, 747, 781, 891, 892, 1270, 1290, 1330.
Prince Albert, 179, 269, 560, 657, 814, 1022, 1094, 1465, 1552.
Prince Edward Island, 17.
Prince of Wales, 81, 473, 521, 650, 776, 965, 1513.
Prisoners' Fund, 922.
Prisoners of War, 818, 993.

Prisoners of War, release of, 11, 51, 80, 81, 110, 188, 208, 240, 344, 451, 502, 993.
Pritchard, Maj. J. E. M., 945, 1011.
Private owner. *See* Pilots.
Prix de la Ligne, 928.
Prize bounty, 749, 963.
Prizes, American, 56, 505, 780, 1170, 1186, 1239, 1257, 1392, 1532.
Prizes, Australian, 392, 624, 700, 800, 1118, 1295, 1385.
Prizes, British (*see also* Atlantic Flight, Hendon), 960, 983, 1106, 1108, 1135, 1139, 1142, 1144, 1150, 1176, 1291, 1472.
Prizes, Canadian, 1294, 1452.
Prizes, French, 118, 317, 375, 447, 456, 480, 751, 928, 1090, 1236, 1295, 1368, 1477, 1590, 1618, 1646.
Prizes, Italian, 385, 1656.
Prize, Portuguese, 780.
Prodger, Clifford B., 607, 708, 730, 753, 810.
Production of aircraft, 792, 881.
Professorships. *See* Chairs of Aeronautical Eng.
Profiteering, 622, 1074, 1304, 1344, 1351.
Prohibited areas, 590, 610, 703, 1494.
Prohibited goods transport, 995.
Propaganda from the air, 511.
Propeller design, 679, 855, 1136.
Propellers, 919, 1161, 1257, 1261, 1522, 1557.
Property, requisition of private, 492, 1460, 1660.
Publications received. *See* weekly list.
Publications, official technical, 475.
"Puma" engine. *See* Siddeley.
Punch, 914.

QUADRUPLANES, 229, 435, 436.
Queen Alexandra, 839, 884, 960, 965.
Queen Mary, 965, 1376.

R.9 AIRSHIP, 509, 1121, 1122, 1129.
R.23 airship, 67, 69, 464, 752, 1123, 1124, 1129.
R.25 and R.26 airships, 70, 1129.
R.29 airship, 71, 210.
R.31 airship, 71, 891.
R.32 airship, 952.
R.33 airship, 238, 340, 752, 888, 904, 913, 1259.
R.34 airship, 374, 752, 816, 818, 858, 868, 888, 892, 897, 906, 913, 925, 926, 931, 953, 968, 1010, 1035, 1047, 1063, 1388. Transatlantic log, 906, 944.
R.38 airship, 1431, 1522.
R.80 airship, 1129, 1328, 1388.
Rabies. *See* Dogs.
Races (*see also* Atlantic flight, Hendon; Schneider Cup), 616, 720, 1090, 1186, 1328, 1370, 1388, 1414, 1422.
Radiator Position (R. F. Mann), 1338.
Radiator, Resistance due to. *See* Resistance.
Radiators, 496, 532, 779, 998.
R.A.F. *See* Royal Air Force.
R.A.F. engine, 1050.
Railway strike, 1301, 1322, 1324, 1329, 1357.
Ramsay, A. M., 1467.
Ranch work, aeroplane for, 447.
Rankers' Club, 1324.
Rateau turbine pump, 290.
Rawlings, Capt. P. T. (death of), 703.
Raymond Orteig Prize, 1532.
Raynham, F. P., 1022, 1458.
"Raynor" biplane. *See* Martinsyde.
Read, Commander, 730, 731, 747, 884, 1149.
R.E. aeroplanes, 487, 990.
Reconnaissance. *See* Surveying.
Record glide, 1170.
Records, airship, 228.
Records, American, 20, 271, 355, 1136.
Records, British, 1553, 1659.
Records, climbing, 1503.
Records, French, 633, 720, 747, 774, 799, 858,
Records, German, 677.
Records, height, 45, 677, 747, 774, 780, 799, 1043, 1090, 1092, 1136, 1257, 1294, 1422.
Records, Italian, 134, 228.
Records, long distance, 661, 1294.
Records, looping, 1422.
Records, passenger, 271, 355, 480, 1090, 1136.
Records, regulations for, 566, 1414.
Records, Royal Air Force, 1148, 1382.
Records, Scandinavian, 1294.
Records, seaplane, 20, 384.
Records, South American, 799.
Records, speed, 232, 428, 509, 1092, 1267, 1323, 1325, 1522, 1553, 1646.
Records, Swiss, 1422.
Records, women's, 780, 799.
Regent Carriage Co., Ltd., 619.
Regulations, air navigation (*see also* International Air Convention; Law), 23, 25, 296, 556, 567, 588, 608, 658, 673, 925, 932, 1016, 1038, 1056, 1082, 1099, 1100, 1107, 1435.
Renault engine, 1049.
R.E.P. monoplane, 1597.
Repairs. *See* Engine repairs.
Repatriation. *See* Aliens; Prisoners, release of.
Report of variation of h.p. *See* Engines.
Research (*see also* Experiments; Tests), 151, 390, 1378, 1610, 1624.
Resettlement of R.A.F. personnel (answers to correspondents), 488, 522, 554, 584, 620, 656, 687, 721, 754, 820, 930, 1056, 1174, 1268.
Resistance due to Nose Radiator (American report on), 1509.
Reviews of books, 574, 684, 790, 861, 960, 998, 1063, 1264, 1291, 1558, 1572, 1603.
Rhine area control, 934.
Ribs, Design and Testing of. *See* Fuller and Milburn.
Richardson, P., 1573.
Richmond gas furnaces, 221.
Richthofen brothers, 1435.
Rickenbacker, Capt. E. J., 118, 708.
Rigby (J.) and Sons, 61.
Rigging (F. W. Halliwell), 107, 132, 176.
Ripault (Leo.) and Co., 655, 789.
Rippon, Capt. T. S. (*see also* Medical Notes), 318.
Rippon, Capt. T. S., on Oxygen and the Transatlantic Flight, 403.
Robbery by aeroplane, 1206.
Robertson, Capt., 1021.
Robertson, Gen. Sir W., 647.
Robinhood Eng. Works. *See* K.L.G. plug.
Robinson and Cleaver, 963.
Robinson, Sir W. A., 329.
Robinson (Thos.) and Son, Ltd., 356, 861.
Roche, Baroness de la, 780. Death of, 978.
Roe, A. V., 623.
Roe (A. V.) and Co., Ltd. (*see also* Avro), 649, 670, 914, 993, 1115, 1323, 1635.
Rogers Bros., 1206.
Roget, M., 1158.
Roland biplane, 1376.
Roll of Honour. *See* War casualties.
Rolls-Royce car, 986, 1485, 1489.
Rolls-Royce engine, 113, 139, 201, 444, 504, 511, 535, 782, 805, 1050, 1544.
Rolls-Royce, Ltd., 521, 1464.
Rome, 473, 572, 1100, 1233.
Roof, landing on, 1170.
Rosebery, Lord, 1565.
Ross, Lt. J. S. L., 1444, 1484. Death of, 1497.
Rotary Club, 572.
Round Britain Flight, 544.
Round-the-world trip, 118, 1257, 1291, 1328.
Rowntree and Co., 1517.
Royal Academy, 647.
Royal Aero Club. *See* Aero Club.
Royal Aeronautical Soc. *See* Aeronautical Soc.
Royal Aeronautical Society (Scottish Section), 1321.
Royal Air Force (*see also* Air fighting; Air Ministry; Despatches; Honours; War casualties), 31, 81 106, 131, 137, 180, 189, 211, 262, 269, 271, 284, 322, 339, 360, 377, 383, 416, 422, 446, 453, 485, 486, 545, 560, 625, 648, 716, 745, 749, 770, 789, 795, 814, 817, 830, 851, 894, 914, 919, 925, 926, 941, 953, 993, 1020, 1057, 1068, 1069, 1091, 1100, 1131, 1135, 1188, 1200, 1272, 1284, 1324, 1327, 1352, 1356, 1414, 1431, 1442, 1487, 1511, 1515, 1544, 1562, 1601, 1662.
  Aid committee, 922.
  Airship Service, 1569.
  Appointments. *See* Official List weekly.
  Boy mechanics, 1517.
  Cadets, 45, 284, 322, 375, 377, 475, 502, 652, 716, 836, 1016, 1045, 1255, 1360, 1368, 1393, 1608, 1623, 1669.
  Club, 56, 548, 549.
  Conditions of service, 1044.
  Demobilisation. *See* Demobilisation.
  Engine and repair shop, 882, 1050.
  Flag, 526.
  "Impressions" (sketch portraits), 851, 1199, 1200, 1231, 1263, 1290, 1322, 1350, 1483, 1511.
  Leaders on, 31, 32, 63, 64, 95, 130, 228, 357, 423, 455, 524, 555, 556, 970, 1001, 1037, 1040, 1142, 1178, 1270, 1358, 1359, 1386, 1411, 1440, 1575, 1606, 1608.
  New titles, 1044.
  Pay, gratuities and pensions, 180, 284, 322, 349, 383, 486, 502, 544, 556, 652, 685, 749, 796, 836, 905, 970, 977, 1001, 1046, 1068, 1169, 1515, 1543, 1601.
  Permanent organisation scheme, 1622.
  Reserve, 544, 1045, 1104, 1543.
  Resettlement of personnel. *See* Resettlement.
  Section T.5, 138, 719.
  Sports, 692, 1094, 1095, 1167, 1264.
  Synopsis of war effort, 578.
  Uniform, 1388, 1669.
Royal Aircraft Establishment, 322, 356, 1194, 1460.
Royal Naval Air Service, 1344, 1505, 1595; 1635.
Royce, F. H., 725.
Ruck, Maj.-Gen. R. M., 858.
Rules of the Air. *See* Law; Regulations.
Rumania, 143, 581, 1593, 1626.
Rushbrooke, Capt. L., on Free Ballooning, 394.
Russia, 247, 427, 446, 502, 581, 706, 816, 926, 992, 1027, 1053, 1100, 1130, 1190, 1234, 1258, 1297, 1322, 1326, 1355, 1361, 1374, 1380, 1405, 1415, 1442, 1459, 1477, 1565, 1569, 1654.
Ruston and Hornsby, Ltd., 487, 521, 998.
Ryland (Llewellyn), Ltd., 61, 1463.

SAFETY appliances, 26.
Safety, factors of, 855.
Safety of flying, 1492.
Sagar (J.) and Co., Ltd., 487.
Sage, Frederick, and Co., Ltd., 258, 326.
Sage "Milestones," 971, 1036.
Sahara, flights over, 384, 416, 1618.
Saint, Capt. H. J., 811.
Salmond, Air-vice-Marshal Sir J. M., 953, 967, 993, 1628.
Salmond, Air Vice-Marshal W. G. H., 17, 140.
Salmson aeroplane, 204.
Salonica, 179, 823.
Salvage by aeroplane, 1350.
Samarrah from the air, 467.
S.A.M.L. biplane, 237.
Santoni, D. L., 388, 1249.
Sassoon, Sir P., 1290.
Saundear carburettor, 1428.
Saunders, S. E., 184, 1224.
Savoia flying boat, 1185, 1186, 1248, 1251, 1252, 1256, 1344.
Scale drawings:
  Airco, 40, 41, 42, 43, 1309.
  Airships, 195, 231, 441, 980, 1128, 1425, 1475.
  Armstrong-Whitworth, 436, 437.
  Austin biplane, 1077.
  Avro, 366, 367, 368, 369, 832, 1181.
  B.A.T. biplane, 495, 663.
  Blackburn, 1471, 1584, 1585, 1586, 1587.
  Boulton and Paul biplane, 634, 1417.
  Bristol, 102, 103.
  C.A.C. biplane, 1286.
  Caproni triplane, 798.
  Cato monoplane, 1335.
  Christmas biplane, 208.
  Curtiss biplane, 903.
  Curtiss triplane, 699.
  De Havilland. *See* "Airco."
  D.F.W. biplane, 1275.
  F.5.L. flying boat, 1025.
  Farman "Goliath" biplane, 1319.
  Gosport flying boats, 1007, 1008.
  Grahame-White biplane, 469, 1215.
  H.S. flying boat, 1551.
  Lawson biplane, 1221.
  Linke-Hoffmann biplane, 1314.
  Martinsyde biplane, 635, 1446.
  "N.C.1" flying boat, 638.
  Nieuport "Nighthawk," 1525.
  "N.S." airship, 441.
  Pfalz biplane, 529.
  Sage biplanes, 978, 974.
  Short biplane, 478.
  Siemens biplane, 333.
  Sopwith biplane, 477, 1363.
  Sopwith seaplane, 1184.
  "S.R.1" airship, 980.
  Tarrant triplane, 627.
  Vickers airship, 195, 231.
  Vickers biplanes, 635, 766, 767, 768, 769, 804, 937, 1448.
  Voisin triplane, 1497.
  Westland biplane, 1146.
Scandinavia, 149, 256, 282, 433, 487, 565, 624, 684, 796, 934, 986, 1047, 1202, 1355.
Scarborough, 1206.
Schneider Trophy race, 720, 857, 872, 1063, 1154, 1180, 1223, 1242, 1244, 1279, 1291, 1414, 1452.
Schools (*see also* Training: Technical schools), 390, 660, 898, 935, 1016, 1297.
Scott, Maj. G. H., 889, 944, 996, 1010, 1011, 1163.
Scott, Sir Percy, 850, 1439, 1450, 1595, 1630.
Scott-Paine, H., 1247.
S.E. aeroplanes, 206, 238, 487, 1013, 1091.
S. E.A. biplane, 1375.
Sea Pie, 1063.
Seaplanes (*see also* Flying Boats), 164, 166, 237, 478, 492, 692, 738, 758, 817, 926, 975, 1012, 1150, 1157, 1180, 1223, 1242, 1246, 1250, 1372, 1395, 1405, 1512, 1572, 1581, 1582, 1590, 1644, 1647, 1656.
Searchlights, 1343.
Seaside pleasure trips (*see also* Civilian aerodromes; Flying boat services), 181, 1505.
Section, T.5. *See* Royal Air Force.
Seely, Maj. Gen. J. E. B., 99, 128, 179, 267, 269, 357, 408, 492, 648, 804, 820, 1078, 1103, 1219, 1468, 1492, 1494, 1511, 1516, 1522, 1545, 1546, 1552, 1575, 1633.
Selfridge's, 314, 351, 739, 892, 984.
Selsdon Engineering Co., Ltd., 452, 1000.
Serck radiator, 998.
Shaw, Sir Napier, 1441.
Sheds. *See* Hangars.
Sheffield, flying at, 1022, 1212, 1327, 1505.
Sheffield University, gift to, 1328.
Shelley-Rolls, Lady, 1459.
Shephard Memorial prizes, 1144.
Sherbondy superchargers, 1088.
Shiers, Sgt. W. H., 1449, 1620.
Ships, 290, 296, 976, 981, 1027, 1262.
Ships, seaplane carrying, 283, 350, 428, 460, 461, 462, 1242, 1343.
Ships, air attacks on, 281.
Shock absorbers, 471, 496.
Short airship, 245, 246, 417, 891.
Short biplane, 477, 503.
Short flying boat, 573.
Short, H. O., 933.
Short seaplane (triplane), 817.
Shortt, Lt.-Col., 862.
Shotter, Lt. J. D., 945, 1011.
S.I.A. biplane, 237, 642.
Siam, 1336.
Siddeley, J. D., 757.
Siddeley-Deasy Motor Car Co., 325, 688.
Siddeley engines, 429, 1049 (*see also* Armstrong-Siddeley).
Siddeley-"Siskin" biplane, 709.
"Side-Winds." *See* Weekly.
Siemens biplane (details), 332.
Siemens Halske engine, 334.
Signals, 526, 610, 1029, 1488, 1494.
Sikorsky biplane, 1415, 1565, 1590.
"Sitter, A," 1143.
Skefko Ball Bearing Co., 861.
Skids, 498, 799, 1218.
Smart, Maj. H. G., 1322.
Smith, H. E., 189.
Smith, Lt. K. M., 1449, 1620, 1654.
Smith, Capt. Ross, 1449, 1472, 1497, 1522, 1558, 1580, 1605, 1619, 1620, 1629, 1654, 1669.
Smith, Maj. C. H. C., 812.
Smith (S.) and Sons, 189, 326, 929, 963, 1069, 1138, 1207, 1237, 1573, 1670.

Smuggling, 296, 307, 355, 1090, 1165, 1172, 1206.
" Snow Drop A," 709.
Society of Arts, 881, 1494.
Society of British Aircraft Constructors, 356, 404, 521, 790, 1433.
Society of Motor Mfs. and Traders, 998, 1433.
Soldiers', Sailors and Airmen's Families Assoc., 960.
Some Points in Aeroplane Design (Capt. F. S. Barnwell), 276, 310, 345.
Sopwith (Australia) Transport biplane, 1432, 1558. Details 1362.
Sopwith Aviation Co., Ltd., 61, 93, 189, 373, 687, 723, 776, 862, 1574.
Sopwith biplane, 110, 204, 206, 476, 583, 640, 650, 667, 729, 739, 818, 846, 847, 957, 987, 990, 991, 1013, 1014, 1015, 1154, 1333, 1414, 1432, 1469, 1655.
Sopwith-Kauper synchronising gear, 862.
Sopwith " Milestones," 163, 283.
Sopwith monoplane, 731, 813.
Sopwith seaplane, 164, 165, 238, 1183, 1246, 1251, 1656.
Sopwith, T. O. M., 557, 809, 1093, 1094, 1253.
Sopwith triplane, 168, 1243.
South Africa, 238, 447, 580, 794, 913, 1257, 1488, 1522, 1554.
South America (*see also* Brazil, Chili), 652, 1627.
Southampton docks, 1495.
Southport, flying at, 983, 1028, 1057, 1097, 1153, 1469.
S.P. biplane, 237.
Spad biplane, 204, 237, 633, 1092, 1136, 1236, 1485, 1643, 1644, 1650.
Spad seaplane, 1250.
Spain, 313, 349, 351, 383, 617, 650, 687, 753, 1047, 1100, 1137, 1186, 1190, 1203, 1233, 1299, 1422, 1477, 1517, 1616, 1626, 1635.
Spain, King and Queen of, 746, 1138, 1414.
Spars. *See* Wing Spars.
Spencer, L. V., on Maintaining Constant Pressure before Carburettors, regardless of Altitude, 1086, 1191.
Spicer, Lt. Col. M., 1290.
Spitzbergen, 1090.
Sport, aeroplanes and, 182, 445, 648, 673, 794, 924, 1149.
Sports (*see also* Boxing), 75, 309, 998, 999, 1094, 1101, 1167, 1173, 1194, 1207.
Spyker biplanes, 1156, 1157.
S.R. 1 airship, 979.
"S.S." airship, 73, 1125, 1127, 1128.
Stability, 856. Stabilisers, 19.
Stag Lane Aerodrome. *See* L. & P. Aviation Co.
Stamps, postage, 852, 1263, 1290, 1322, 1540, 1566.
Standard biplane, 238.
Standardisation, 328, 458, 514.
Starter, engine. *See* Odier.
State control of civilian aviation. *See* Air Ministry.
Static head turn indicator. *See* Sir H. Darwin.
Statistics (*see also* Imports and exports; Casualties), 55, 137, 201, 204, 206, 237, 238, 558, 866, 885, 1169, 1431, 1621.
Statuary, 984.
Steel, 681, 745, 753.
Stephanik, Gen. (death of), 617.
"Still" engine, 721.
Storms, 820, 857.
"Strafed," 591.
Stresses in Braced Structures (J. Case), 704, 904.
Stresses in Landing Gear (H. H. Thomas), 483, 672 (*see also* Aircraft undercarriages, by J. D. North).
Strikes, 192, 194, 646, 1027, 1301, 1329.
Struts, 563, 711, 913.
Stunt flying, 83, 708, 1238.
Submarines, aircraft *versus*, 247, 749, 963, 1572, 1595.
Subsidisation, 260, 328, 389, 1491, 1606.
Sudanese chiefs at Hendon, 1092.
Summer time, 1299.
Sunbeam engine, 201, 236, 239, 1035, 1653.
Sunbeam Motor Co., Ltd., 93, 94, 126, 220, 421, 454, 488, 1327.
Sun Electrical Co., Ltd., 125, 158, 487, 1410.
Sunstedt seaplane, 313.
Superchargers. *See* Engines.
Supermarine Aviation Co., 753, 1097, 1410.
Supermarine flying boat, 1097, 1101, 1120, 1185, 1223, 1247, 1251, 1495, 1523.
Surgeries, flying, 355.
Surplus Government property, disposal of, 194, 339, 349, 384, 485, 486, 585, 619, 652, 658, 676, 677, 685, 716, 721, 749, 752, 781, 789, 800, 861, 922, 963, 1043, 1056, 1068, 1091, 1154, 1428.
Surveying work, 86, 374, 416, 475, 548, 775, 781, 1028, 1485, 1515, 1618, 1662.
S.V.A. biplane, 237, 1159, 1160.
Sweden, 508, 565, 642, 671, 719, 752, 799, 926, 928, 986, 1202, 1206, 1232, 1257, 1294, 1344, 1375, 1428, 1460, 1477, 1627.
Switzerland, 355, 752, 1027, 1062, 1201, 1323, 1406, 1422, 1435, 1459, 1488, 1522, 1539, 1627.
Sykes, Maj.-Gen. Sir F. H., 97, 607, 673, 789, 804, 840, 1016, 1032, 1082, 1136, 1149, 1163, 1442, 1468, 1494, 1522, 1542.
Sykes, Maj.-Gen. Sir F. H., on Commerical and Civil Aviation, 84, 260, 271, 571, 720.
Sykes, Herbert, 1435, 1513.

"TABOR" triplane. *See* Tarrant.
Tail planes, fins, and rudders, 666, 941, 1147, 1530.
Tait-Cox, Maj. L. R., 812.
Tanner, Mr., 1435.
Tarrant triplane, 291, 592, 702, 752, 789, 896.
Tarrant triplane (details), 626.
Taxation, 360, 426, 737, 1382, 1520.
Technical instruction (*see also* Schools), 625, 1056.
Territorial Air Force, 489, 898, 1104.
Testing apparatus, 1378, 1398.
Tests (*see also* Research; Trials; Experiments), 692, 720, 741, 956, 1079, 1423, 1559.
Thames Aviation Works, 553.
Thomas, G. Holt, 491, 593, 868, 1199, 1361.
Thomas, G. Holt, on Aeroplane in Industrial Development, 701.
Thomas, H. H., on Stresses in Landing Gear, 483, 672.
Thomson, B., on Flight Aspects of Supercharging, 1555. On Large Aeroplanes, 1292.
Thorburn, D. W., 182, 388, 819.
Thulin, Dr. E., 671.
Thurston, A. P., on Metal Construction of Aircraft, 680, 710, 741.
"Tiger" engine. *See* Siddeley.
Timber. *See* Wood.
Timbuctoo, flight to, 1320.
Times, the, 95, 109, 131, 191, 327, 358, 389, 423, 775, 792, 898, 1106, 1142, 1176, 1263, 1361, 1457, 1519, 1575.
Tolls, 296.
Torpedoes, aerial, 349.
Tour de France competition, 375, 456, 480, 565.
Tournament, Naval, Military and Air Force, 266, 817.
Tower bridge, flying through. *See* bridges.
Towers, Comdr., 730.
Towns, flying over. *See* Danger to public.
Trade. *See* Civil and commercial aviation; Labour.
Trade, foreign, 424, 438, 1272, 1459, 1569, 1638.
Training. *See* Pilots.
Transatlantic flights. *See* Atlantic.
Transport. *See* Airship services; Commercial and civil aviation. Ministry of Transport.
Transvaal Aero Union, 447.
Trenchard, Air-Marshal Sir H. M., 52, 499, 793, 804, 814, 993, 1040, 1063, 1072, 1085, 1130, 1540, 1622, 1661, 1669.
Trials, 751, 872.
Triplanes, 105, 113, 262, 273, 291, 560, 591, 592, 599, 626, 698, 702, 797, 817, 886, 1243, 1343, 1496, 1512, 1582, 1644.
Triplex Safety Glass Co., Ltd., 61, 62, 126, 257, 620, 687, 963, 1069, 1208, 1355, 1410.
Trusts, control of, 624, 1304.
Tryon, Maj. G. C., 1654.
Turin to London flight, 992.
Turkey, 467, 1032, 1626.
Turn indicators (Sir H. Darwin), 1429.
Turner, C., 772, 813, 1383, 1410, 1438.
Turner, Maj. C. C., 1357.
Tweedie, Maj. H. A., 857, 913.

UNDERCARRIAGES, 471, 496, 631, 665, 799, 1216, 1217, 1287, 1422, 1596.
Uniforms. *See* Royal Air Force.
United Aircraft Engineering Corpn., 929.
United States. *See* America.

VACUUM OIL CO., LTD., 1604.
Valves, airship, 1455.
Van Berkels Patent seaplane, 1156, 1157.
Vandervell (C. A.) and Co., Ltd., 125, 257, 325, 388, 553, 1173, 1573, 1670.
Vane, H. T., 829.
Varnishes, 416, 617, 952, 1410, 1463.
Vaughan, Capt. C. R., 813.
V.E. aeroplane, 238.
Vedrines, Jules, 118, 141, 143. Death of, 551, 1053, 1513.
Verses, 1264.
Versteegh, Lt., 1160.
Vickers airships, 195, 230, 263, 281, 351, 417, 509, 1121, 1209, 1328.
Vickers biplane, 813, 887, 1013.
Vickers, Ltd., *see also* Duralumin, 554, 620, 713, 887, 1022, 1036, 1047, 1325, 1616.
Vickers "Milestones," 760, 1121.
Vickers "Viking," 1643, 1646.
Vickers "Vimy-Commercial" biplane, 633, 1113, 1116, 1149, 1162, 1256, 1368. Details, 936.
Vickers "Vimy-Rolls" biplane, 594, 634, 801, 884, 928, 963, 1015, 1118, 1149, 1170, 1233, 1428, 1447, 1458, 1472, 1497, 1512, 1522, 1558, 1580, 1594, 1597, 1619, 1628.
Victoria Cross award, 983.
Victoria memorial, 408.
Victory Aerial Derby. *See* Derby.
Victory Loan, 864, 881, 905, 913.
Victory marches, 408, 605, 606, 941, 965, 967, 969, 975, 993.
Victory medal, 984.
Violinist at Hendon, 1566.
Voisin biplane, 204, 237, 1596, 1651.
Voisin triplane (details), 1496.
V.S.—B.1. aeroplane, 238.
Vyvyan, Air Commodore A. V., 1414.

WADDON aerodrome, 676, 677.
Wakefield Boxing Trophy, 75, 440, 482, 1635.
Wakefield (C. C.) and Co., Ltd. (*see also* "Castrol"), 719, 929, 1490, 1604, 1636.
Wakefield, Sir C. C., 223.
Wales, flying in, 1057, 1097, 1120, 1256, 1383.
War, aircraft in (*see also* Despatches), 19, 84, 137, 370, 461, 578, 591, 605, 853, 955, 1085, 1165, 1240, 1361, 1451, 1457, 1478, 1606.
War casualties, British, 21, 46, 77, 84, 106, 137, 174, 240, 270, 306, 322, 344, 370, 451, 505, 534, 584, 652, 749, 770, 960, 1047, 1203, 1297, 1344, 1516.
War casualties, French, 720, 1111.
War honours and medals. *See* Honours.
War (leaders on), 32, 130, 162, 558, 866.
War relics, 141, 198, 817, 1257.
Waring and Gillow, Ltd., 1138.
Warren, W. T., 924.
Waste (*see also* Air Ministry expenditure), 660, 1388, 1412.
Watford magnetos, 487.
Watson, Geoffrey, paintings by, 896.
Watteville, Col. H. de, 881.
Weather. *See* Meteorology.
Weddings, 247, 816, 885, 892, 1027, 1063, 1091, 1435.
Weekly Dispatch, 891.
Weir of Eastwood, Lord, 1, 3, 16, 29, 370, 650, 1321, 1578. On Developments in Aircraft Design, 955, 987, 1013, 1048, 1136.
Wells, H. G., 125.
West, Capt. A. G. D., 535, 553.
Western Australian Insurance Co., 223.
Westland "Limousine" biplane, 1145, 1615, 1616.
"Westlands" of Yeovil, 1054.
Westminster Latin play, 1662.
Weston-super-Mare, 1120, 1256, 1505.
Wheels (*see also* Undercarriages), 1355, 1636.
Whirling of an Airscrew Shaft (J. Morris), 679.
White, J. S., and Co., 356, 964, 1174, 1355, 1383.
White-Smith, H., 456.
Whitehead Aircraft (1917), Ltd., 190, 688, 896, 964.
Whiteman and Moss, 1173.
Whitfield Aviation Co., 388.
Williams, Maj. E. L., 247.
Williams, E. O., on Drawing Office Data, 512, 536, 561, 596, 643.
Wilson, President, 17, 805.
Wimperis, Maj. H. E., on Air Navigation, 600.
Winchester, Clarence, 1299.
Wind (*see also Meteorology*), 601.
Wind storm, 1062.
Windermere, flying at, 1097, 1225, 1294, 1456.
Wing design, 506, 956.
Wing sections, 956, 1079, 1336.
Wing spars, 277, 683, 710, 741.
Wings, 134.
Wireless Press, 428.
Wireless telegraphy, 87, 379, 754, 794, 879, 881, 890, 1078, 1093, 1222, 1328, 1522, 1601.
Wireless telephony, 379, 384, 549, 642, 740, 776, 1570.
Wires, 280, 913.
Withers, J. E., 772, 1485.
Witton Engineering Co., 1573.
Wolseley-built engine, 199.
Wolseley Motors, Ltd., 257, 1174, 1438.
Women and aviation, 109, 222, 486, 780, 799, 928, 978, 1169, 1170, 1380.
Women, honours for, 47, 76, 106, 179.
Women's Royal Air Force, 66, 89, 99, 222, 293, 309, 349, 355, 382, 438, 486, 652, 685, 737, 749, 789, 817, 818, 894, 925, 926, 959, 969, 1072, 1131, 1135, 1148, 1167, 1169, 1170, 1328, 1332, 1431, 1432, 1457, 1488, 1553, 1576, 1595, 1633.
Wood, 10, 384, 502, 617, 652, 685, 716, 749, 894, 1023, 1068, 1566. Wood pulp, 1350.
Workers, aircraft (*see also* Labour; Strikes), 34.
Wounded airmen, 692.
Wright, C. A., on Inclined Struts and Wires, 913.
Wright, Sergt. C. W. (death of), 716.
Wright biplane, 1596.
Wright, Col. Warwick, 986.
Wright patents, 190.
Wright (Wilbur) memorial, 21.
Wright (Wilbur) memorial lecture, 780, 853.

ZAIMAN, A., on Meteorology and Transatlantic flight, 641.
Zeebrugge and Ostend battles, 268.
Zeppelin airships, 21, 46, 56, 60, 66, 134, 385, 881, 953, 1175, 1198, 1236, 1257, 1259, 1278, 1350, 1377.
Zeppelin "Bodensee" airship, 1289, 1380, 1407, 1452, 1508, 1522.
Zeppelin giant aeroplane, 331, 385, 574, 576, 912.
Zeppelin relics, 510.
Zeppelin sheds, bombing of, 21.

MODEL SECTION.

Airscrews, 1602, 1634.
Calculating areas. *See* Wing surfaces.
Competitions, 1603.
Compressed air motors, 1571.
Design of Model Aeroplanes, 1572.
Duration, 1602.
Handley Page Model Aero Club, 896.
Hollow spars, 1635.
Illinois Model Aero Club, 1603.
Jones (A. E.), Ltd., 1572.
Model Aeroplane Notes (F. J. Camm), 1571, 1602, 1634, 1668.
Monoplane, compressed-air-driven, 1634.
Propellers. *See* Airscrews.
Retrospective, 1571.
Scale models (silver), 1206.
Scale models, exhibition of, 1023.
Tests, 1602.
Twin-winder, 1668, 1669.
War Seal Model Competition, 943.
Wing surfaces, 1635, 1668.

FLIGHT

The
AIRCRAFT
ENGINEER
&
AIRSHIPS

First Aero Weekly in the World.
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 549 (No. 27, Vol. XI.) JULY 3, 1919 **Weekly, Price 6d. Post Free, 7d.**

Flight
and The Aircraft Engineer
Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2
Telegrams: Truditur, Westcent, London. Telephone: Gerard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.*
These rates are subject to any alteration found necessary under war conditions

CONTENTS

Editorial Comment: PAGE

The Advent of Peace .. 863
An Excellent Departure.. .. 863
The Provision of Landing Grounds .. 864
The First of the Flying Clubs .. 864
The Loan as a Remedy for Unrest .. 864
The Ministry of Munitions and the War .. 866
Waste which was Not Waste .. 866
The Linen Deal .. 866
Flight—and the Men: Brig.-Gen. R. M. Groves, C.B., D.S.O., A.F.C. .. 865
London from Above .. 867
The Cosmos Aero Engines .. 869
The Royal Aero Club: Official Notices .. 872
Design and Construction of Flying Boats .. 874
Royal Aeronautical Society Garden Party at Cricklewood .. 877
Reappearance of the Reports of the Advisory Committee for Aeronautics . 878
A Visit to the National Physical Laboratory .. 879
Civilian Flying.. .. 880
An R.A.F. Engine Hospital.. .. 882
Airisms 885
The Atlantic Flyers at Elstree .. 887
Some Notes on the Transatlantic Voyage of R 34 .. 888
Personals.. .. 892
The Royal Air Force 893
In Parliament 894
The Brock Bullet Claim .. 895
Side-Winds 896

EDITORIAL COMMENT

The Advent of Peace

AT last the long-drawn-out negotiations of the Paris Conference have ended, and we have peace with Germany. Whether it is a good or a bad peace time alone will show. There are some who hold that it is a bad peace, in that it leaves Germany nothing to live for, and that she neither can nor will comply with its terms. The answer again is that time will demonstrate whether we are dealing now with a new Germany, or if the Hun remains the same treaty-breaking, political outcast he showed himself to be in 1914. There is also the reflection that had Germany won the War and stood in the place occupied by the Allies at Versailles, the case in which she finds herself is as nothing to that in which we should have been placed. However, we can let that pass for the moment; we are not Germans.

Peace now brings with it anxieties for the future, and problems to be settled that we have hitherto refrained from approaching with the seriousness they deserve. All the world has been content to rest from the strain of prolonged war until the consummation of the final act should bring those problems into the political orbit in a manner which should admit of no further delay in dealing with them. So far as concerns our own country, these problems are many and pressing. We are loaded down by debt and taxation. There is serious unrest in the industrial world, and we are not even now able to tackle in earnest the tasks of commercial reconstruction. The same conditions in a more or less accentuated form exist in other countries, where remedies must be found if the world is to recover from the effects of five years of unexampled strife. Truly, the outlook is not without its dark side, which we should be foolish to ignore or even to discount. But, on the other hand, we have won the War. The menace of Prussian militarism which overshadowed Europe like a cloud for so many years has been utterly destroyed, and the world can breathe freely again. We have put forth colossal efforts for its destruction, and we have now to make a corresponding effort to repair the ravages of war. It is a hard task we have in front of us, but we believe the country will be as true to itself in peace as it was in war, and that we shall win through.

◆ ◆ ◆

An Excellent Departure

The Air Ministry has broken new ground in an excellent direction, by the regular issue for publication of items of news, interesting to those associated with aviation and to the general public as well. This is how it should be. If only each of the great Government departments were to establish its own publicity department and take the public into its confidence a little more than is the fashion, in place of adopting the lofty official attitude that departmental business is nothing to do with the public, a great deal of misunderstanding of policy would be avoided. The public, too, would begin to learn that the departments do, after all, accomplish something for the money they spend, and there would result a better feeling of confidence in the ability of those who are entrusted with the governance of the realm. We sincerely congratulate the Air Ministry on its progressiveness in this direction and trust to see its example followed by other departments of the State.

The Provision of Landing Grounds

The reflections set out above are the result of a Press *communiqué* from the Air Ministry relative to the provision of landing grounds for aircraft. It states that statistics collected by the Ministry show that a considerable proportion of the accidents caused by forced landings, due to engine trouble or other circumstances, might have been avoided if suitable landing grounds had been within sight and gliding distance of the aircraft at the time of the occurrence.

In a speech at the House of Commons recently, General Seely referred to this, and to the desirability of the provision of numerous emergency landing grounds. He has since addressed a personal letter on behalf of the Air Council to all Lord Lieutenants, Lord Mayors, and Governors, on the subject of the selection and allocation by private individuals and public bodies of suitable sites as such landing grounds, with a view to their being inspected, marked out, and appointed for this purpose. In this matter, as an interim measure, and until further and permanent arrangements of the nature indicated can be made, chief constables of counties can, it is thought, in conjunction with landowners and farmers, render great assistance. A personal letter has also been addressed to the chairmen of boards of directors of the various railway companies in regard to the painting of the names of places on the roofs of railway stations or other suitable spaces.

Undoubtedly the Air Ministry is proceeding on the right lines in thus seeking to enlist the help of private individuals and corporations in developing aerial transport. It is perfectly obvious that commercial aviation can only attain its proper development if the *whole* scheme is right. To complete that scheme it is equally clear that it must include a large number of such emergency landing grounds as are referred to in the *communiqué*. They mean a very great deal to the safety of aerial navigation. In fact, it cannot be said to be safe without them. At present, they cannot be provided at the public expense, nor can the pioneer companies engaged in the development of the moment provide them. The cost in either case would be absolutely prohibitive. Therefore, the only way in which the thing can be done is for public-spirited individuals and bodies who are interested in seeing that we do not lose the commanding lead in aerial navigation we assumed during the war, to come forward and assist in the manner suggested by the Air Council and General Seely.

Another direction in which a great deal must be done is in the proper sign-posting of the aerial routes. Here, again, it is obvious that if it is necessary in the interests of road locomotion that the highways should be properly sign-posted, it is ever so much more essential that the aerial routes should be similarly indicated. There are no better guides to the aerial navigator than the great trunk railways of the country. (The Huns who came to us by air during the war realised this.) But something more is necessary than that the aviator of the future may know that he is following, say, the Great Northern Railway at some point of its course. Various suggestions have been made for the better indication of routes, and have been commented upon in Flight. Nothing concrete has resulted so far, but we have hope that the Air Council's letter to the railway companies will be productive of much good in the required direction.

◆ ◆ ◆

The First of the Flying Clubs

The London Flying Club has now been launched on its way, and bids fair to become an established success. It is conceived on an ambitious scale, and with objects which are as diverse as they are likewise ambitious. Its prime purpose is to "promote and encourage flying and aerial travel of all description," and that is its all-sufficient claim upon those who are interested in the development of aviation. In course of time it will doubtless become *the* fashionable country club of the metropolis, besides being the hub of social flying activities. It is not so much in that connection we welcome the advent of the club. Naturally, we wish it all success in all its aspects, but it is principally because we foresee that the example thus set will, in all probability, lead to the launching of similar enterprises in other parts of the country that we are glad to see it in being.

We are very strongly of opinion that nothing better for the general cause of aviation can be imagined than that the country should possess dozens of such flying clubs. True, they cannot all be on the scale the London Flying Club plans to do things, but whether they are large or small, wealthy or of restricted means, such clubs have a distinct and useful rôle to play in the "promotion and encouragement of flying and aerial travel." As we have said many times, what is more essential than anything now and in the immediate future is active propaganda of the right sort, and we can imagine nothing better than the flying club as a means to the desired end.

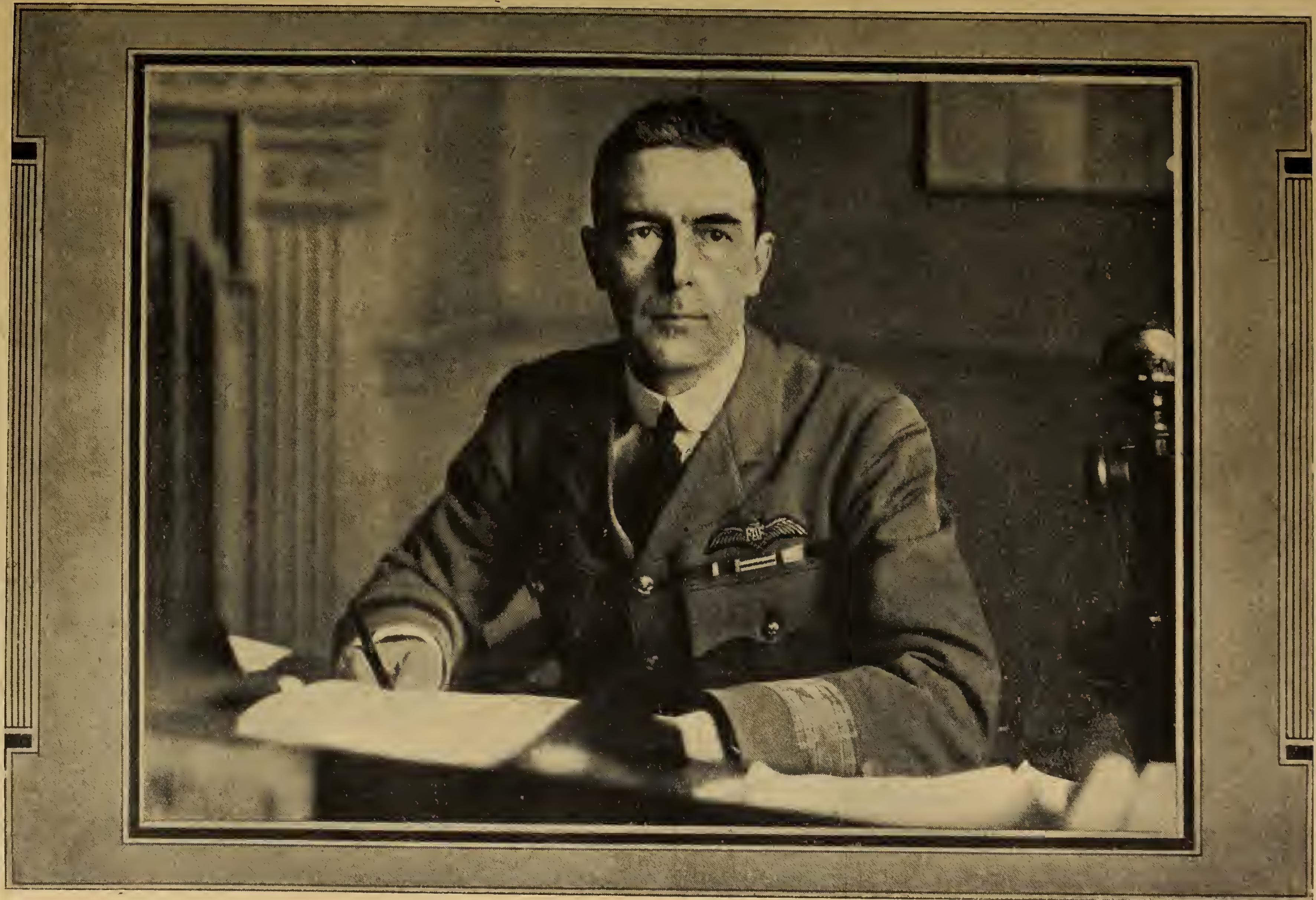
◆ ◆ ◆

The Loan as a Remedy for Unrest

In addressing a small audience of journalists on behalf of the "Victory Loan," Sir Robert Kindersley, the chairman of the National War Savings Committee, pointed out that the swiftest and surest remedy for the present unsettled conditions in industry, and the fictitious values now maintaining, is to stabilise the financial position of the country, and that this can best be accomplished by the masses of the people investing at least something in this loan.

There is undoubtedly a large amount of truth in this. At the present moment we have an enormous transient debt, amounting to some £1,500,000,000 of short-time commitments which must be paid off very soon. The country is really in the position of the individual who has been carrying on by the doubtful expedient of "kite-flying," and we know what happens when the bills mature and there is no prospect of there being money to meet them. Either the borrower is obliged to carry over at a ruinously increased rate of interest, if his credit will allow of further borrowing, or he must file his petition. His position is one of acute financial instability, which can only be recovered by a thorough and scientific re-arrangement of his commitments. That is really the position of the country to-day. Our condition is one of instability, and the purpose of the Loan is to carry out that scientific re-arrangement of which we have spoken. Naturally, such instability of the

Flight—And the Men



"Flight" Copyright.

Brigadier-General R. M. GROVES, C.B., D.S.O., A.F.C., Deputy Chief of the Air Staff

State means proportionate disturbance in industry and commerce, and the longer the nation's finances remain unstable, the worse the cumulative effect on the individual and on commercial relations must be. Apart, then, from all considerations of patriotic duty to the State, it is clear from this line of reasoning that the selfish interests of the individual will be best served by investment. Not only is the return on investments good—no State Loan has ever been issued on such favourable terms—but the Victory Bonds appeal to the sporting instincts of the people, while every pound subscribed assists to stabilise our credit and thus to bring about a more settled condition of affairs generally.

◆ ◆ ◆

The Ministry of Munitions and the War

It may be true that the conduct of the affairs of the Ministry of Munitions has been lacking in business discernment in many directions. The reports of Comptroller and Auditor-General on its methods have made it impossible to absolve the department from charges of gross incompetence and slackness in dealing with the nation's money. But if it has wasted resources in some directions, in others it must be adjudged to have made good in the work for which it was created—to provide our fighting services with the material to aid them to achieve victory over the enemy. The enormous extent to which the tiny pre-War output of munitions of war was expanded sounds more like a romance than the statement of a series of sober facts. The Minister of Munitions, reviewing the work of his department during the War, told the House of Commons last week that, among other matters, the total number of aeroplanes we possessed at the outbreak of War was about 100. (Incidentally, this is not in accord with the figures given to the House at the time Mr. Joynson-Hicks and those associated with him in "gingering-up" the War Office, in 1913, were assured we possessed and when they were invited to go round the aerodromes and count them). At the date of the Armistice we were producing 4,000 a month!

In April last year the great German offensive was made, and the organisation was submitted to a test which tested it from top to bottom. In the course of that offensive our Armies lost 1,000 guns, 70,000 tons of ammunition, 4,000 machine guns, 200,000 rifles, 250 million rounds of small-arm ammunition, 700 trench mortars, and 200 tanks. At the time when that news began to come in there was a good deal of industrial trouble in this country. As soon as it became known in the workshops that the British soldier was fighting with his back to the wall faction and disunion were swept away, and within a fortnight every loss was replaced, in many cases by superior weapons. In August last year, when the British offensive began, in one week there was an expenditure of 2,900,000 rounds of gun ammunition, whilst in the culminating period of October last the biggest week's expenditure amounted to 3,500,000 rounds. On the day the British Army broke the Hindenburg line they fired 943,837 shells—a weight of 40,000 tons. That was a greater number fired in that 24 hours than was fired in the whole four years of the South African War. If they took the pre-War output at 55,000 per annum, it meant that our guns were firing that day every 80 minutes an amount equal to the total production before the War.

A truly marvellous record, this. It is one, too, which demonstrates as no other statistics we have ever seen could do what a wonderful potentiality for production this country possesses. If only we are true to ourselves and do not fritter away time and resources in useless discussion we have no need to fear the manufacturing activities of the greatest among the industrial nations.

◆ ◆ ◆

Waste which was Not Waste

Touching upon the charges of waste and muddle which have been brought against the Ministry, the Minister went on to explain that much of this was due to the amount of experimental work which had to be carried out and the placing of contracts for supplies which had become obsolete before they could be delivered. To illustrate the point, he let the House into a little bit of interesting secret history. He told them he held in his hand specimens of the bullets which stopped the German air raids on this country. There were six different types of bullet used at one time or another for that purpose. The first issue was indistinguishable from the bullet an infantryman fired from his rifle, and the subsequent changes, althought almost imperceptible on a casual examination, resulted in the production of the bullet which, used against the raiders on Whit-Sunday of last year, prevented any further German air raids on this country. It was true, he said, that the money spent on some of the types of bullet was not remunerative if judged by ordinary peace standards, but if the computation were to be made on the ground of loss of money alone, there ought to be placed on the other side of the account the saving to the State, not only of lives, but in respect of the interference with supplies and material damage. On the day after Whitsuntide of last year it was known the Germans had prepared for an air raid on this country by heavier-than-air machines greater than ever before. But the enemy airmen did not come, because they knew of the reception which had been given them on Whit-Sunday.

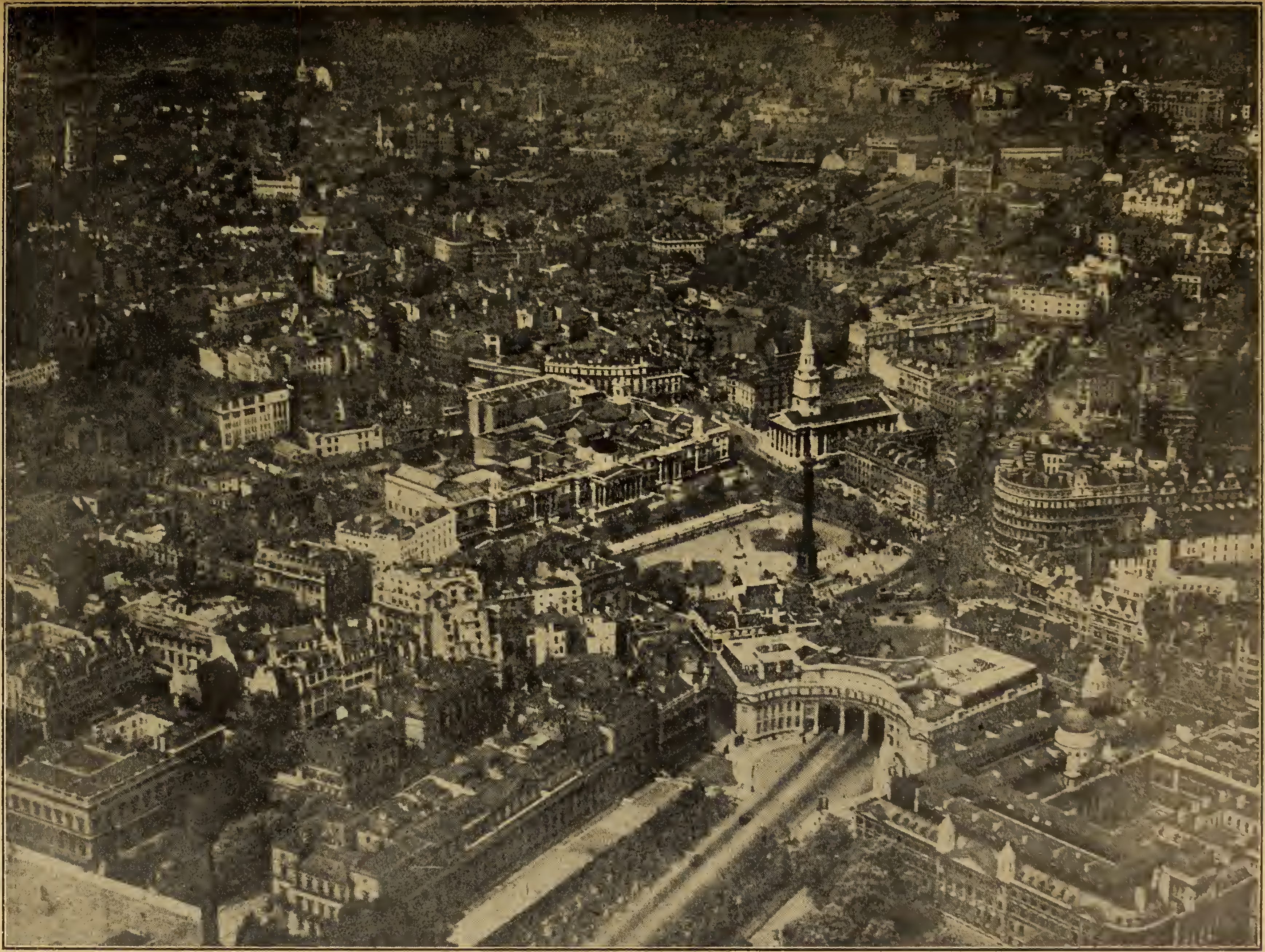
It is very interesting, and as a defence of the methods of the Ministry in production and experiment it may be passed as quite convincing. We have already said that the record of the Ministry in these directions is perfectly wonderful and rebounds vastly to its credit. But we really must point out, though we did not set out to be critical, that all these tit-bits of inside history and the records of experiment and production do not dispose of the charges of, for instance, paying large accounts twice or even three times over. Still, it was an able and generally a convincing outline of a stupenduous task well carried out.

◆ ◆ ◆

The Linen Deal

Another topic of interest dealt with in the speech was that of what has now come to be known as the "Linen Deal." The production of linen at the time of the Armistice had been brought up to 7,000,000 yards per month, and the Ministry found that it had 43,000,000 yards on its hands, for which they had paid from 1s. 3d. to 4s. a yard.

The obvious thing for the Government to do, finding themselves with all this linen on their hands, was to try to get it back into the hands of the traders who knew the business. If it had been possible to come to terms with the linen manufacturers that



LONDON FROM ABOVE.—A very remarkable photograph of Charing Cross, the "Hub of the Universe," Trafalgar Square, the Admiralty Arch, and the surrounding district, taken by the Aircraft Manufacturing Company, Ltd., to illustrate Mr. Holt Thomas's speech at the London Society on June 26. Minute examination of buildings and streets is well repaid, and from the picture quite a new "vision" of London is obtainable.

course would have been taken. But they were not prepared to give more than 1s. a yard for 43,000,000 yards. They came forward subsequently with a proposal to join the Disposal Board in selling the linen on a profit-sharing basis. Under this plan the trade would have borne 25 per cent. of any loss below 1s. 1d. per yard and would have received 25 per cent. of any profit over that figure. This offer was declined by the Disposal Board. That they acted in the public interest was shown by the contract into which they had since entered. They had got 1s. 8d. a yard. If they had accepted the offer of the linen manufacturers they would have had to hand to them over £300,000, which now went into the pockets of the taxpayers.

Before this very clear explanation of the Government point of view was made, we said that so far as it was possible to discern from the facts, the Government appeared to have done the best possible thing in the circumstances. Neither the Belfast trade nor the retailers would have anything to do with the linen, except on terms which were not, to say the least, precisely favourable to the taxpayer. Mr. Martin seems to have come along with a firm offer of a fair price for the whole quantity and the Ministry closed with it. That seems to be all there is to be said about it, until we know what is to become of the linen and whether or not the deal will result in the creation of a corner in linen.

AIR MAILS *v.* CABLES

PRESIDING at a meeting of the London Society on June 27, Lord Montagu said that we should live to see a park like St. James's Park or the Green Park covered with a great glass roof, which would be the central landing stage of London. There would be the aeroplanes landing on the roof, light and sunshine pouring through the glass, the sides open and the wind blowing through, and underneath, so to speak, an open winter garden. He also said that London must be the centre for the meteorological research of Western Europe. Meteorology and navigation were the two most important things to study in aviation to-day. Geographically speaking, the position of London in regard to Western Europe was the most important. We were the nearest of all the big capitals to the Atlantic, and our meteorologists were, owing to the difficulties of forseeing the variations in our changeable climate, possibly as good as, if not better than, any in the world.

Mr. G. Holt Thomas then gave a lecture on London and its future aerial transport. He confessed that he could not imagine, enthusiast as he was, that internal flying in London was going to render any great service; he could not see aeroplanes conveying mails from the General Post Office in the City to the Post Offices of the West End, although it was impossible to prophesy safely as regarded flying in view of the enormous progress recently made. As the London Society were out to secure open spaces, and consequently better health for the population of London, they would, he thought, some day be working hand in hand with those interested in aircraft, with the object of securing large open spaces in the centre of populous districts. A central aerodrome would be almost the first item planned in new towns.

Remembering London's experience of air raids, he urged the need of a sufficiently large air force being kept in existence to repel possible future attacks by air. He had no doubt that all who had read the newspapers thought that a League of Nations, though very desirable, was rather doubtful, and that if we were left without an Air Force we should be in a very precarious position.

After referring to recent long-distance flights, Mr. Holt Thomas said one could get to Paris to-day quite easily and comparatively comfortably by train and boat, but nothing but the aeroplane would carry either passengers or letters in 2¼ hours, and he saw aircraft competing much more with cables, for instance, than the train. He would go so far as to say that if he started an aeroplane, say, every two hours from London to Paris, and *vice versa*, no more telegrams would be sent, as they could convey words far more cheaply than any cable or telegraphic system and much faster.

He did not think anyone would send a telegram to Paris again, if a letter could be delivered in 2¼ hours, as no telegram was as efficient as a letter, as one could not convey, except at enormous expense, the sense of the message. It was impossible to convey photographs, blue prints, deeds, certificates, and valuable documents of all kinds.

It was therefore evident that if the aerial mail could convey, with sufficient regularity, something which the telegraph could not convey, and at a much lower rate, it had a very serious future. London and commerce, on which we all live, was entirely dependent on rapidity of communication. It was especially important to have quick means of communication between London and every city of the Empire.

It cost 2*d*. per word to send a telegram from London to Paris. Assuming that it cost £120 to fly from London to Paris, and taking one of his own machines, which was to-day used on the military service between London and Paris, they could carry (he was quoting Gen. Sykes) 672 lb. of matter. Assuming such a low weight as 2,000 words per ounce—he thought it could safely be put at 5,000—the number of words carried would be 21,500,000, which worked out at so low a figure that one could hardly talk about the price per word. As the calculation would show, they could carry words at 700 a penny.

The same calculation showed one—and this was a subject which they had been specially studying—how the telegraphic and telephonic communication of this country could be linked up with the telegraphic and telephonic services of another country. There was another reason for talking chiefly of mail and matter, as compared with passengers—viz., the expense. Suppose it cost 10*s* a mile, or £120, to fly to Paris, carrying two passengers. The price of £60 was almost prohibitive. But consider the weight, say, of two 11-stone passengers as made up of half-ounce letters, and the situation was completely changed. The two 11-stone passengers equalled 9,856 letters, and at the same price per trip, the transport of the letters cost about 3*d*. each. The charge would, of course, have to be much higher because one would not get 10,000 letters to deliver. Also a special form of collection and delivery would have to be arranged for, as it was no use flying from London to Paris in two hours and taking four more to deliver letters to their destination. Every one must recognise that speed must be paid for.

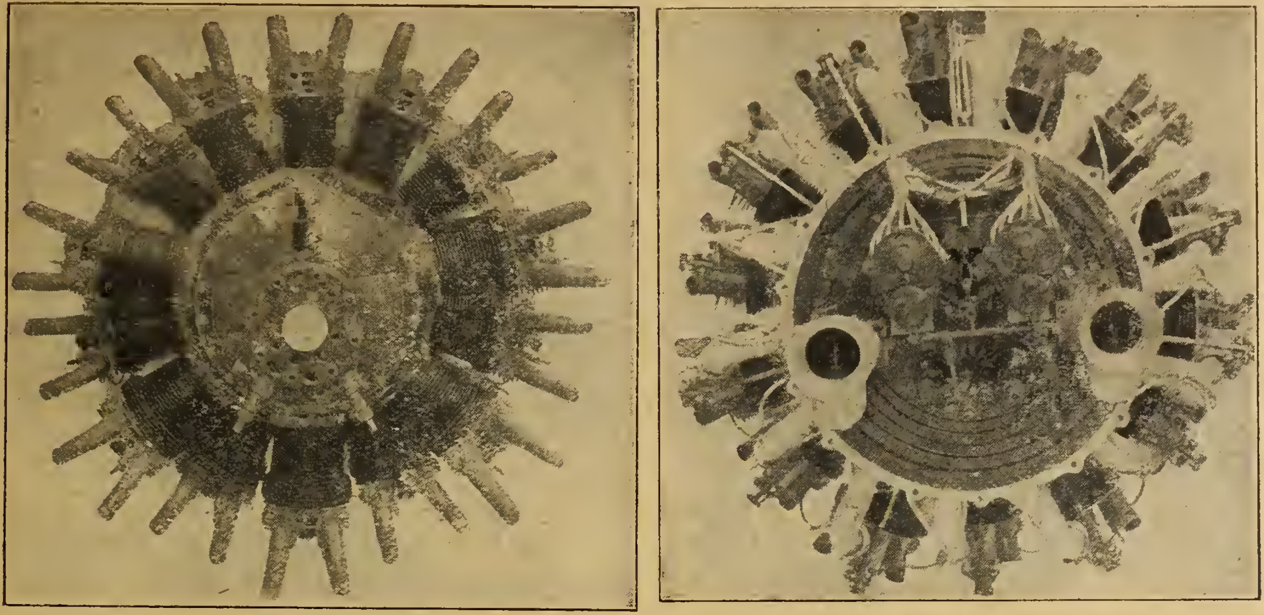
Alluding to the possibilities of stereoscopic photography in charting unsurveyed country, Mr. Holt Thomas said that a single aeroplane had in one flight completely covered with photographs an area of 40 square miles. The cameras used for this work were quite automatic and once started would go on taking photographs of whatever was under them, without any attention until the film was used up.

"R.34" STARTS FOR AMERICA

AT 2.48 a.m. on the morning of Wednesday, July 2, "R. 34" started from her aerodrome at East Fortune and commenced her journey to America. As she rose the airship was lit up by arc lamps on the roof of the huge hangar, and with lights shining out of the portholes in her cabin and engine cars, she formed a fine sight. There was a slight Scotch mist at the time of the start, and the airship was soon lost to sight, disappearing towards the Firth of Forth, although the sound of her Sunbeam engines could be heard for a considerable time after she had disappeared from view. As related elsewhere in this issue the "R. 34" carries an excellent wireless set, which will enable her to be in wireless communication with wireless stations ashore or on board ships during the whole of her voyage. Up to the time of going to press three messages had been received by the Air Ministry from the Commander of "R. 34," Major G. H. Scott. The first, at 6.50 a.m., read: "Off Rathlin Island, North-East Ireland. Steering West. Going well. Fine." The second message at 9 a.m. read: "Position 55 deg. 20 min. North, 10 deg. 40 min. West. Speed 40 knots. Up-to-date average speed 45 knots." At 11.5 a.m. Major Scott reported "Going through thick fog. Everything going well." Providing weather conditions are not too unfavourable the "R. 34" should be able to reach New York during Saturday next (July 5), while if any following winds are encountered she may even arrive on Independence Day.

THE COSMOS AERO ENGINES

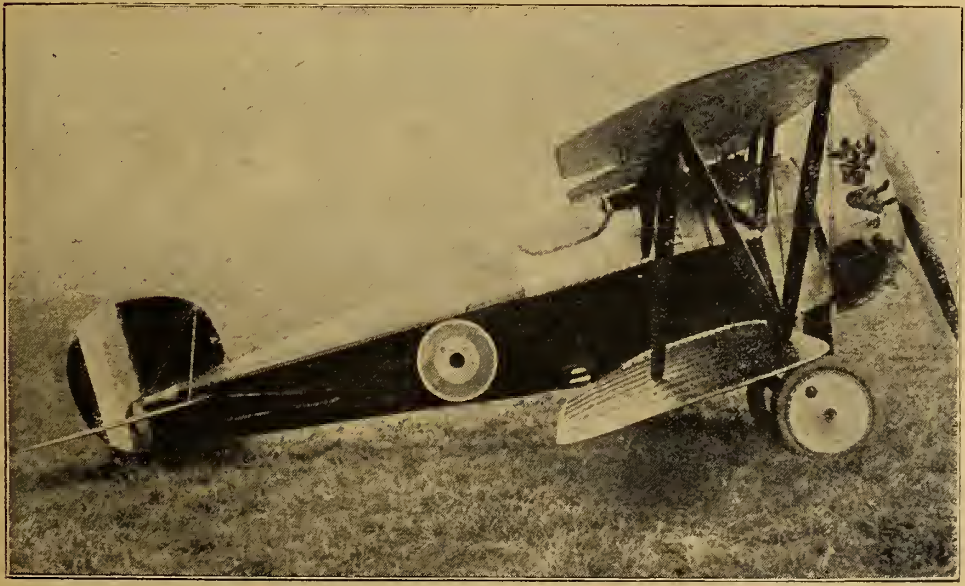
THE peculiar conditions under which aeroplanes were working during the War—especially those used for fighting—have led to an extensive development of the radial air-cooled aero-engine, a type which previously was represented by only a few examples, and which was thought by many to be going out of fashion. The reasons for its restored popularity—and there can be no doubt that, at any rate towards the latter part of the War, this type was the subject of very thorough research—are various, but chief among them is undoubtedly the fundamental advantage of the radial type as compared with others; that of short overall length. This enables the aeroplane designer to mass his heavy weights close together, thus reducing the longitudinal moment of inertia of his machine to a minimum, which is a desirable feature in a fighting machine that has to be capable of very quick manœuvres. Combined with this, experience has shown that a well-designed radial engine can be produced having a very high power-weight ratio.



THE COSMOS 300 H.P. " MERCURY " ENGINE.—Front and rear view.

It might be argued that for commercial flying manœuvrability will not be of such vital importance as it was in the case of the fighting aeroplane, and that, therefore, overall length will not count to the same extent, while light weight per h.p. will be of less moment than reliability. Granting that this is so, and that in the list of qualities which the commercial aero-engine must possess, reliability should come first, it should not be forgotten that, generally speaking, the machine whose engine is of light weight per horse-power, will have a greater paying cargo capacity than one fitted with a heavier engine. Therefore, other things being equal such as reliability and fuel consumption, the light engine will still score in commercial aviation.

Among those who believe that the radial air-cooled aero-engine offers great possibilities in weight reduction, even after reliability and low fuel consumption have been ensured, is the Cosmos Engineering Co., Ltd., of Fishponds, Bristol, whose post-War programme is based entirely on the pro-

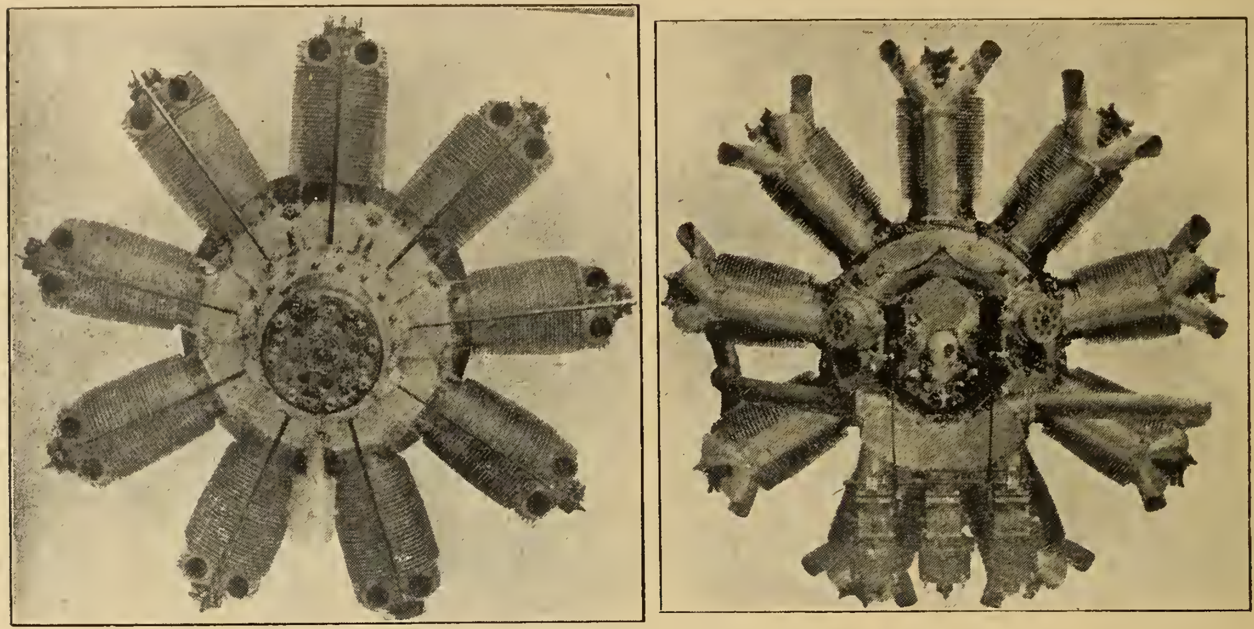


The Cosmos 300 h.p. " Mercury " engine in a " Bristol " scout.

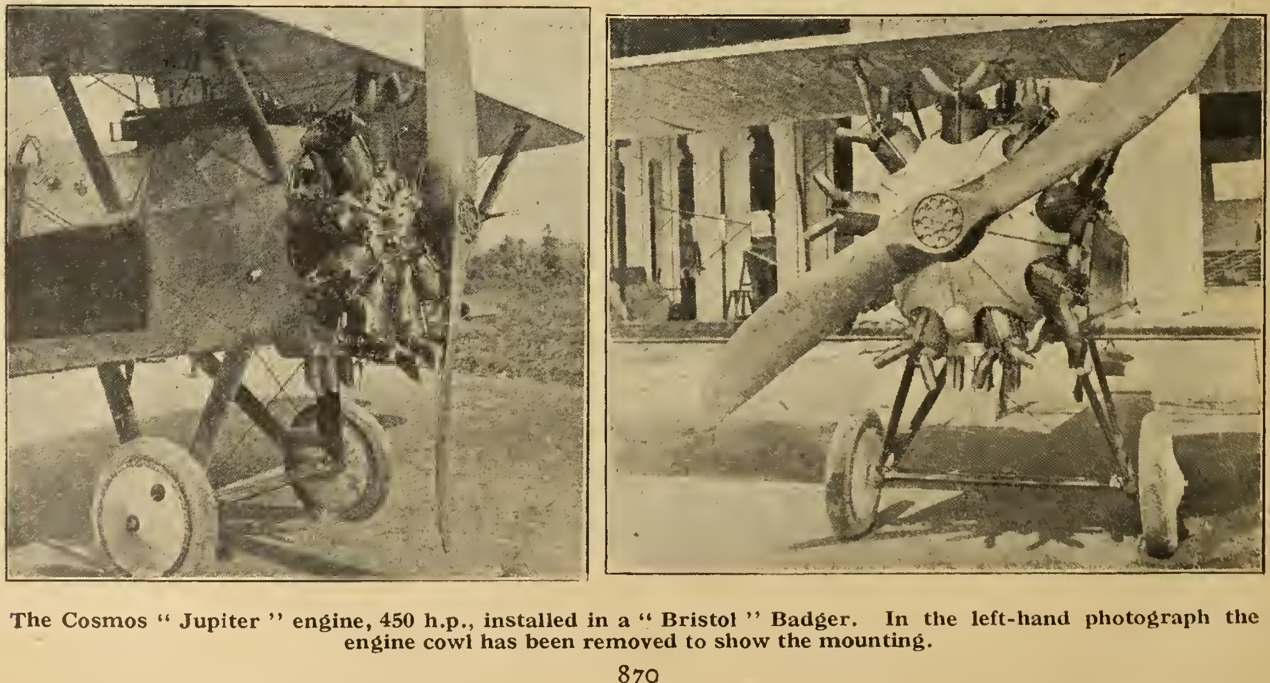
duction of engines of this type. Before proceeding to give a brief description of the various types of engines made by this firm, a few historical notes may be of interest.

The entry of Messrs. Brazil, Straker and Co., Ltd., into the field of aero engine manufacture dates back to the summer of 1915, when aero engine work was undertaken for the Air Department of the Admiralty. Ever since then the firm has been engaged upon work for this department and, later, for the Air Ministry, the work including the reconstructed Curtiss, and the "Hawk" and "Falcon" Rolls-Royce aero engines. Incidentally, it might be mentioned that, so far as we are aware, this is the only firm which has been entrusted with the manufacture of Rolls-Royce engines, apart, of course, from Messrs. Rolls-Royce themselves. Also, with the exception of the original experimental engine, Messrs. Brazil, Straker and Co., Ltd., have produced the whole output of the R.R. "Hawk" engine. At the close of 1918 the firm of Brazil, Straker and Co., Ltd., was reconstructed, and became the Cosmos Engineering Co., Ltd., and, as already mentioned, the firm has decided on a post-War programme concentrating on the production of radial air-cooled engines. Already during the War those responsible for the management of the Cosmos Engineering Co. realised the importance of not attempting to carry out experimental work in the production factory and, more than two years ago, an entirely separate experimental factory was formed which is organised and controlled by a separate experimental staff.

The experimental department of the Cosmos Engineering Co., Ltd., is now one of the best-equipped in the country, being installed in new buildings, with a new machine shop, and with an excellent test house in which new features of design are thoroughly tested out before being finally adopted. One part of the building is fitted up for the testing of separate cylinders, the power developed, the petrol and oil consumption and the temperature being taken and noted. When a single cylinder has in this manner been thoroughly tested out and has fulfilled the rigorous demands imposed by Mr. Fedden, technical director of the firm, a complete engine is erected and tested in another shop where such parts as were not incorporated in the test of separate cylinders are given a thorough try-out. When parts have been tested here, and any of them that proved unsatisfactory have been re-designed and tested, the complete engines are given long



THE COSMOS 450 H.P. "JUPITER" ENGINE.—Front and rear view.



The Cosmos "Jupiter" engine, 450 h.p., installed in a "Bristol" Badger. In the left-hand photograph the engine cowl has been removed to show the mounting.

endurance tests during which the power, speed, fuel consumption, etc., are read off and noted. When prolonged tests have failed to reveal any more improvements, and not till then, the engine is installed in an aeroplane and given its flying tests. If any defects are developed during these, the engine is returned to the works and the defective parts re-designed and tested until satisfactory, when all the tests on the bench as well as in the air, are gone through again. It will be obvious from the brief indication given of the thoroughness of the experimental work done on an engine before it is allowed to pass from the experimental into the production factory, that the Cosmos engines are not just designed to look pretty on paper and excellent in theory, but have to pass through the hard tests of practical experience in which faulty or unsatisfactory design is ruthlessly scrapped.' By thus insisting on perfection, and refusing to accept anything short of what he demands of his engines, Mr. Fedden is laying for the Cosmos engines a foundation on which to build a great reputation in future commercial aviation.

It has already been pointed out that the Cosmos Engineering Co., Ltd., is concentrating on one type of aero engine, the radial air-cooled. Within this type, however, four different models have already been designed, two of which are in production, while the other two, although they have been experimented with, have not yet fully convinced Mr. Fedden that they are ready for passing into production. From what has been said regarding the thoroughness of the Cosmos testing, it will be realised that when the other two models *are* placed on the market, they may be expected to perform according to promise.

The Cosmos "Mercury" Engine

Of the two models which have passed into production the "Mercury" was designed first. It was designed in 1917 and perfected in the early part of 1918. This engine was produced to conform to the special requirements of the Government, *i.e.*, it was designed within the limits of 42 ins. maximum diameter, its overall dimensions being $41\frac{5}{8}$ ins. The "Mercury" is a 14-cylindered radial engine, with its cylinders in two rows of seven each, the cylinders of the back row being placed opposite the spaces between the cylinders of the front row.

The main features of the engine are as follow: Bore and stroke $4\frac{3}{8}$ ins. by $5\frac{13}{16}$ ins. Normal power (calibrated on Froude dynamometer) 315 b.h.p. at 1,800 r.p.m. Maximum b.h.p. 347 at 2,000 r.p.m. Total weight with full equipment, including carburettors, magnetos, Remy distributor and coil, and Constantinesco gun gear—587 lbs. (This weight does not include exhaust pipes, as these are specially designed to suit the machine into which the engine is being fitted.)

The cylinders are of steel, machined from the solid, with fins formed integral with the cylinder barrel. The cylinder head is a separate aluminium casting carrying the valves and valve rockers and, owing to the heat conductivity of this separate cylinder head, the cooling is more effective, while the liability to distortion is claimed to be reduced to a minimum. There are three valves per cylinder, two exhaust and one inlet. The valves are operated via push rods located at the rear of the cylinders, by a double cam ring at the back of the engine. The crankshaft is of the two-throw type, and runs on roller bearings. As the drive is direct, the propeller shaft is integral with the crankshaft. The connecting-rods are of special design to accommodate the roller bearings. It might be mentioned that both the crankpins and crankshaft and also the connecting-rods are case-hardened and ground.

The crankcase is a one-piece casting, the holes for the cylinders being arranged in a slight spiral to accommodate the grouping of the connecting-rods. The back of the crankcase is provided with a rigid circular flange of large diameter through which pass the bolts attaching the engine to the *fuselage*. This simple form of support has been found quite satisfactory in practice. Between this circular flange and the back cover of the crankcase are the two circular induction chambers through which the two-cylinder groups are supplied with gas from two carburettors.

Dual ignition is provided, by two M.L. 7 cyl. magnetos in conjunction with the 14 cyl. Remy distributor and coil.

Lubrication is on the dry sump principle, there being two spur-gear pumps, one of which is a delivery pump sucking oil from the tank and delivering it, under pressure, of course, to the hollow crankshaft and other bearings, separate leads going to the auxiliary drives. Another pump sucks the oil from the crankcase and delivers it back to the main supply. There are two filters in the oil system.

The Cosmos "Jupiter" Engine

Although differing in many details from the "Mercury," the "Jupiter" engine has many features in common with its prototype. It is, however, a nine cylindered single-row engine. It will be marketed in two types, series 1 being of the direct-drive type, while in the series 2 type there is an epicyclic reduction gear giving 1,300 r.p.m. to the propeller shaft. The direct-drive engine has the following main features: Bore and stroke $5\frac{3}{4}$ ins. by $7\frac{1}{2}$ ins. Normal power 450 b.h.p. at 1,800 r.p.m. Total weight including carburettors, magnetos, electric starter, Constantinesco gun gear, and all accessories, 662 lbs. The series 2 engine is rated at 500 h.p.

Except for the difference in dimensions the cylinders of the "Jupiter" are, generally speaking, similar to those of the "Mercury," having the same separate aluminium head, which has again been successful in avoiding distortion and maintaining a high B.M.E.P.; about 118 lbs., we believe. There are four valves in each cylinder, two inlets and two exhausts.

The crankshaft, needless to say, is of the single-throw type and is a solid shaft made of K1 steel, running in roller bearings. The connecting-rod assembly differs from that of the "Mercury" in that there is a master connecting-rod with eight articulated rods. The master rod has a white-metal lined bearing.

The crankcase is a two-piece aluminium casting, split vertically, with long bolts passing right through the crankcase and holding the engine to the *fuselage*. One of the most interesting features of the "Jupiter" engine is the induction system. There is an annular induction chamber, provided with a cover, machined on the inside, into which is fitted a spiral aluminium casting which forms the distribution system of the engine. The pitch of this spiral casting is such that by bolting the three carburettors on to the cover of the annular induction chamber one carburettor feeds three cylinders in proper rotation. This forms a special, patented feature of the "Jupiter" engine. The advantages claimed for it are that it ensures an excellent distribution of the mixture, and at the same time obviates cutting-out of the engine in the event of one cylinder getting out of commission, as each of the three carburettors has an entirely separate induction system, isolated from the other two.

As in the "Mercury," dual ignition is provided, the two magnetos being Thomson-Bennett 9 cyl. driven by bevel gearing off the crankshaft. As will be seen from the rear view of the engine, the magnetos are mounted at an angle to the back cover, so that when the engine is installed in an aeroplane the contact breakers, etc., are readily accessible. The lubrication system is similar to that of the "Mercury," *ie.*, it is of the dry-sump type, with two pumps; one delivery pump and one suction pump.

Both the "Mercury" and the "Jupiter" engines have, as already mentioned, passed their bench and flying tests, and have gone into production. The former was installed in a Bristol scout, which gave the following performance: Climbed to 10,000 ft. in 5 mins. 25 secs.; to 20,000 ft. in 16 mins. 15 secs. Speed at 10,000 ft. 143 m.p.h. The "Jupiter" fitted on a Bristol "Badger" biplane, has also given very good results, as the following performance figures indicate: Total weight of machine, including pilot and passenger, military load, two machine guns, etc., 2,800 lbs., engine revolutions on ground, 1,550 r.p.m.; average revs. when climbing at 80 m.p.h., 1,600 r.p.m.; revs. flying level at 7,000 ft., at a speed of 125 m.p.h., 1,850 r.p.m. The times for climbing were: 2,000 ft. in 1 min. 4 secs.; 4,000 ft. in 2 mins. 10 secs.; 6,000 ft. in 2 mins. 33 secs.; and 7,000 ft. in 4 mins. 15 secs. The figures relating to the performance of the "Badger" are not official, but were, we understand, obtained during preliminary tests.

As already mentioned, the Cosmos Engineering Co., Ltd., will market, later on, two more models. One of these will be a three-cylinder radial air-cooled with a bore and stroke of $5\frac{3}{4}$ ins. by $6\frac{1}{2}$ ins. It will be known as the "Lucifer," and is expected to develop about 100 h.p. for a weight, complete of about 220 lbs. The second model will be a large one of about 1,000 h.p., and will, in effect, consist of a two-row "Jupiter." The bore and stroke will be $6\frac{1}{4}$ ins. by $7\frac{1}{2}$ ins., and the weight is not expected to exceed 1,400 lbs. complete.

■ ■

Removal of Air Ministry Meteorological Branch

The Air Ministry Meteorological Branch has removed to Canada House, Kingsway. The address for correspondence is: Secretary, Air Ministry (F.O. 5), Canada House, Kingsway, London, W.C. The telegraphic address will be as heretofore, Flyingdom, Phone, London. Requests for weather reports by telephone should be made to Holborn 2951, Extensions 520, 521, 522, 523, 524 or 525.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

TECHNICAL AND COMPETITIONS COMMITTEE

A MEETING of the Technical and Competitions Committee was held on Monday, June 30, 1919 when there were present: Lieut.-Col. F K. McClean in the Chair, Mr. Griffith Brewer, Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., Maj. R. H. Mayo, Lieut.-Col. Alec Ogilvie, R.A.F., and Mr. H. E. Perrin, Secretary.

Classification of Aerodromes.—The Committee considered the draft scheme for classification of Aerodromes received from the Air Council. A report was drawn up for submission to the Committee of the Club.

Jacques Schneider Maritime Cup.—The arrangements in connection with this Competition were considered.

Flight from England to Australia.—The supplementary regulations suggested by the Australian Commonwealth were considered and approved.

COMMITTEE MEETING.

A Meeting of the Committee was held on Tuesday, July 1, 1919. when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. E. C. Bucknall, Mr. G. B. Cockburn, Lieut.-Col. T. O'B. Hubbard, M.C., R.A F., Lieut.-Col. F. K. McClean, Lieut.-Col. Alec Ogilvie, R.A.F., Col. C. R. Samson, D.S.O., R.A.F., Mr. A. Mortimer Singer and Mr. H. E. Perrin, Secretary.

New Members.—The following New Members were elected:—

Capt. Sir John Alcock, K.B.E.
Lieut. Douglas Henry Walter Arnot (Argyll and Sutherland Highlanders).
Lieut. Sir Arthur Whitten Brown, K.B.E.
Basil Johnson.
Maj. Charles Henry Chichester Smith, R.A.F.
Sir Charles Cheers Wakefield.

Classification of Aerodromes.—The report of the Technical and Competitions Committee was received and approved and ordered to be sent to the Air Council.

Jacques Schneider Maritime Cup

The Jacques Schneider Maritime Cup having been won in 1914 by C H. Pixton on a Sopwith Seaplane, the nominee of the Royal Aero Club representing the British Empire, the Race for 1919 will be held in England early in September next; the exact date and place will be announced later.

The Race will be over a distance of 200 nautical miles exclusively at sea, in a closed circuit having a minimum course of five nautical miles, and situated outside any port or enclosed harbour. At least two alightings must be made on the water at points fixed by the Officials.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and reserves to itself the right to hold eliminating trials.

Entries are to be made at the Royal Aero Club, 3, Clifford Street, London, W. 1, not later than July 31, 1919. Each entry must be accompanied by the Entry Fee of £20.

Aviation Insurance

The Royal Aero Club has given its official approval to the Aviation Policies of the Aviation and General Insurance Co., Ltd., 56, St. James Street, London, S.W. 1, and arrangements have been made for Members of the Club to receive a rebate of 20 per cent. upon all Premiums.

A feature of the Policy issued by the Aviation and General Insurance Co., Ltd., is that in the event of any difference of opinion arising, the same shall be settled by an arbitrator or arbitrators to be appointed by the Committee of the Royal Aero Club whose decision shall be binding.

Gold Medals for Capt. Sir John Alcock, K.B.E., and Lieut. Sir A. Whitten Brown, K.B.E.

The Committee at its Meeting on June 17, 1919, unanimously resolved to award the Gold Medal of the Club to both Capt. Sir John Alcock, K.B.E., and Lieut. Sir A. Whitten Brown, K.B.E.

These Medals were presented by the Chairman of the Club, Brig.-Gen. The Duke of Atholl, K.T., M.V.O., D.S.O., at the Club's Banquet on June 23, 1919.

Certified Trials

GENERAL REGULATIONS

(*Under the Competition Rules of the Royal Aero Club*)

1. *Object.*—The object of the Trials is to test the merits of an aircraft as a whole or in part, or of an accessory under various conditions. The competitor may make a request to have any particular quality or merit tested and certified.

2. *Certificates.*—The Club will give a Certificate of the actual performance during the Trial, and an official observer, or observers will be provided for the Trial by The Club. The Certificate shall be a record of the Trial. containing such details of the aircraft or part thereof under Trial, and any observations The Club may find desirable. The Club undertakes that a copy of each Certificate shall be published in the Official Organ of The Club.

3. *Observation.*—The Trial shall be under the control and observation of The Club. The Club reserves the right to stop a Trial if, in its opinion, such Trial from any cause would tend to endanger life or limb.

4. *Trial Void.*—Should the competitor be prevented from carrying out the Trials owing to the absence of the observer, or from any cause within The Club's control, The Club may issue such Certificate as the occasion warrants and at its discretion return the whole or part of the entry fees. Should the Trial be postponed or cancelled at the request of the competitor, the entry fees will not be returned.

5. *Withdrawal.*—The competitor may, at any time before the completion of the Trial, give notice in writing to The Club that he wishes to withdraw from the Trial, and shall state his reason. In the event of such notification, the aircraft shall, at the discretion of the observer, remain under observation until the cause thereof has been investigated and the aircraft released by The Club.

6. *Working Hours per Day.*—An aircraft in flight shall not be observed save between the hours of sunrise and sunset, unless particular provision is made therefor in the Regulations agreed to by The Club.

7. *Start and Finish.*—Trials shall start from, and finish at, or be held at, such places as may be agreed to by The Club. The Competitor shall give notice to the observer of his intention to commence the Trial, and the observer shall record the moment of starting.

8. *Entries.*—Every entry shall be made upon the official Entry Form of The Club, and shall state the nature of the Trial. and the number of days to be occupied.

No entry will be accepted unless accompanied by the entry fee, which is not returnable, except as laid down herein.

The Club reserves the right to refuse any entry without giving a reason, or to limit the length of any Trial at its discretion.

9. *Fees.*—Fees for the Trial shall be determined by The Club in accordance with the nature, duration, and venue of the Trial.

10. *Advertising the Trial.*—A competitor by entering for a Trial agrees to accept the official records of The Club, and authorises The Club to publish them in such manner as The Club thinks fit. The competitor may publish only the full and complete Certificate issued by The Club. In the event of his desiring to publish, by way of advertisement or otherwise, any other matter relative to the Trial, he shall submit a proof of such matter to The Club before its publication, and he undertakes not to publish any such matter until he has received the written authority of The Club.

11. *Unrecognised Trials.*—No Trial shall be recognised except such as is officially observed or sanctioned by The Club. Should an unrecognised Trial be held, and should any publicity or advertisement be given thereto, any person taking part in such Trial and/or the manufacturers and/or the machines shall be liable to disqualification and suspension.

12. *Responsibility for Damage.*—A competitor by entering waives any right of action against The Club for any damages sustained by him in consequence of any act or omission on the part of the officials of The Club or its representatives or servants or any fellow-competitor.

The aircraft shall at all times be at the risk in all respects of the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself, or his aircraft, or his employees or workmen, and to assume all liability for damage to third parties or their property, and indemnify The Club in respect thereof.

13. *Definitions.*—In these regulations the word "aircraft" shall be held to mean the aircraft and/or its parts and/or accessories, whether under test or not; the word "competitor" shall include any person or body making entry for or taking part in any Trial or Competition, except any passenger other than the driver or mechanic; the word "entrant" shall mean the person or persons entering the aircraft for a Competition.

14. *Interpretation of Regulations.*—The interpretation of these Regulations shall rest entirely with The Club, which may from time to time alter, add to, or omit from them, and may in the case of any special Trial modify the Regulations to suit a particular case.

Certified Trials. Speed

(*Under the Competition Rules of the Royal Aero Club*)

Regulations

(*Aeroplanes*)

1. Certificates of speed will be delivered in respect of flights over a straight course of not less than one kilometre. Each trial shall consist of four flights out and back in quick succession, and the times will be taken at the moment of passing each mark. The speed of the trial shall be the mean of the speeds of the flights out and back.

2.—The Competitor shall rise from the ground to the height at which he proposes to cover the measured distance, and shall maintain approximately the same level throughout the trial.

3.—All flights must be controlled by one official observer assisted by at least one official timekeeper, both previously approved by The Club, and a mark-keeper, approved by the observer, at each mark.

4.—The course over which the flight is accomplished must be certified by a surveyor approved by The Club, and checked by the observer, the surveyor's plan being lodged with The Club.

5.—Entries must be made upon the Entry Form provided for the purpose, and must be accompanied by a remittance of £5 5*s.*, the amount of the fee. The Entry Form, which must be duly filled up as regards the nature of the test and full particulars of the Aeroplane, must reach the Secretary at least seven days prior to the Trials.

If desired by the Competitor the carried weight shall be recorded on the Certificate. For details, see Regulations 1, 2 *and* 3, *Weight carrying.*

Certified Trials. Vertical Speed.

(*Under the Competition Rules of the Royal Aero Club*)

Regulations

(*Aeroplanes*)

1.—Certificates for vertical speed, *i.e.*, climbing speed, will be delivered in respect of flights recorded by barograph and controlled by an official observer appointed by The Club.

2.—The barograph must be provided by the Competitor, and be provisionally approved, set, and sealed by the observer prior to the start.

3.—The record sheet of the barograph must travel at least 6 inches in one hour.

4.—The test shall be reckoned to have commenced at the time when the Competitor shall have risen 100 feet as registered on the barograph.

5.—The Certificate will state the time taken to rise 1,000 feet, 2,000 feet, and so on per 1,000 feet above the 100 feet starting level. Failure to attain a height of 1,000 feet above the starting level will be recorded on the Certificate.

6.—After the descent the Competitor shall deliver the barograph to the observer, who shall take charge of it and deliver it sealed to the Royal Aero Club for examination. In the event of the Competitor alighting at a distance from the starting point, he shall immediately take steps to inform the observer of his whereabouts.

7.—Entries must be made upon the Entry Form provided for the purpose, and must be accompanied by a remittance of £5 5*s.*, the amount of the fee The Entry Form, which must be duly filled up as regards the nature of the test and full particulars of the Aeroplane, must reach the Secretary at least seven days prior to the Trials.

If desired by the Competitor the carried weight shall be recorded on the Certificate. For details, see Regulations 1, 2 *and* 3, *Weight carrying.*

Certified Trials. Height

(*Under the Competition Rules of the Royal Aero Club*)

Regulations

(*Aeroplanes*)

1.—Certificates of height will be delivered in respect of flights recorded by sealed barograph. The ascent must be performed in the presence of an official observer, who will, independently of the barograph, record the time of leaving the ground, and, if possible, alighting.

2.—The barograph must be provided by the Competitor, and be provisionally approved, set, and sealed by the observer prior to the start.

3.—After the descent the Competitor shall deliver the barograph to the observer, who shall take charge of it and deliver it sealed to the Royal Aero Club for examination. In the event of the Competitor alighting at a distance from the starting point, he shall immediately take steps to inform the observer of his whereabouts.

4.—Entries must be made upon the Entry Form provided for the purpose, and must be accompanied by a remittance of £5 5*s.*, the amount of the fee. The Entry Form, which must be duly filled up as regards the nature of the test and full particulars of the Aeroplane, must reach the Secretary at least seven days prior to the Trials.

If desired by the Competitor the carried weight shall be recorded on the Certificate. For details, see Regulations 1, 2 *and* 3 *Weight carrying.*

Certified Trials. Weight Carrying

(*Under the Competition Rules of the Royal Aero Club.*)

Regulations

(*Aeroplanes*)

1.—Certificates for weight or passenger carrying will be delivered in respect of flights where each passenger carried must be at least 18 years of age and not less than 10 stone 3 lb. in weight.

2—The carried weight shall comprise the weight of the Competitor, passengers (if any) and ballast, but shall not include fuel.

3.—The weight must be verified by an observer appointed by The Club, immediately before and after the flight, and all weighing must be done on Government tested machines, provided by the Competitor and approved by The Club.

4.—The attempt shall be for a minimum flight of 15 minutes.

5.—Entries must be made upon the Entry Form provided for the purpose, and must be accompanied by a remittance of £5 5*s.*, the amount of the fee. The Entry Form, which must be duly filled up as regards the nature of the test and full particulars of the Aeroplane, must reach the Secretary at least seven days prior to the Trials.

Should a further Certificate be desired for speed with a given weight, vertical speed with a given weight, or height with a given weight, the Regulations for the respective tests will be followed, in addition to the above, as far as applicable.

FLYING SERVICES FUND COMMITTEE

A Meeting of the Flying Services Fund Committee was held on Wednesday, June 18, 1919, when there were present: Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., in the Chair, Mr. Chester Fox and Mr. Harold E. Perrin, Secretary.

Grants and Allowances.—The following Grants and Allowances were made:—

(27) A Grant of £5 to an Ex-Petty Officer in the Royal Naval Air Service who had been incapacitated on active service.

(51) An allowance of £2 a month for six months to the widow of a Sergeant in the Royal Flying Corps who had been killed on active service.

(73) An allowance of £2 a month for six months to the widow of a 3rd Class Air-Mechanic in the Royal Air Force who had been killed on active service.

(76) An allowance of £3 a month for six months to the father of a Corporal in the Royal Flying Corps who had been killed on active service.

(90) An allowance of £4 a month for six months to a 2nd Lieutenant in the Royal Flying Corps who had been incapacitated on active service.

(106) An allowance of £2 a month for six months to the widow of a 3rd Class Air-Mechanic in the Royal Flying Corps who had been killed on active service.

(111) An allowance of £1 10*s.* a month for six months to the widow of a Private in the Royal Flying Corps who had been killed on active service.

(112) A Grant of £20 to the widow of a 1st Class Air-Mechanic in the Royal Air Force who had been killed on active service.

(113) An allowance of £4 a month for six months to the widow of a Flight-Sergeant in the Royal Flying Corps who had been killed on active service.

(And a further thirteen, particulars of which will appear next week.)

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

DESIGN AND CONSTRUCTION OF FLYING BOATS*

By Captain DAVID NICOLSON

Introduction

DURING the War information regarding the progress in design and details of construction of aircraft was rigidly guarded by the Defence of the Realm Act regulations, consequently little has been published on the subject of flying-boat design or construction, and what follows may, to a certain extent, remedy the deficiency at least from the practical standpoint.

Within the limits of a paper it is not possible to treat the subject exhaustively, and I merely propose to deal mainly with the construction of the larger types of flying boats, known officially as F.2A, F.3, F.5, P.5, and N.4.

Of these, the F.2A has the smallest hull, which measures 42 ft. 6 ins. in length and 10 ft. in breadth, and is 2 ft. 6 ins. shorter than the F.3 and F.5 types.

The P.5 and N.4 types, patented by Major Linton Hope, are entirely different in design and construction from those above mentioned. Being of circular cross-section, with fair and easy lines, they offer much less air resistance, consequently with the same horse-power are driven at higher speeds; they are much stronger weight for weight than the F. type, more seaworthy, and generally show the impress of the trained naval architect's hand.

In comparison, the F. type follow more closely the aeroplane body, an attempt having been made to attach a flying-boat fore body to a *fuselage* tail. Compromises are seldom successful; the tail proved to be both weak and unseaworthy, and it was found necessary to strengthen it considerably by additional planking. As, however, this class was already slightly tail-heavy, the additional weight did not improve matters. Having rectangular sections, they were actually weaker in transverse strength than the Linton Hope circular design.

Development of Flying-Boat Design and Construction

The first flying boat in the British service appears to have been the "Donnet Leveque," a French design, which was followed by the Sopwith bat-boat and the Curtiss small "America," which developed later into the White and Thompson and the Norman Thompson (N.T.2B) types.

A larger Curtiss boat, with twin engines, built in the United States, was in use for the North Sea patrol, and was probably the worst example of boat building that could be imagined, it having had no less than four consecutive planks butted—not even scarphed—on the same timber, which had a siding of only $\frac{5}{8}$ inch, the line of butts being in line with the step, where the boat was naturally weakest.

Other early boats were the Saunders small "America," midway in size between the 24 ft. 6 ins. White and Thompson boat and the 33 ft. twin-engined Curtiss, the Nieuport, and the F.B.A. The two latter were of French design, and the last-mentioned was largely used for training purposes; in this respect also the N.T.2B has done excellent service.

The White and Thompson boats were built by Messrs. Saunders, of Cowes. These and other hulls were excellent examples of good work, but the system of their multi-skin-sewn construction proved inefficient, as the wire sewing, sunk flush with the surface of the outer skin, cut into the soft cedar when the boat was subjected to severe landing shocks, etc. Another source of trouble was the combination of a more or less flexible structure, with a series of rigid bulkheads, which did not prevent movement of the parts of the structure between them, with the result that distortion occurred, resulting in considerable damage.

The Curtiss boat, as originally built, was wall-sided, *i.e*, without projecting side fins to the front step and planing bottom, but as it experienced difficulty in getting off the water, the breadth of the step was increased by adding fins, thereby improving the planing efficiency, although the fins in service were very liable to damage.

A number of modifications of the Curtiss design were built at the Royal Naval Air Station, Felixstowe, to the plans of Col. Porte, who was responsible for the design of the first large flying boat, known as the "Porte Baby," which was built by Messrs. May, Harden and May. Although these "Porte Babies" were all constructed under the best conditions with respect to material and workmanship, they were inherently weak in the bottom, especially at the step, owing to the faulty design of the keel, which was of spruce, and very small in section at the tail.

American-built Curtiss boats of large size were later on imported in considerable numbers, but although the workmanship and materials were much improved, they were still weak owing to a lack of continuity in the structural design, and frequent damages were reported, until Lieut.-Com. Hope-Vere (then in command of the Royal Naval Air Station at the Scillies, where these boats were kept afloat at moorings) stiffened up the bottoms with bent timbers and stringers. Boats of the F. type which followed were a great improvement on the Curtiss type, and were fitted with engines of considerably greater power, but, as in previous boats, the bottoms gave trouble owing to the faulty keel and floor construction.

While these various types of boats were being built at Felixstowe and in the United States, the 30 ft. A.D. boat was designed at the Admiralty, and a number of hulls were built. This was the first flying boat to be built on the system of resilient construction, and the hull proved to be extremely strong. Shortly afterwards, during the early summer of 1916, a 41 ft. boat was designed by Major Hope and a model tried in the William Froude Tank at the National Physical Laboratory, Teddington. The chief feature of this design, apart from form and light hull construction, was the much greater proportion of power to weight (15 lbs. per horse power) than in the existing boats, and there is little doubt that this boat would have given a performance far ahead of any existing boat or seaplane, with the exception of the little Sopwith "Schneider." Unfortunately, there was strong opposition to this design, and it was rejected in 1918. The "Phœnix Cork" was built to a somewhat similar but improved design on slightly increased dimensions, and proved very successful, being far ahead of anything previously accomplished.

Construction. Type F.

The construction of the F. type is on the box-girder principle, with four *longerons* running right fore and aft. The keel, another fore and aft member, runs from the sternpost right round the nose to form the stem, and finishes at the gun ring. The keel and keelson combined with the floors form the backbone of the hull. That the keel is of faulty design is the opinion of the writer, for many boats were found to leak badly, partly due to the bad connection between the keel and bottom planking, and partly because the keel is too narrow. The keel and planking are fastened as in Fig. 1, but only one row of brass screws secure the bottom planking to the keel in the hulls of the F.3 type.

Another weak point is the discontinuity of transverse strength caused by running the timbers down to the keel and stopping them there, no provision really being made to hold the centre girder to the bottom planking or sides of the hull.

In the F.5 type the timbers are continuous from fin chine to fin chine, as in Fig. 2, forming a much stronger combination. The keel was increased in depth to $1\frac{13}{16}$ ins., the width being kept the same, namely, $2\frac{1}{2}$ ins. It would have been much better if the siding had been increased instead of the moulded depth. The bottom planking is again only fastened with one row of brass screws, which is insufficent. However, a great improvement was made by the continuous timbers, as they were through fastened to the keel by copper rivets.

Keelson.—The keelson is fastened to the keel in the F.3 boats by brass screws 18 ins. apart, but in the F.5 types the spacing is 9 ins., and the screws are hove up through bottom of the keel. Although the keelson in some parts measures nearly 12 ins. in depth, it is greatly weakened by having one-third of the depth cut out to accommodate the floors.

Floors.—It will be seen from Fig. 3 that two-thirds of the depth of the floor is cut away, thereby sacrificing strength to accommodate the keelson. A built-up floor, as in Fig. 4, would certainly be much more effective, and would be probably 40 per cent. lighter.

Timbers.—The timbers are of American rock elm, $\frac{1}{2}$ in. by $\frac{1}{2}$ in. spaced 4 ins. apart amidships, increasing to 7 ins. at the ends of the boat, and terminate at the lower chine; but it would have been an improvement had they been carried to the upper chine. The timbers are through fastened to the keel by copper rivets.

Bottom Planking.—This is arranged on the diagonal system, the inner skin being of cedar $\frac{1}{8}$ in. thick at the ends and $\frac{3}{16}$ in. thick amidships, fitted at an angle of 45° inclination to the keel. The outer skin is of mahogany, $\frac{5}{32}$ in. thick forward, $\frac{3}{16}$ in. thick amidships, and $\frac{1}{8}$ inch thick aft, the planking being at an angle of 30°, with the forward end of the planks butting against the keel. This arrangement tends to diminish surface friction in wake of the seams. A layer of varnished fabric is fitted between the two skins, making the structure very strong. The planking is fastened together with copper nails, and to the floors and stringers with brass screws. Along the keel and fin member it is connected with brass screws 1½ ins. apart.

---

* Paper read before Institution of Engineers and Shipbuilders in Scotland.

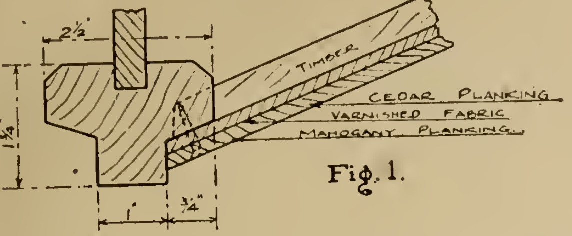


Fig. 1.

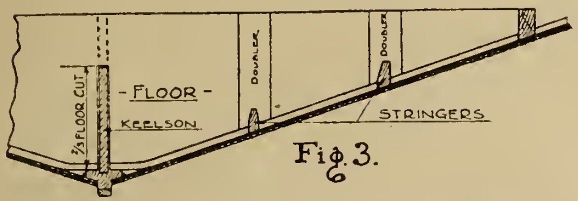


Fig. 3.

In the earlier types of boats the planking was 5 ins. in breadth, with the rivets widely spaced, but it was found that with this breadth the atmosphere affected such thin material, and opening of the seams resulted. The planking was afterwards cut down to 3½ ins. in breadth. It was also found necessary to keep the rivets very close to the edge of the planks, as there was a tendency for the planks to buckle. The bottom planking extends to the fin chine, which runs from the bow for fully two-thirds of the length of the boat.

Figs. 5 and 6 illustrate the connection of the planking with the fin chine in the earlier and later types of boats, and it will be seen that the back rabbet for the planking of the fin top and fin bottom is more workmanlike in the former than in the latter, which is less than 1 in. in length. By having only ½ in. of material between the ends of the fin chine and the planking, a boarding boat coming alongside might cause the planking to spring, as such a meagre allowance is inadequate to prevent an accident of this kind.

Fin Top.—The timbers under the fin for the early F.3 hulls were heavy and widely spaced, but in later boats timbers ½ in. by 5/16 in., spaced 2 ins. apart, were substituted to permit all-through fastenings of the diagonal planking on the hardwood timbers. It might also be stated here that the fin top of the first series of F. boats was of three-ply birch, and in later types was covered with fabric and varnished. The introduction of diagonal planking was a great improvement on this system. All the fins on the F.3 class are flat, but the F.5 types have a ½-in. camber, which adds to the strength, gives a better appearance, and assists in getting rid of water easily.

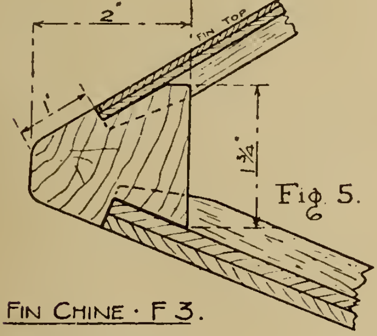


Fig. 5.

Fin Chine · F 3.

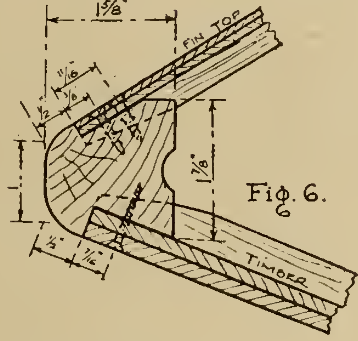


Fig. 6.

· Fin Chine · F 5.

Stringers.—Two stringers, equally spaced from the fin member, run under the fin, and other two stringers placed immediately below these on the bottom are connected by ½-in. square posts spaced 1 ft. apart. Intermediate stringers, 16 ft. long, are introduced in the fore part of the boat further to strengthen the shell and to absorb shocks when the hull alights in the water.

Fin Member.—In the first boats of the F. type the fin member, Fig. 7, was of American rock elm. On account of improper connection between the side of the hull and the fin top, the longitudinal seam naturally opened up, so in later hulls the fin member was constructed as in Fig. 8, which has the member and bead in one.

This in turn might be improved by rabeting out a piece at the back to allow the sides to house correctly, as in Fig. 9.

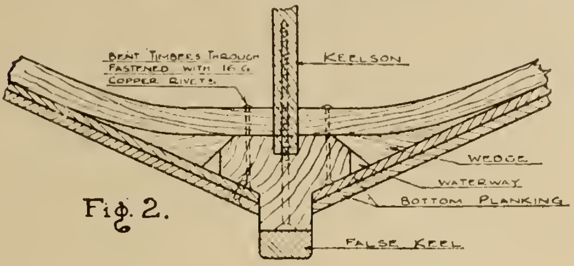


Fig. 2.

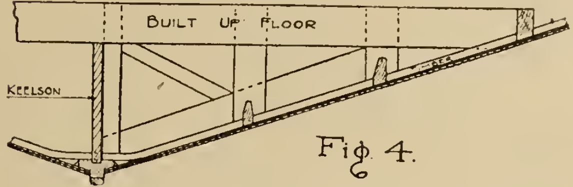


Fig. 4.

Bow and Nose.—The timbering at the bow is composed of rock elm, ¼ in. by ⅜ in., spaced 2½-in. centres apart, and reinforced by horizontal stiffeners below the top *longerons.* These are spaced to take the outer seams of planking, tapered towards the stem, and connected to the same by small oak breasthooks. These breasthooks bind the two sides of the bow together at the juncture of the stringer and stem, thus forming a very strong combination. Above the top *longeron* there are 10 deck-stringers, which are notched to take the ribs, together with three strong beams which subdivide the athwartship ribs. This skeleton, which is shaped like a dome, is planked diagonally, the inner skin being laid at 45°, with the forward ends of the planks lowermost. The outer skin is laid approximately fore and aft to suit the curve of nose. Each skin is of mahogany, 3/32 in. thick, the planking being fastened to strong beams with wood screws. Where stringers and ribs occur, copper nails are driven through and fastened on rooves on the inner skin; elsewhere the planks are fastened with copper nails spaced about 1 in. apart. This work, being well constructed, adds greatly to the appearance of the boat, and although the bow is slightly heavier than the rest of the hull, it is the best piece of construction in the whole boat. Strength at the nose or fore end of structure is very essential, for at high speeds the resistance of the air is very great at this point, and a weak nose would be very easily damaged and driven in.

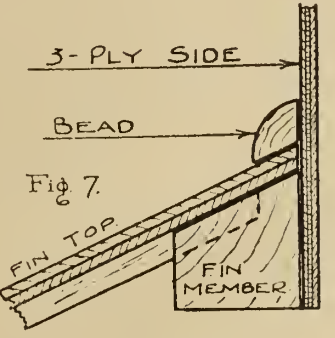


Fig. 7.

Sides.—Abaft the bow planking, the sides are of three-ply birch, and extend from the bottom of the fin member to the top *longeron*, running aft to the gun-port openings, a distance of about 18 ft. The three-ply boards are butted against the side stanchions, thus saving buttstraps. Up to within a few months ago, the sides abaft the gun-port openings were built up of a narrow strip of mahogany, with fabric stretched between the same and the upper *longeron.* The fabric was not strong enough in anything like rough weather, nor under bad handling in fine weather, and the tails were weak in torsion; it was therefore superseded by diagonal planking of two skins, each 1/16 in. thick, with nainsook between. This planking was fastened to timbers, running from *longeron* to *longeron*, spaced 2 ins. apart, with one stringer midway running fore and aft. The new tail planking was a great improvement, although it added about 47 lbs. to the weight of the hull; but experience has justified the change and extra cost. Several of the latest hulls have the sides covered with two-ply "consuta," made up of two pieces of very thin mahogany sewn together with flax thread, which is lighter than riveted work.

Top of Hull.—The transverse strength is made up of beams and arches combined with spruce stringers spaced about 7 ins. apart. The top of the hull has many openings, the foremost being a 30½-in. diameter gun ring; about 3 ft. abaft this there is the pilot's hatch, 4 ft. by 2 ft. 3 ins.; and 6 ft. further aft there is the wireless operator's hatch, 1 ft. 10 ins. in diameter. The engineer's hatch is placed on the port side, immediately abaft of which is a three-ply footway extending across the hull. About amidships there is a second 30½ in. diameter gun ring. Another opening accommodates the wireless mast, and lastly there is an 8-in. triangular ventilator.

Fig. 8.

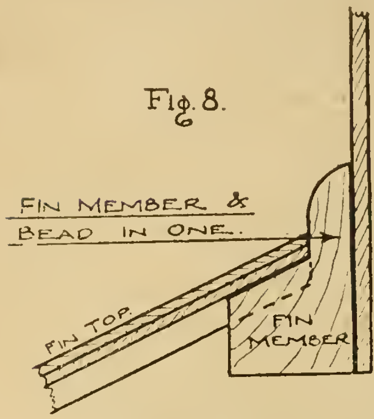
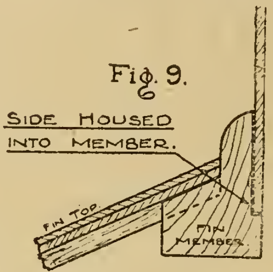


Fig. 9.



The deck aft is built and covered with fabric, and the stringers decrease to a minimum, in order to keep the tail weight as low as possible. Naturally the longer and heavier the after part of the tail is the greater is the bending moment and tendency to shear, and as the extreme end has to carry the rudder elevators, etc., the designer aims at keeping down weight consistent with strength in this part of the structure.

Bulkheads.—These are four in number, each running from the top of the floors to a few inches above the top of the fin line. They are of $\frac{3}{16}$-in. three-ply birch, stiffened by diagonal spruce stiffeners. The top of the bulkhead is stiffened by a capping piece of spruce. Where a bulkhead came in line with a floor, it was necessary to fit a packing piece between the floor and the bulkhead, except amidships, where the keel is practically horizontal.

Where elevator control wires pass through a bulkhead a fabric stocking-joint with brass washer plates on each side keep the bulkhead watertight, and where centre bracing struts pass through, a three-ply watertight-collar is fitted.

Metal Fittings.—The chief elements of the structure, such as struts, pillars, beams, floors, wing-root spars, etc., are held and bound together by light metal fittings of about 16 B.W.G. steel.

The fittings were so numerous in the F. type that they had a considerable influence on production during the War, and, in consequence, they had to a great extent been eliminated in the P. and N. type, with the exception of the external stay tube plates and mooring eyes.

Painting.—The inside, as far up as the fin top and the end of the tail, is coated with bitumastic paint, while the remaining portions are well varnished.

The bottom outside is painted with a special flying-boat black anti-fouling composition. The first hulls constructed had the bottoms varnished, and when the third coat was still "tacky," black lead was rubbed in and the surface polished. This treatment proved excellent, but it involved a considerable amount of work at the air stations keeping the bottoms in good condition. Black lead was applied for the reason that, when the bottom was almost dry, it could be polished to the smoothness of glass, thereby greatly assisting the hull to get off the water when driven at high speeds.

As an experiment, one hull was covered on the bottom and fin top with velure paint, which gave satisfactory results, and it was found to be lighter than the covering of varnish and black lead.

The outside work not required to be painted, such as the nose planking, hatch coamings, three-ply work on the topsides, top of fins, and the outside of the tail, receives three good coats of best varnish.

Two coats of black stove enamel are applied to all the steel fittings.

Bracing.—The *longerons* combined with the struts and stays form the principal superstructure of the hull above the fin top. From the nose to the gun-port openings these vertical and diagonal struts are of spruce, moulded to give the greatest strength with lightest section. Abaft the gun-port opening to the sternpost the vertical and horizontal struts are of 1-in. mild-steel tubes, braced diagonally fore and aft and transversely with 10 B.W.G. wire, all the wires being adjusted by turnbuckles.

The tail of the hull is not too stiff in torsion, so adjustment with the bracing wires must be carefully carried out, and all the turnbuckles locked. Occasionally tails get out of alignment in transit, a circumstance which causes a great deal of trouble when erecting the wings, tail fin, etc.

Wing-root spars.—The wing-root spars rank among the most important pieces of the structure. They not only carry the weight of the wings, but they support the engines. When in the air the hull is, so to speak, suspended from them; it is therefore most important that they should be of the finest and best material available. They are held in position at the sides and centre of the hull by heavy stanchions and struts. The centre bracing-struts are slotted, let over the keelson, to which they are bolted, the ends resting on the keel. This may not be considered good practice, as it compels concentration of thrust in a small local area, resulting in some cases to springing of the bottom planking and fastenings. Until quite recently all wing-root spars were of solid-section grade A silver spruce, but these are now laminated in two or three sections.

Outside the hull, and running fore and aft, six ribs of basswood, all equally spaced from the *longeron* to the end of the spar, further strengthen and help to keep the spars in place. These ribs have two small stringers passing through them, giving firmness to the structure, which in turn is covered on top with three-ply birch, and on the bottom, the fabric is stretched from the leading edge to the trailing edge, the whole forming the wing roots.

Interior of Hull.—The bottom deck is of sparred spruce-boards, varying in width from 3 ins. to 4 ins., screwed to the top of the floors.

At amidships, where the petrol tanks are stored, the floors are shaped to take the tank stools, and are specially stiffened and built up at the sides to form the tank cradles.

Accommodation for a gunner is located immediately below the fore gun-ring, and a table for his use extends from his seat to the nose of the hull. Underneath the table is carried an ammunition box and trays. The hinged seat, which has a high back, is made of three-ply wood, except the rails and supports.

Abaft this seat is the station for the pilot and assistant pilot, so arranged as to give a proper lookout. Their seats are well upholstered with kapok cushions, which act as lifebuoys if required. The assistant pilots' seat and back is made to hinge, so that a clear passage may be obtained for walking fore and aft. A few feet behind the pilot is the wireless cabinet, with operator's seat, while at the port side of this a ration box is fitted. The engineer's accommodation is situated aft, with a ladder giving access to the top deck. Further aft is the second gun-ring, with an adjustable platform, to allow a gunner to have a good range of heights above or below the gun-firing.

Steps.—The steps of the F.2A and F.3 boats are framed with ash bearers ½ in. thick, and are 3 ins. deep at the after edge, tapering to meet a board which runs off to a feather edge forward.

The bearers are spaced about 5 ins. apart, and through fastened to the bottom planking; where the timbers come in the way, they also take the fastening. The bearers are joggled to take the step timbers, which are of ash, ⅜ in. by $\frac{5}{16}$ in., spaced about 2 ins. apart. The inner skin of the planking is of $\frac{1}{16}$-in. cedar, and the outer skin of mahogany of the same thickness, both laid diagonally. The whole step is constructed at the bench, fixed in place, and screwed on to the bearers.

At the forward edge of the steps a 6-in. copper band of light gauge covers the edge of the step, the forward edge of which is sunk into the bottom planking.

Trouble was experienced with the feather boards swelling, and in some cases coming away altogether, due to the "tearing" or frictional resistance of the water when the hulls were driven at great speeds just previous to their getting off. This was remedied in the F.5 boats by carrying the inner skin of the bottom right through from end to end of the boat. The outer skin abaft the back step was then put on and carried forward to a feather edge under the back step, while a short false inner skin was fitted over the usual step framing and then attached to the bottom skin. The outer skin between the steps was put on from the after end of the back step and worked forward to a feather edge under the main step with a false inner skin as before. The outer skin of the fore bottom was then carried right over this from the after side of the main step to the stem. This construction is much stronger, and a great improvement on the former step.

(*To be concluded.*)

THE ROYAL AERONAUTICAL SOCIETY AT CRICKLEWOOD

THERE was a large gathering at the garden party given by the Royal Aeronautical Society at the Handley Page aerodrome at Cricklewood on Sunday last, and although the boisterous weather did its best to prevent passenger flights, the H.P. biplanes were more than equal to their task, and took up a large number of passengers, who thoroughly enjoyed their flights in spite of the "bumps." The visitors were received by the chairman and council in the large running-shed facing the aerodrome, and after an inspection of the Handley Page works, in which were seen a number of machines of the "small" as well as the large type, tea was served in the running-shed. Here also were on view a Handley Page twin-engined (Rolls-Royce) passenger biplane, recently finished, built to the order of the Chinese Government; one of the four-engined (Rolls-Royce) H.P.s, a Norman Thompson flying boat with Beardmore engine, and, by way of contrast, an old Caudron biplane with 50 h.p. Gnome engine. All these machines were inspected by the visitors, and later in the afternoon there was a very interesting lecture, given by Commander T. Y. Baker, R.N., and Maj. L. N. G. Filon, D.Sc., F.R.S., R.A.F., on "Navigation on a Transatlantic Flight."

In another hangar the visitors enjoyed a technical exhibition prepared by the Technical and Research Departments of the Air Ministry, by permission of Brig.-Gen. H. R. M. Brooke-Popham, D.S.O. This exhibition included instruments of all descriptions, speaking-tubes for use on board aircraft, wireless telephone and wireless telegraph outfits of different types and ranges, aero-cameras of all descriptions with specimens of some of the excellent photographs taken with them, and samples of British and German aero engines. The exhibition was highly instructive, and was greatly appreciated by the visitors.

The scientific nature of the exhibits in this hangar was relieved, later in the afternoon, by a very successful and well-attended concert given by the D.A.P. (Department of Aircraft Production) Quartette (Miss Agnes Goddard, Miss G. J. Gowrie, Capt. E. J. Webb, and Maj. A. H. Wood).

It had been intended to give demonstrations of parachute descents, but in view of the high wind which was blowing these were cancelled, and, we think, wisely so, since in such a gale it is extremely difficult to judge the right position for "jumping," with the consequence that the parachutist may easily land on some obstacle and sustain an injury.

In spite of these little variations in the programme, the visitors enjoyed themselves immensely, and all, we think, came away with the feeling of having spent a very interesting afternoon. Besides members of the Society, the guests included representatives of the Air Force and Air Ministry, the Chinese Ambassador, Gen. Squires, the American Air Force Chief, Maj.-Gen. Ruck, Maj.-Gen. Seely. Maj.-Gen. Sir H. M. Trenchard, Maj.-Gen. Sir F. H. Sykes, Maj.-Gen. Sir W. S. Brancker, Sir Robert Hadfield, Mr. Handley Page, and Mr. Holt Thomas.

"Flight" Copyright.

AT THE ROYAL AERONAUTICAL SOCIETY'S GARDEN PARTY, CRICKLEWOOD AERODROME.—(1) View of some guests watching flying. (2) Tea in running-shed. In the background, first passenger 'plane made for the Chinese Government. On the right, Brig.-Gen. Brooke-Popham inspecting the exhibits

REAPPEARANCE OF THE REPORTS OF THE ADVISORY COMMITTEE FOR AERONAUTICS

During the War it has not been possible to publish the Annual Reports of the Advisory Committee for Aeronautics, for obvious reasons. The consequence has been that, although the chief designers of the various firms engaged on aircraft design and construction have had access to the valuable information contained in these reports, a great number of people directly and indirectly interested in aviation have been denied the benefit of access to the data obtained. We are glad to note that now, when the reasons for withholding general publication have disappeared, no time is being lost in issuing the reports. The first list of publications is printed below. The reports are placed on sale by H.M. Stationery Office, and it will be noted that each subject is issued, and may be purchased, separately, so that our readers will be able to get the subjects in which they are specially interested. As new publications become available, lists of them will be published in Flight. The Memoranda number of each report, the date and the price are given in brackets at the end of each publication.

An estimation of the variation of the drag coefficient of a rigid airship form, from model size to full scale. By E. F. Relf, A.R.C.Sc. (No. 245, date May, 1916. 6*d.*)

The screening effect of airship screens and docks. By E. A. Griffiths and C. H. Powell, B.Sc. (252, July, 1916. 4*d.*)

The stability of airships, mathematical theory and illustrations of its use. By L. Bairstow, A.R.C.Sc., E. F. Relf, A.R.C.Sc, and J. L. Nayler, B.A. (257, June, 1916. 9*d.*)

The relation between the efficiency of a propeller and its speed of rotation. By L. Bairstow, A.R.C.Sc., A. Fage, A.R.C.Sc., and H. E. Collins. (259, May, 1916. 9*d.*)

A windmill to drive a wireless set of power one kilowatt. By A. Fage, A.R.C.Sc., and H. E. Collins. (261, October, 1916. 2*d.*)

Graphical solution of stability biquadratic. By R. G. Harris. Presented by the Superintendent, Royal Aircraft Factory. (262, September, 1916. 1*s.* 3*d.*)

The lateral stability of large kites. By J. L. Nayler, B.A. (263, September, 1916. 2*d.*)

Tests on five model airscrews and an experimental investigation of the interferences between these airscrews and a model of the end of the whirling arm at the Royal Aircraft Factory. By A. Fage, A.R.C.Sc., and H. E. Collins. (264, June, 1916. 9*d.*)

Test of a propeller with its axis of rotation at right angles to the wind direction. By E. F. Relf, A.R.C.Sc. (265, July, 1916. 3*d.*)

A method of measuring the speed of an aeroplane at a height. Central Flying School. (266, August, 1916. 3*d.*)

Notes on the performance of aeroplanes, based on a reduction of the observations made at the Central Flying School during the acceptance tests of aeroplanes. By L. Bairstow, A.R.C.Sc., F.R.S., E. F. Relf, A.R.C.Sc., and C. H. Powell, B.Sc. (268, February, 1917. 1*s.* 3*d.*)

An investigation of the strength of two airscrews for F.E. 2b. By A. Fage, A.R.C.Sc., and H. E. Collins. (279, October, 1916. 2*d.*)

Experiments on the possible rate at which a pilot can pull back the control column in an aeroplane. Royal Aircraft Factory. (282, July, 1916. 6*d.*)

Landing run of R.A.F. aeroplanes. Effect of increasing angle of incidence of wings. Presented by the Superintendent, Royal Aircraft Factory. (283, August, 1916. 1*d.*)

The velocity of the wind in front of the wing tips of an aeroplane in flight. Royal Aircraft Factory. (289, August, 1916. 3*d.*)

Drifting smoke. By A. M. Mallock, F.R.S. (299, October, 1916. 2*d.*)

Experiments with models of seaplane floats, 11th series. By G. S. Baker, M.Inst.N.A., and E. M. Keary. (300, December, 1916. 9*d.*)

On the testing of hydrogen for aeronautical purposes. By Guy Barr, B.A., D.Sc. (301, December, 1916. 2*d.*)

Experiments at high speeds, on six aerofoils suitable for airscrew design. By A. Fage, A.R.C.Sc., and H. E. Collins. (322, April, 1917. 6*d.*)

Some notes on the calculation of the working stresses of an airscrew. By A. Fage, A.R.C.Sc., and H. E. Collins. (420, March, 1918. 9*d.*)

Some experiments with tandem combinations of airscrews. By A. Fage, A.R.C.Sc., and H. E. Collins. (421, March, 1918. 9*d.*)

Some notes on floats for seaplanes of the single float type (14th series). By G. S. Baker, O.B.E., late R.C.N.C., M.Inst.N.A. (437, May, 1918. 6*d.*)

Dependence of the efficiency of an airscrew on the speed of rotation and the diameter with a direct reference to the question of engine gearing. By A. Fage, A.R.C.Sc., and H. E. Collins. (442, May, 1918. 9*d.*)

Strength test of main plane ribs. Method employed at the Royal Aircraft Establishment. By Wm. D. Douglas, A.R.C.Sc.I. Presented by the Director-General of Aircraft Production. (443, April, 1918. 9*d.*)

Exploration of the slipstream velocity in a pusher machine. By D. H. Pinsent. Presented by the Director-General of Aircraft Production. (444, April, 1918. 6*d.*)

Windage experiments with a model of the rotary engine, B.R. 1. By A. Fage, A.R.C.Sc., and H. E. Collins. (448, May, 1918. 9*d.*)

An empirical method for the prediction of wing characteristics from model tests. Compiled from existing experimental data. By E. F. Relf, A.R.C.Sc. (450, June, 1918. 9*d.*)

Critical loading of struts and structures. Part III. Vibration of spars under end thrusts. By W. L. Cowley, A.R.C.Sc., and H. Levy, M.A., B.Sc. (453, June, 1918. 3*d*).

Second report on the twisting of propeller blades. (Supplementary to T. 1075.) By A. A. Griffith, M.Eng., and B. Hague, B.Sc., submitted by the Superintendent, Royal Aircraft Factory. (455, February, 1918. 4*d.*)

An analysis of the mutual interference of aeroplane bodies and airscrews. By A. Fage, A.R.C.Sc., and H. E. Collins. (458, June, 1918. 4*d.*)

The resistance of flying-boat hulls. By R. Jones, M.A., and G. N. Pell, B.Sc. (461, July, 1918. 6*d.*)

The variation of engine power with height. Presented by the Superintendent, Royal Aircraft Factory. (462, March, 1918. 9*d.*)

A comparison between two model aeroplanes differing only in plan form of wings, and the corresponding full-scale aeroplanes. By the Wind Channel Staff of the Royal Aircraft Establishment. Presented by the Controller, Technical Department, Aircraft Production. (463, July, 1918. 9*d.*)

The behaviour of the slipstream of a phugoid oscillation. By the Aerodynamics Staff of the Royal Aircraft Establishment. Presented by the Controller, Technical Department, Aircraft Production. (464, July, 1918. 2*d.*)

Tests of a model of the "Weasel" aeroplane body. By H. B. Irving, B.Sc. (465, June, 1918. 2*d.*)

Second order flexural stresses. By A. A. Griffith, M.Eng. Presented by the Director-General of Aircraft Production. (468, June, 1918. 3*d.*)

Report on measurement of accelerations on aeroplanes in flight. (Supplementary to R. and M. 376). By G. F. C. Searle, Sc.D., F.R.S., and W. Cullimore, M.A. Presented by the Director-General of Aircraft Production. (469, June, 1918. 9*d.*)

Experiments with models of flying-boat hull. 16th Series. By G. S. Baker, O.B.E., late R.C.N.C., M.Inst.N.A., and E.M. Keary. (472, September, 1918. 4*d.*)

Experiments with full-sized machines. 1st Series. By G. S. Baker, O.B.E., and E. M. Keary, in conjunction with Capt. Gundry, R.A.F., and Lieut. Hackforth, R.A.F., of the Isle of Grain Experimental Station. (473, September, 1918. 6*d.*)

Report on the whirling of an airscrew shaft. By Arthur Berry. Presented by the Controller of the Technical Department, Aircraft Production. (477, August, 1918. 3*d.*)

Model tests on alternative bodies for an armoured aeroplane. (Pusher R.A.M. III.) By J. A. Carroll, of the Royal Aircraft Establishment. Presented by the Controller of the Technical Department, Aircraft Production. (478, July, 1918. 3*d.*)

Critical loading of struts and structures. Part IV. On the strength of a strut of variable flexural rigidity. By W. L. Cowley, A.R.C.Sc., and H. Levy, M.A., B.Sc. (484, September, 1918. 3*d.*)

Critical loading of struts and structures. Part V. On the whirling of a shaft of variable flexural rigidity. By W. L. Cowley, A.R.C.Sc., and H. Levy, M.A., B.Sc. (485, September, 1918. 2*d.*)

Investigation of the distribution of wind pressure over the body and the fins of a Caquot kite-balloon. By L. F. G.

Simmons, B.A., A.R.C.Sc., and R. A. Frazer, B.A., B.Sc. (479, August, 1918. *6d.*)

Report on the tearing strength of fabrics and certain other materials. By A. J. Turner, B.A., B.Sc. Presented by Controller, Technical Department, Aircraft Production. (487, July, 1918. 1*s.* 3*d.*)

On the vibrations of a uniform rod rotating uniformly about one end, which is encastré. By Arthur Berry, Fellow of King's College, Cambridge. Presented by the Controller of the Technical Department, Aircraft Production. (488, September, 1918. 2*d.*)

Report on the protection of aeroplane fabric. By the Chemical Department, Royal Aircraft Factory. Presented by the Superintendent. (498, September, 1915. 3*d.*)

A report on high angle practice, to determine the wind at various heights for comparison with simultaneous determinations by pilot balloon ascents carried out at firing ground of H.M.S. *Excellent*, April 25 and 26, 1917. Presented by Sir Napier Shaw, F.R.S. (499, May, 1917. 3*d.*)

Records of temperature and altitude. By Flight-Comdr. Brian C. Clayton, R.N. Comments by Sir Napier Shaw, F.R.S. (501, May, 1917. 4*d.*)

Table of temperature, pressure and density at different levels up to 20 kilometres. Communicated by Sir Napier. Shaw, F.R.S. (509, July, 1917. 1*d.*)

On a method of measuring rolling moments and *aileron* hinge moments on a model biplane. By H. B. Irving, B.Sc. (512, November, 1918. 6*d.*)

Variation of wind speed near the ground. Admiralty and Sir Napier Shaw, F.R.S. (531, March, 1918. 2*d.*)

Report on some formulæ for use in strut calculations. By A. A. Griffith, M.Eng. Presented by Controller, Technical Department, Aircraft Production. (543, October, 1918. 2*d.*)

The approximate solution of linear differential equations. By A. A. Griffith, M.Eng. Presented by Controller, Technical Department, Aircraft Production. (545, October, 1918. 4*d.*)

Forces and moments on a model of S.E. 5, yawed, rolled and pitched in accordance with the instructions given in letter from Controller, Technical Department, September 14, 1918, Ref. 52659/APT. By L. W. Bryant, B.Sc., A.R.C.Sc. (546, October, 1918. 1*d.*)

Distribution of pressure over the tailplane of a De H.4 aeroplane. By the Aerodynamics Staff of the R.A.E. Presented by the Controller, Technical Department, Aircraft Production. (552, August, 1918. 1*s.* 6*d.*)

The whirling and whip of a revolving shaft. By Sir G. Greenhill. (560, December, 1918. 6*d.*)

Résumé of experimental work on air-cooled cylinders at the Royal Aircraft Establishment. By A. H. Gibson, D.Sc. Communicated by the Controller, Technical Department of Aircraft Production. (24, May, 1918. 1*s.* 6*d.*)

The expenditure of current and energy required for ignition in an explosion engine. Supplementing I.C.E. 190. By C. C. Paterson, M.I.E.E., and N. R. Campbell, Sc.D. (25, April, 1918. 3*d.*)

The existence of a "Time-lag" in the passage of the spark discharge. By C. C. Paterson, M.I.E.E., and N. R. Campbell, Sc.D. (26, May, 1918. 6*d.*)

The influence of the electrodes on the ignition of explosive mixtures by sparks. By N. R. Campbell, Sc.D. (27, June, 1918. 6*d.*)

The effect of capacity and shunt resistance on the peak voltage of a magneto. By C. C. Paterson, M.I.E.E., and N. R. Campbell, Sc.D. (29, February, 1918. 4*d.*)

◆ ◆ ◆ ◆

A VISIT TO THE NATIONAL PHYSICAL LABORATORY

In the years before the War it was customary to invite a number of visitors down to Teddington to inspect the National Physical Laboratory and thus acquire a first-hand knowledge of the progress made in the research work carried out there. This visit generally took place in the month of June. Like so many other things this custom had to be suspended during the War, but it was revived on June 24 last, on the occasion of the annual inspection by the General Board, when a number of distinguished visitors had gathered to gain an idea of the nature and amount of work done at Teddington during the years that have lapsed since these visits have been in abeyance. The arrangements had been admirably superintended by Sir Richard T. Glazebrook, C.B., M.A., D.Sc., F.R.S., Director of the N.P.L., who, we regret to learn, is retiring in September. The reception was held in the new (and not yet completed) aeronautics building, and the visitors were then conducted to the various departments.

Of most direct interest to those concerned in aviation were naturally the aeronautics department, and the William Froude National Tank, although some of the other departments are also doing work very directly connected with the science of flying. In the Aeronautics department visitors had an opportunity of seeing actual tests being made in the old 3-ft. wind channel on a scale model of an S.S. Zero airship, the object of the tests being the determination of rotary derivatives. In the 4-ft. channel experiments were being conducted on the spinning of aeroplanes, the model being so mounted in the channel that as soon as the air current was started the model commenced to spin. In the 7-ft. No. 1 wind channel was mounted a model of the keel of a rigid airship, with one of its engine cars, and experiments were being made on the mutual interference of airscrew and car, and on the flow in the neighbourhood of the airscrew. Experiments on balancing the rudders of an airship were being carried out in the 7-ft. No. 2 channel, while in the room containing this channel were to be seen models of complete machines for use in the wind channel tests, and a model of a very ingenious device for mooring rigid airships. As already mentioned, the new aeronautics building is not yet completed, but work is progressing there on, among other things, a new wind channel measuring 7 ft. in height and 14 ft. from side to side. When this channel is finished it will be possible to test very large models on which the effects of the airscrew slipstream can be represented.

In the Froude tank two sets of experiments were being made. One was on the resistance, running angle, and longitudinal stability of a seaplane float when planing on the water, and the other on the impact of a seaplane alighting on the water. In the Metallurgy department some interesting demonstrations were given of rolling high-tensile aluminium alloys down to a very thin section (about 2½ thousandths of an inch) suitable for covering the wings of aeroplanes. Of the experiments being carried out in the Physics department, and the apparatus employed, mention may be made of the Griffiths indicator showing at a distance the depth of petrol in the tanks of an aircraft. Finally, as it is obviously impossible to mention all the interesting experiments and demonstrations taking place, visitors were permitted to inspect the Paterson-Walsh electrical height indicator.

◆ ◆ ◆ ◆

Awards to Inventors

Any inventor who desires to present a claim to the Royal Commission on Awards to Inventors should submit brief details of his invention, stating whether it is protected by Letters Patent or not, and giving such reference to any correspondence that may have passed between him and the Department concerned as may enable his case to be traced.

The necessary forms of claim, together with full information as to procedure, will be forwarded to applicants by the Commission when it is clear that a substantial case for hearing by the Commission as a body has been made out, but every application for *ex gratia* remuneration must undergo a preliminary scrutiny by an investigating committee.

The address of the Commission is 2, Queen Anne's Gate Buildings, Westminster, S.W. 1.

An Airship Club Dinner

The Airship Officers' Club are holding a dinner at 7.45 p.m., on July 19, at the Connaught Rooms, Great Queen Street, W.C. This function is likely to mark another milestone in aeronautics. All who are interested and desire tickets, should communicate at once with the Secretary, Airship Officers' Club, 4, Dean Stanley Street, S.W. 1.

Direction Finding by Wireless

An exhibit which will attract at the exhibition of British products, organised by the British Science Guild, is an apparatus for obtaining the bearing of a wireless station from an aeroplane while in flight, enabling an aviator both to navigate and to signal his approaching arrival or change of direction by wireless telegraph or telephone.

CIVILIAN FLYING

THE LONDON AERODROME AND AIR STATION, HENDON

Coming Events for July.—Saturday, July 5, Hendon Peace meeting. Sunday, July 6, special flying displays. July 12, Summer meeting. July 13, special flying displays. Several events are now in course of arrangement, and the dates of these will be announced later. These include Hendon–Birmingham–Manchester air race; Hendon–Paris–Hendon air race; Hendon–Brighton–Hendon air race. In addition, there are exhibition and passenger flights daily, and air races and special flying displays every Saturday and Sunday afternoon.

Peace Meeting, July 5

To celebrate the signing of Peace, a special air race meeting will be held at the London Aerodrome, Hendon, on Saturday next, July 5, when the programme will include a speed contest round the aerodrome pylon course (the first since the pre-War period). The race, which will commence at 4 p.m., will be run in two heats of four laps each, and a final heat of six laps.

The prizes include the London Aerodrome "Peace Trophy," presented by the directors.

The entrants include:—

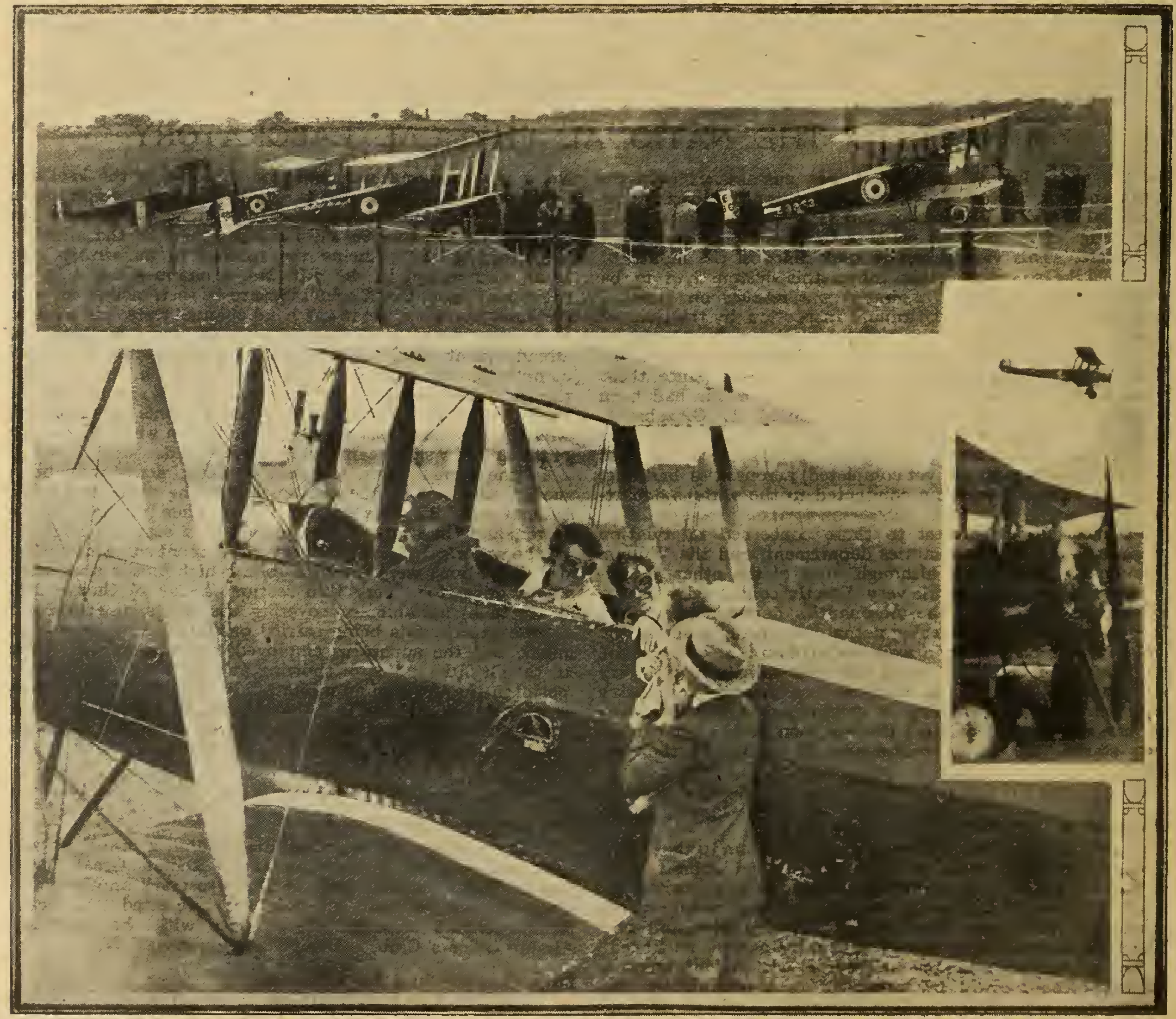
1. Lieut. C. Turner, A.F.C., on B.A.T. (170 A.B.C. "Wasp").
2. Capt. P. R. T. Chamberlayne, Grahame-White "Bantam" (80 Le Rhone).
3. Maj. C. Draper, D.S.O., B.A.T. (Special "Bantam") (170 A.B.C. "Wasp").
5. Maj. R. H. Carr, A.F.C., D.C.M., Grahame-White "Bantam" (80 Le Rhone).
12. Maj. C. H. C. Smith, D.S.C., Bristol monoplane (110 Le Rhone).
19. Capt. D. H. Robertson, A.F.C., Avro (110 Le Rhone).
20. Lieut. G. R. Hicks, D.F.C., Avro (110 Le Rhone).

It is expected that Mr. Prodger will take part in the contest, and also Capt. G. Gathergood, A.F.C., who will probably use the same machine on which he won the Aerial Derby. The usual passenger and exhibition flights will also take place on this, and the following (Sunday) afternoon.

NORTHOLT AERODROME

Yet another civilian aerodrome was opened to the public last Saturday afternoon when the Central Aircraft Co. started work, at their new aerodrome at Northolt, catering for the ever-increasing demand from the public for joy flips. On this first occasion two and three-seater Avro biplanes, with 110 h.p. Le Rhone engines, were in commission, piloted by Mr. Herbert Sykes and Lieut. Castleman. It is hoped that some of the "C.A.C." 'buses (designed by Mr. Fletcher), including the twin-engine eight-seater, will be added to the flying stock by next week.

The weather on Saturday was by no means ideal, it being overcast and very windy, but in spite of this both Sykes and Castleman were kept quite busy taking up visitors for flights until well into the evening. Many of these passengers consisted of American soldiers and sailors, a large party



"Flight" Copyright.

THE OPENING OF THE CENTRAL AIRCRAFT AERODROME AT NORTHOLT ON SATURDAY.—A quartette of the Avros used for passenger flying. "Au revoir" to baby by two passengers taking a flight with Lieut. Castleman, and, on right, Mr. Sykes returning from an exhibition of stunting on an Avro.

having come to the aerodrome for an outing. An interested—if at times somewhat critical—spectator was Mr. Fletcher, jun., who, by the way, can now manage to do straights without instructor with comparatively few bad landings.

Sykes handled his Avro very skilfully, making perfect landings on the same corner of the cinder patch every time, in spite of the exceedingly bumpy wind and the fact that the Avro is a comparatively strange machine to him. Castleman is undoubtedly an expert on the Avro, and prior to his taking up passengers, he gave us a wonderful display of stunting, including three-minute "hovers."

Northolt aerodrome is easily got at, either from Ruislip, on the Metropolitan Railway, or from Northolt Junction, on the G.C. Railway (Marylebone) and G.W.R. (Paddington), the aerodrome being only a few minutes' walk from either station.

◆ ◆ ◆ ◆

No Flying Through Tower Bridge

The Air Ministry notifies for the information of all pilots that the practice of flying through the Tower Bridge between the high level footways and the bascules must cease. Any such cases reported in future will be severely dealt with.

The M.O.M. and Aeroplane Output

In his speech in the House of Commons on June 24 introducing the Ministry of Munitions Vote, Mr. Kellaway said that at the outbreak of War the British Army had in its possession about 100 aeroplanes. The Ministry became responsible for aeroplane production on September 12, 1917, when the production had increased to 500 aeroplanes per month. At the date of the Armistice—a little more than 18 months later—production had been increased to 4,000 per month. At a time when raw material and machinery was very largely engaged on other essential war production this country was able, thanks to the ingenuity of its craftsmen and the farsightedness of its captains of industry, to make so great a step forward in its aircraft production as that, and the improvement in the fighting quality and the safety of the machines was just as great as the increase in the numbers. There was no question amongst informed men that during the latter stages of the War this country held the supremacy over her enemy in the air. That was due not only to the extraordinary fighting spirit and ingenuity of the men who flew and fought the machines, but also to the ingenuity and patriotism of the craftsmen and the employers engaged in that great industry.

And Why the Raids Stopped

Later in his speech, in alluding to some criticisms of Ministry of Munitions methods, he alluded to anti-aircraft bullets. He showed sections of half a dozen bullets. The first, he said, was indistinguishable from the bullet that the infantryman fired out of his rifle Another was one which, to the layman, did not differ on casual examination from the first, but that bullet (the sixth) was used only once, on Whit-Sunday of last year, and prevented any further air-raids on this country. Were we right to scrap the earlier bullets when we found a better one? Were we not right to stop the contract for the earlier bullet and to pay compensation to the contractors? He would not have liked to have been the Minister to stand up in that House on one of those nights when London was being raided, and, when questioned as to whether we had not a bullet to stop the raids, to have said, "Yes, it is true, but the contractor is engaged turning out the earlier form of bullet, and we must not turn him off that in order to make the new bullets, otherwise the Comptroller and Auditor-General, the Public Accounts Committee and the Press will denounce the Department as being wasteful muddlers." On the day after Whit-Sunday last year it was known that Germany had prepared for air raids on this country, by heavier-than-air machines, greater in magnitude than had ever been attempted before. Why did they not come? They did not come because the reception that their airmen got that Sunday night made it impossible to get men to face such risks. On the mere ground of money alone, if that ground is taken, then on these contracts the Department can claim to have acted justly and properly in the action which it has taken.

Aerial Derby Notes

From an inspection of the Timekeeper's table for the Aerial Derby, flown on June 21 last, the following points, which we think are of interest, are elicited :—

The times made for each lap by individual competitors were very consistent, proving that in each case a good course was flown. The only exceptions were Capt. Gathergood (No. 7) and Lieut.-Col. Henderson (No. 4). The former increased his speed of 126·42 m.p.h. for the first lap, to 132·34 m.p.h. for the second. His average speed for the total distance of two circuits was 129·38 m.p.h. The latter was compelled to make a temporary landing at Hounslow on his second round for adjustments, which explains the discrepancy in his lap times; but for this he would probably have come near to winning the sealed handicap. The fastest lap was made by Capt. Gathergood, viz., 42 mins. 50⅗ secs. The average speeds stated above are, of course, equivalent to considerably greater speeds on the straight and in calm air. The turning points reported that, with one or two exceptions, all competitors flew low and close.

Having regard to the great disparity in the speeds of the competitors, which ranged from 70 to 133 miles per hour, the handicapping must be adjudged a good one. It will be seen from the handicap times set forth in last week's issue, that only 17 minutes separated the first and last of the seven machines which completed the course, and less than five minutes separated the second and sixth. Maj. J. H. Ledeboer and Mr. C. T. Glazebrook, the official handicappers, are, therefore, certainly to be congratulated on their work.

No prize was offered for the fastest time third place, but we understand that a special trophy will be presented to Mr. Manton for this by the Grahame-White Co., Ltd.

The London Aerodrome silver medal will also be presented to all pilots (except prize-winners) completing the course, and the London Aerodrome bronze souvenir medal to all pilots who started but did not finish.

Royal Society of Arts Silver Medal

Amongst the recipients of the silver medal of the Royal Society of Arts for papers read during the past session are :—

Sir Frank Heath, K.C.B., Secretary, Department of Scientific and Industrial Research, for his paper "The Government and the Organisation of Scientific Research."

Walter Leonard Lorkin, A.M.I.E.E., "Electric Welding and its Applications."

W. Norman Boase, C.B.E., "Flax—Cultivation, Preparation, Spinning, and Weaving."

Brig.-Gen. Lord Montagu of Beaulieu, C.S.I., "Aviation as Affecting India."

The London Air-Raids

In an interesting address given by Col. H. de Watteville to members of the London Topographical Society at Burlington House, last Friday, a little further light was let in upon the past happenings. Col. de Watteville, after remarking that the Zeppelins were far from being an unqualified success, said: "For every ship that got to these shores, you may be sure that there was an accident somewhere in Germany. During the War no fewer than 120 of these enormous airships were built, and yet there were never at any time more than 15 or 16 that were fit to take the air.

"Wireless telegraphy played a very considerable part in the navigation of these ships over the water. We discovered this in 1915, and made full use of it. The actual apparatus had better not be described, but I can assure you that some of us in London actually knew half-an-hour before a ship left the sheds in Germany that a raid was coming to these shores."

The long record of raids over London was one, from the German point of view, of comparative failure. The bringing down of the Zeppelin at Cuffley by Capt. Leefe Robinson proved the turning-point in the airship campaign against England. It was witnessed by ten other raiders, and the sight of the burning ship dropping to the earth was too much for them. Col. de Watteville repudiated the suggestion that the amount of damage done in these raids was suppressed. "Our *communiqués* of the damage done by the airship raids were absolutely correct," he said. "Every single casualty and every single bit of damage that was done by a German raider throughout the War was recorded."

Advertising Victory Loan from Aircraft

In order to assist the progress of the Victory Loan it has been decided to allow commercial or private aeroplanes, flying over the British Isles, to drop, subject to the undermentioned condition, small discs of paper, advertising the loan, on the towns or country over which they are passing.

Clause 2 (*d*) of Regulation 5 of the Air Navigation Regulations, 1919, will not apply to aircraft engaged on this special work provided that any companies or other owners of aircraft willing to undertake the work act on the instructions of the Secretary, National War Savings Committee, Salisbury House, Salisbury Square, E.C. 4, from whom all further information can be obtained.

Unless this condition is complied with, action will be taken in accordance with Regulation 10 (1) of the Air Navigation Regulations, 1919.

AN R.A.F. ENGINE HOSPITAL

BY CAPTAIN L. A. RUSHBROOKE

THE aero engine is a delicate mass of mechanism. Built to stand great stresses, it yet needs constant skilled attention, for running at the enormous speeds it does, the least play in a bearing, the smallest flaw, develops in a few moments into a serious breakdown.

There is an ominous ring about the phrase "engine failure." In the early days engine trouble was looked upon as more or less inevitable, and was of frequent occurrence. Gradually, however, the toll of losses due to this cause has been reduced almost to a minimum. The most scientific organisation, the most skilled technical knowledge, have been devoted by the R.A.F. to the perfecting of the engines used in the Force, thus ensuring that, so far as human foresight can prevent it, no lives shall be needlessly lost on this score.

A visit to the R.A.F. engine repair shops in France enables one to realise the complexity of the organisation necessary to keep in repair the engines required for the vast number of aeroplanes which were operating at the close of hostilities, and the minute care which is lavished upon every detail of the work.

The story of the growth of these engine shops is a fascinating record of steady progress. The parent of the depôt was No. 1 Aircraft Park, which closely followed the first five squadrons to France in 1914. After frequent moves during the early months of the War, including a 24-hours stay at Amiens from which a rapid retirement was necessary, No. 1 A.P. settled for a time near Rouen.

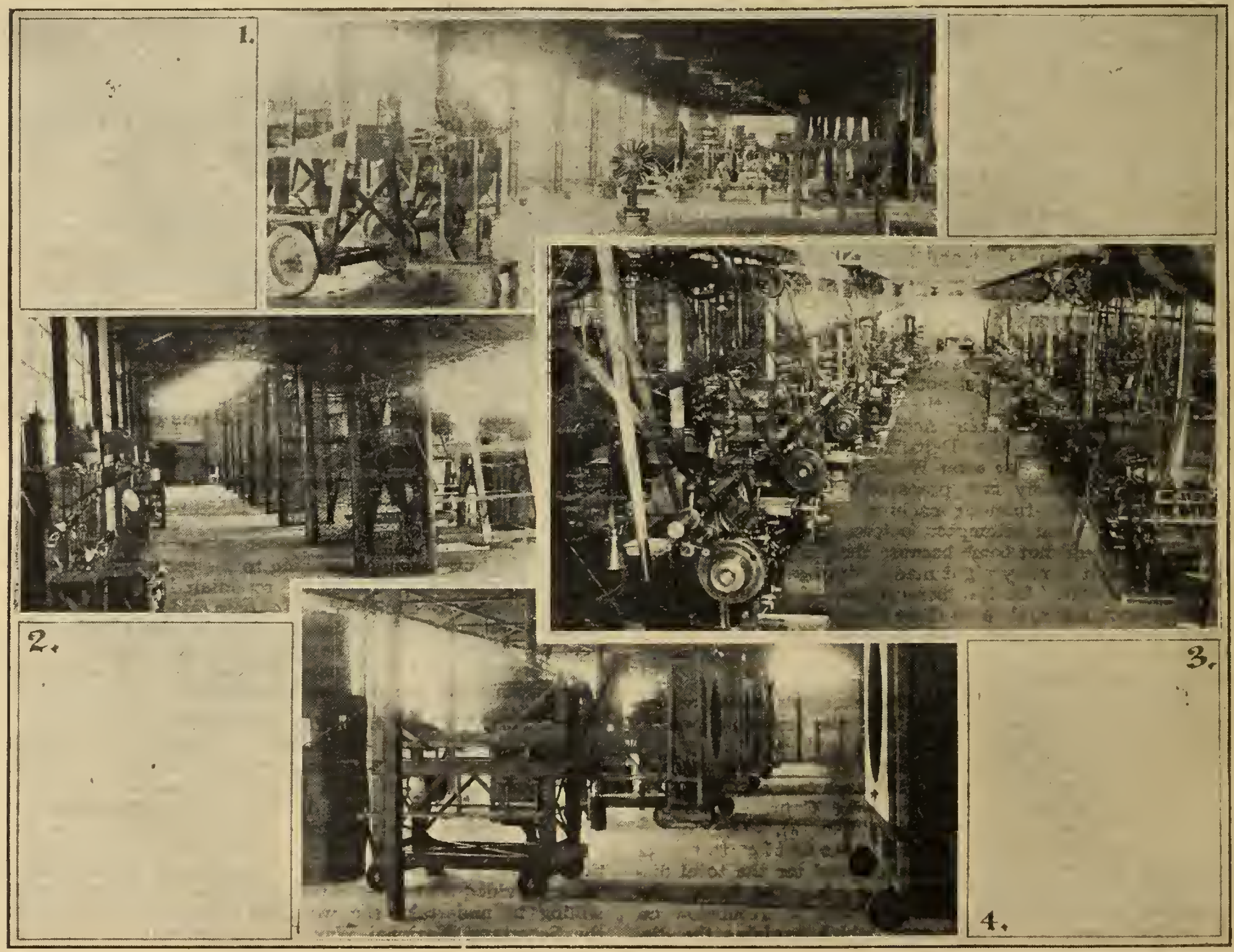
When the line became stabilised, the A.P. went forward, leaving behind the engine workshop section, consisting of 50 men and two officers. This section then became an independent unit and was re-named the engine repair shops, and took up its quarters in a nearly completed boot factory. This factory, which previously housed the whole staff of 50, is now merely the fitting and machine shop with a staff of 800 men.

As the number of squadrons in the field increased, the E.R.S. grew proportionately. In May, 1915, the section dealing with motor transport engines was detached. More ground was taken over, new sheds erected, new plant sent from England, and installed. The establishment was doubled, re-doubled and doubled again, until on November 11 the total staff numbered nearly 5,000, including 90 officers. Moreover, to keep pace with the work it was necessary to work continuously with day and night shifts. In 1914 all the power necessary was supplied by one small kilowatt set. In November, 1918, the power station contained four 100 h.p. and one 20 h.p. Petter oil engines generating 400 kilowatts. An interesting feature of the E.R.S. is that since its earliest days it has been under the continuous command of the same officer—Col. G. Hynes, D.S.O., who has been responsible for the wonderful organisation now existing.

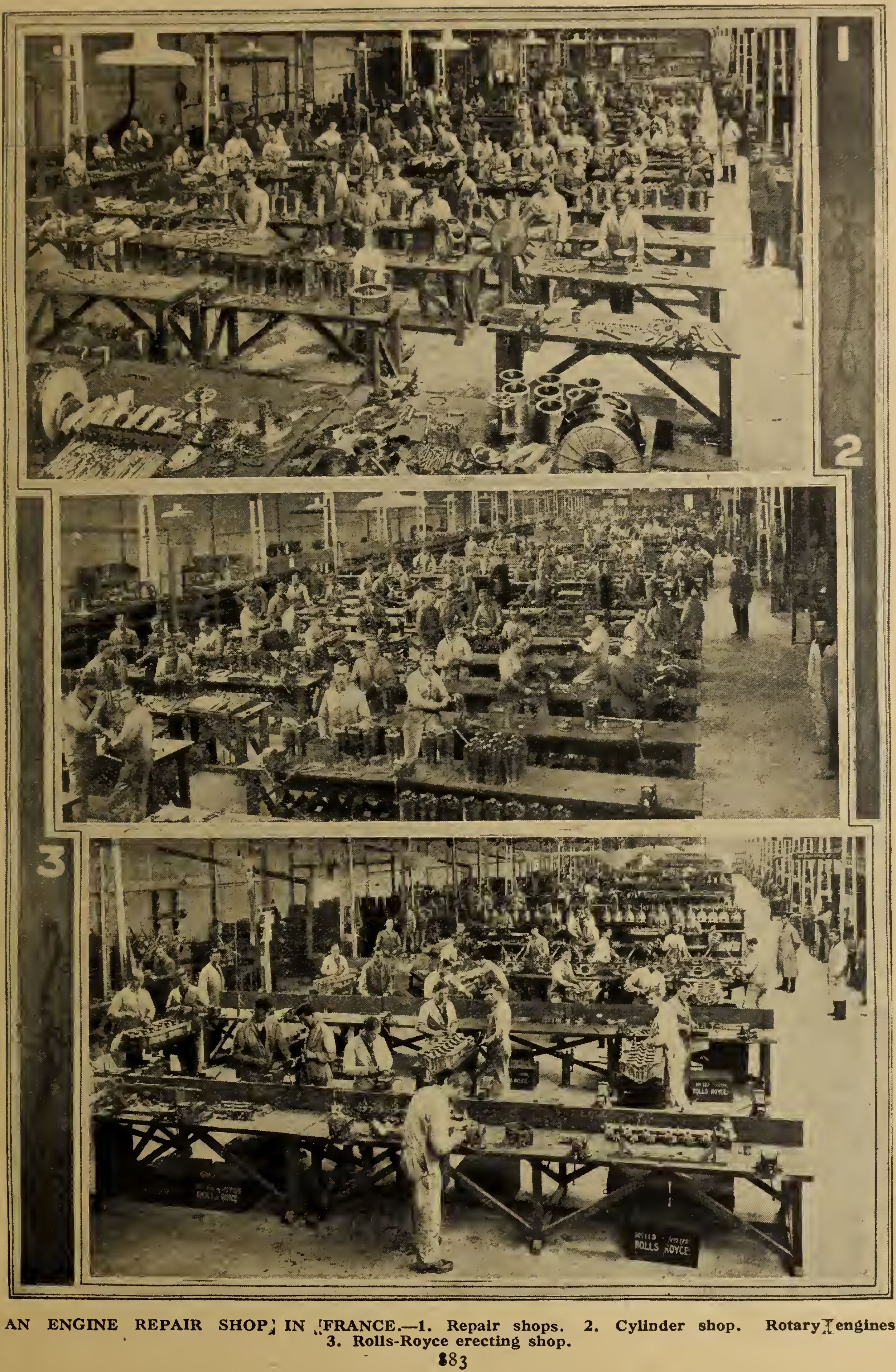
War flying is inevitably wasteful. The expenditure of engines is great. With over 1,500 machines in the field, hundreds of engine casualties occurred every month. In the R.A.F. the number of hours flying which any engine is allowed to make without complete overhaul is strictly limited. No risks are taken. As soon as the time limit is reached the engine is returned to the E.R.S. for overhaul.

Then there are the crashed engines. Apparently hopeless wrecks reach the shops and in a few weeks' time emerge as perfect as ever.

The division of the depôt is into six main groups, the first three dealing with different types of engines, and the last three with sub-division of the work.



AN ENGINE REPAIR SHOP IN FRANCE.—1. The testing shed. 2. Engines under propeller test. 3. One of the machine shops. 4. Engines running in wind brake test.



AN ENGINE REPAIR SHOP IN FRANCE.—1. Repair shops. 2. Cylinder shop. Rotary engines. 3. Rolls-Royce erecting shop.

1. Rolls-Royce, Beardmores and Liberties.
2. Hispano-Suiza direct drive, Le Rhone, Clerget and B.R. 1 and 2.
3. The 220 geared Hispano-Suiza.
4. Machine shops, tool shop, fitters, gas plant and heat treatment, chemical laboratories and rest room.
5. Pumps, magnetos and carburettors, electricians, foundry, power house, tin and copper welders, carpenters and painters.
6. Stores, motor transport, O.M., drawing office and H.Q.

The procedure is the same in each engine group. Every engine on receipt from the unpacking shed is sent to its respective group.

It is then completely stripped and each part washed and examined. Faulty parts are sent to their particular sub-divisions for repair and replacement. The various parts are then collected in the erection shops. This, by the way, is one of the longest jobs. In the Rolls-Royce engine there are over 3,000 parts, while 2,000 may be taken as a fair average for all types. Minute accuracy is required to eliminate all play, and many parts after being trued on machines to $\frac{1}{1000}$ in. are finally scraped by hand. The work of erection takes two men from 14 to 21 days for each machine.

After rebuilding, the engine is passed to the tuning shop and thence to the test house. After running for an hour on the brake test it is returned to the finishing section of the erection shops, re-examined by the inspection depôt, packed and re-issued to an aircraft depôt for supply to squadrons.

Although absolutely no precaution is neglected or trouble or necessary expense spared to ensure faultless running, typical economies are introduced whenever possible. For instance, all gas for the various heat treatments, etc., is generated in a special plant from waste oil and petrol. Scrapped iron is melted down in the foundry and re-cast. White metal for bearings is also melted down and cast into ingots for refuse, but this babbit metal is never used twice for aero engines. The ingots are passed on to the base depôt for M.T. use there. Perhaps an unnecessary precaution—since it has not been conclusively proved that babbit metal suffers by re-casting—but where lives may depend upon such details the R.A.F. takes no chance.

An interesting feature is the indicator board in the chief engineer's office, which tells at a glance how many engines are under repair, where each one is and how many are ready for issue. Another board in the production office keeps track of every job which comes to the shop apart from the actual engine repairs—such as orders for spare parts, etc.

One thing strikes one forcibly, that it has been possible to build up—under all the difficulties of active service—an organisation rivalling in efficiency the most modern shops laid down under peace time conditions at home. It is an achievement of which the R.A.F. may well be proud.

HONOURS

THE King has been pleased to give orders for the following promotion in and appointment to the Most Excellent Order of the British Empire, in recognition of the services of the following officers during the War:—

O.B.E.

Lieut. H. J. WAGG, R.N.V.R.—For valuable services as Second in Command of the Anti-Aircraft Telephone Staff at General Headquarters, Great Britain.

M.B.E.

Shipwt. Lieut. A. C. SMITH, R.N.—For valuable services as Barrack Master, Cranwell Air Station.

The King has been pleased to approve of the following award to the following officer in recognition of his gallantry and devotion to duty in the field:—

D.S.O.

Lieut. H. O. LONG, No. 3 Sqdn., R.F.C. now R.A.F.—For most conspicuous gallantry and ability during June and July, 1916. He initiated low-flying attacks on troops, transport, and trains far beyond the enemy lines. He also brought down several enemy aeroplanes. These flights were carried out alone and unescorted. He did splendid work.

The " Atlantic " Knights

IN last Friday's *Gaeztte*, formal announcement was made of the knighthoods of the Order of the British Empire conferred on Capt. John William Alcock, D.S.C., late R.A.F., and Lieut. Arthur Whitten Brown, late R.A.F., "in recognition of distinguished services to aviation in connection with the successful flight from St. John's, Newfoundland, to Clifden, Co. Galway, on June 14-15, 1919."

" N.C. 4 " Pilots Arrive Home

UPON the return to the United States on the transport *Zeppelin*, of Commander Read and the other American Atlantic flyers on June 27, arrangements were made for the vessel to be met and escorted into harbour by aeroplanes and airships. The reception programme had to be much modified by reason of rain and mist.

Atlantic Vickers-Rolls for Holland

AT the Air Exhibition at Amsterdam the Vickers-Rolls aeroplane in which Sir John Alcock and Sir Whitten Brown made their crossing is to be on view. During the exhibition an aerial service, which is to be maintained afterwards, between Paris and Amsterdam, should do much to keep interest alive in the show.

The Aerial Defence of London

UNVEILING at Poplar on June 23 a memorial erected to the 18 children who were killed in Upper North Street school in the daylight raid on June 13, 1917, Maj.-Gen. E. B. Ashmore, who has had charge of the aerial defence of London, said that after the last raid, although he did not like to prophesy, he did not think the Germans would try to get to London again. Between May 19, 1918, and the Armistice he had devised a new system of defence, four times as strong as the previous defences. After the defences were started two more day raids were made with a view to reaching London. One was stopped at Southend, and the other at Ramsgate, and at the latter place the guns shot down two of the raiders.

So far as the night raids were concerned, he himself at one time looked as though he would be hanged, but the Government spared nothing in the way of guns and searchlights. London, however, owed its defence more particularly to the gallant boys who flew by night, and so splendidly did thay do their work that two squadrons were made up to do night bombing work over the lines in France.

The balloon aprons which were erected in certain localities were also found very serviceable. Accordingly on May 19, 1918, when seven machines were brought down, this finally decided the Huns and they left London alone and turned their attention to Paris, which they afterwards raided 16 times.

From Plymouth to Buenos Aires

THREE flying men from South America, Capt. Angel M. Zuloaga (commander), Capt. Annibal Briguega (navigator), and Eng. Ambrosio Taravella (mechanic), are visiting London with a view to completing preparations for a flight from Plymouth to Buenos Aires *via* Portugal and Africa, some 8,000 miles, the Atlantic crossing, representing about 1,500 miles.

The flight may be made in an F 5 flying boat if one can be purchased from the British Government.

Roses Dropped by Parachute

AMONG the many gifts received by Queen Alexandra one which gave her great pleasure was a bouquet of Alexandra roses brought to her in a decorated car from Hyde Park, where it had been dropped, by means of a Guardian Angel parachute, from a Handley Page bombing machine piloted by Lieut.-Col. W. S. Douglas, M.C., D.F.C. Through her private secretary Queen Alexandra sent the following telegram to Messrs. Handley Page: "Queen Alexandra wishes me to thank you for the beautiful bouquet of roses which you have so kindly sent her, and which Her Majesty is interested to know was dropped in a parachute in Hyde Park and despatched to her by car. Queen Alexandra was pleased to see the splendid aeroplane circling round Marlborough House this morning."

Milan-Venice Airship Service

IT is reported from Milan that the airship service between Milan and Venice has been inaugurated. The dirigible "F.6" left Buggio, near Milan, with 30 passengers on board, on June 23, while at about the same time the " N. 14 " left Campalte, near Venice, carrying 20 passengers. Both airships are said to have made the journey successfully.

AIRISMS FROM THE FOUR WINDS

ANOTHER historical fact to be recorded for all time to the credit of aeronautical progress is the sending on Saturday, from Paris to London, by aeroplane—an Airco 4A—the Prime Minister's message to King George announcing the signature of the Peace Treaty. It was written at 4 p.m., in the Salle des Glaces, on the plain Congress notepaper. According to *The Londoner*, at 5.15 Mr. Bonar Law and Mr. J. C. Davidson, carrying the message, went up at Le Buc. In spite of head winds and a rough passage, they were—thanks to the skill of their pilot, Lieutenant Powell—at Kenley at 7.30. From Kenley Mr. Bonar Law and Mr. Davidson drove in a car to Downing Street. Mr. Davidson then continued his journey alone through the crowds to the Palace, which was reached at 8.25. At 8.30 the message was handed to His Majesty, who questioned Mr. Davidson with much interest on the details of this speedy and interesting flight.

- - -

KING ALBERT OF BELGIUM has throughout the War, in which he took so active a part, shown increasing interest in the aeroplane as an everyday means of travel. He has now, according to the *African World*, marked the same keen sense of future success in the air by providing a special fund of £80,000 for the purchase of 15 seaplanes of different types as an experimental mail and passenger service in connection with the opening up of the Congo.

- - -

IT was a pretty idea for the one and only "flag-day"—Rose-Day—which the public are now inclined to willingly tolerate, to be marked by the dropping of a magnificent "aerial" bouquet from a Handley Page for presentation to Queen Alexandra. Quite an elaborate scheme with rose bouquets attached to aeroplanes had been worked out in connection with Marlborough House, but this had to be abandoned, and the promoters rest content with dropping one for the Queen in Hyde Park, whence it was conveyed to Marlborough House by motor car.

- - -

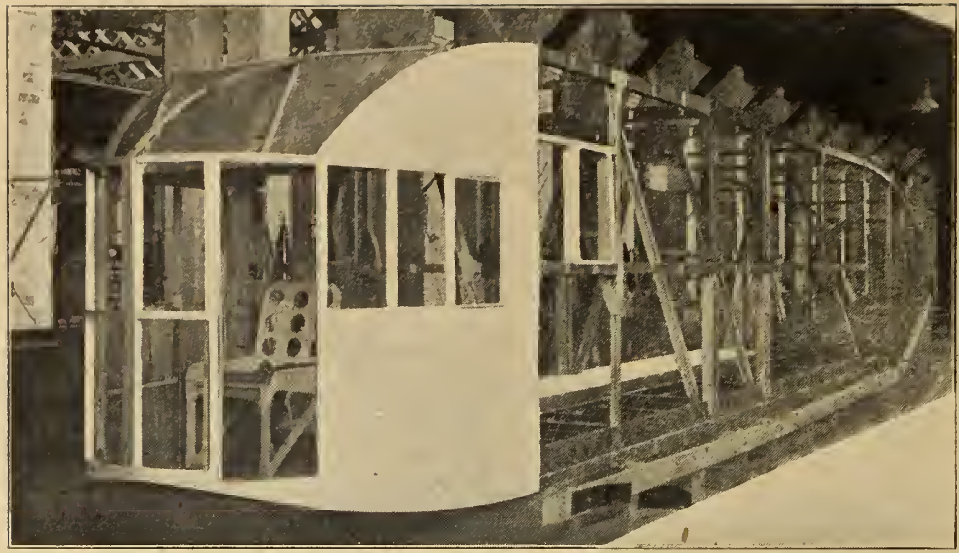
IT is, however, a far cry from a graceful little tribute like this to sending choice specimen flowers by plane for exhibition—and for competitive purposes at that—to the United States as suggested by Mr. F. Herbert Chapman, a Fellow of the R.H.S., in the Press. Mr. Chapman's suggestion is that: "Among other important possibilities of an aeroplane service to America will be the conveyance of flowers and plants for exhibition. Hitherto it has been impossible to exhibit new and choice flowers raised here at the American shows, but there are certain classes of flowers that would keep well in the cut state, even if out of water on the journey, and would then 'come up smiling' at an American show after the short period of an aeroplane passage."

Mr. Chapman thinks that "It is a great, important, and far-reaching prospect to plant breeders on both sides of the Atlantic." And we can believe it, but for many reasons, New York will, we fancy, still have to wait a little before it gets English-grown blooms on show the day of cutting.

- - -

WE are glad to be able, upon the authority of the Chancellor of the Exchequer, Mr. Chamberlain, to correct the figures regarding the cost of Air Ministry motor cars, which has been put by the Committee upon National Expenditure at the bagatelle of £2,700 per annum per touring car. Although most of the staff for whose use the cars have been necessary are thoroughly entitled to have automobile facilities for carrying out their onerous work, the sum named for maintenance is distinctly steep. Mr. Chamberlain has now stated at Edinburgh, that, having inquired into the facts, the real cost of each car works out at about £599. Even granting the extra odd £1 to bring the item to even money, this would not appear to be a very out-of-the-way cost for upkeep of a powerful car. But it would be as well if these new figures were backed by something more than mere statement, having regard to the original source of the estimates of the costs. Either Mr. Chamberlain should give bell and book for his correction, or it will be up to the Committee on National Expenditure to explain how they came to have their legs pulled so badly.

"GOING AWAY" BY AEROPLANE.—The wedding of Miss Standen and Mr. Hamilton at Chorley Wood last week, when the bride and bridegroom travelled by aeroplane for their honeymoon to Fowey, Cornwall. In the photograph the Avro is just about to depart.



ON THE STOCKS.—A view of the front portion of the *fuselage* of the Bristol passenger-carrying triplane. The usual transverse bracing has been modified so as to allow passengers to walk through the whole length of the cabin. There will be seating accommodation for 14 passengers, in addition to the two pilots.

QUITE a good idea to extend the utilisation of the old observatory on Ben Nevis for meteorological investigation in connection with aeronautics. The suggestion is that the building should be taken over by the Air Ministry and the weather record work, carried out there by scientists for the past 20 years up to the time of the War, should be elaborated During the War period, the building and approaches have suffered pretty considerably, owing to the closing of the observatory. It is an opportunity which might well be taken advantage of.

- - -

EXHIBITS for the Imperial War Museum are accumulating apace, and War in the Air should assuredly not be the least represented arm of our attack and defence when the Museum ultimately opens to the public. Already amongst noteworthy exhibits in the Air Force section are a seaplane used at the Battle of Jutland and six aeroplanes of historic interest, and a number of exhibits from the German airships brought down at Cuffley, in the Thames and elsewhere. Eighteen artists have been commissioned to represent from different points of view the war in the air, with the most important of its incidents, including bombing raids in co-operation with the naval and land forces.

AFTER all, Hawker was not the first aeronaut to be stranded in the water on a record attempt. In 1912 Emile Dubonnet and W. Jourdan set out from Paris in a balloon, and fell into the Channel, at a point far from any regular steamer track. They happened to be picked up by a little Dutch tramp steamer, which had run short of coal, and was taking a short cut to the nearest port. The water was up to the men's waists when they were rescued: about the only time when the shortage of coal was a blessing!

- - -

THAT weird fowl, the paragraphist who writes notes concerning aviation on a totally invisible Remington (after the manner of good old Charles Lamb, who used to supplement his income in much the same way), has been at it again. He is full of advice for the civilian aviator. John Citizen who buys a pensioned-off Curtiss with the idea of escaping speedily to a better world, is advised to smear his face with whale oil (*after* bidding farewell to his better half). You can imagine him calling up the Zoo, "Have you a spare whale, I'm rather afraid of frost-bite?" We are afraid his reception would be similar to that which the unhappy Zoo telephonist gave to the joyous young stockbrokers who used to fill in the idle moments a few years back by asking to speak to Mr. C. Lyon!

Mr. Sydney Pickles at Australia House on Alexandra Rose Day auctioned an "aeroplane" for the good of the cause. Mr. Pickles leaves England next week for Australia, the land of his birth.

THE ATLANTIC FLYERS AT ELSTREE

At the invitation of the chairman and directors of Vickers, Ltd., a highly successful garden party was given last week at Edgwarebury House, Elstree, the residence of Sir Trevor Dawson, to meet Capt. Sir J. Alcock, and Lieut. Sir A. Whitten Brown. The grounds of the house were delightfully decorated for the occasion, and the guests were received on the lawn by their host and hostess. During the proceedings some aeroplanes, flying at a low altitude, circled the grounds. The guests included Maj. and Miss Kennedy, Col. Arthur Lynch, Sir Ernest and Lady Moy, Col. Sir Roper Parkington, Sir John and Lady Bland Sutton, Sir James and Lady Miles, Sir Joseph and Lady Ward, Mr. Stedman, Sir Sam Fay, Lord Herbert Scott, the Greek Minister, Sir Edmund and Lady Wilde-Smith, Col. Sir Campbell Stuart, Sir Harry Brittain, Mr. Grahame-White, Mr. Gordon Selfridge, the Serbian Charge d'Affaires and Mme. Koyitch, Sir Arthur and Lady Robinson, Gen. Ashmore, Lieut.-Gen. Sir George and Lady Macdonogh, the Duchess de Lousada, Lieut.-Gen. Sir Travers Clarke, Sir Maurice and Lady de Bunsen, Maj.-Gen. Sir W. S. Brancker, Maj. Sir Fred Sykes, Gen. Swinton, Sir Glyn and Lady West, Sir John and Lady Denison Pender, Lieut.-Col. Sir Donald and Lady Robertson, Sir George and Lady Younger, Sir Beethom and Lady Whitehead and Miss Whitehead, Gen. Sir Henry and Lady Mackinnon, Gen. and Mrs. Napier, Sir Malcolm and Lady Fraser, the Marquis and Marchioness Townshend, Sir Frank Dyson, Gen. William Alexander, Vice-Admiral and Mrs. Waymouth, the Chinese Minister, Lady Tennant, Admiral the Hon. Sir Edmund and Lady Fremantle, Sir Arthur and Lady Pearson, Rear-Admiral Sir Charles and Lady Ottley, Col. Sir Arthur and Lady Leetham, Maj.-Gen. Sir Charles and Lady Parsons, Gen. Sir Hugh and Lady Stewart, Mr. and the Hon. Mrs. Vickers, Lord and Lady Cochrane of Cults, and the Hon. Dorothy Cochrane and Comdr. the Hon. A. D. Cochrane.

1

2

3

4

The directors of Vickers, Ltd., last week gave a garden party at the residence of Sir Trevor Dawson, Elstree, to meet Capt. Sir J. Alcock and Lieut. Sir W. Brown after their crossing the Atlantic in the Vickers-Rolls aeroplane. (1) On the lawn at Edgwarebury House, Elstree. Left to right: Sir Trevor Dawson (the host), Mr. Vickers, M.P., Capt. Sir John Alcock, Lady Dawson, the Hon. Mrs. Douglas Vickers, Lieut. Sir A. Brown and Miss Kennedy. Sir Vincent Caillard and the Hon. Mrs. Stuart Bouverie are just behind Lady Dawson. (2) The reception on the lawn. (3) Lady Dawson receives Sir John Alcock and Sir A. W. Brown. Sir Trevor Dawson on the right. (4) The Vickers commercial passenger-'plane flies over the grounds of Edgwarebury House.

SOME NOTES ON THE TRANSATLANTIC VOYAGE OF R 34

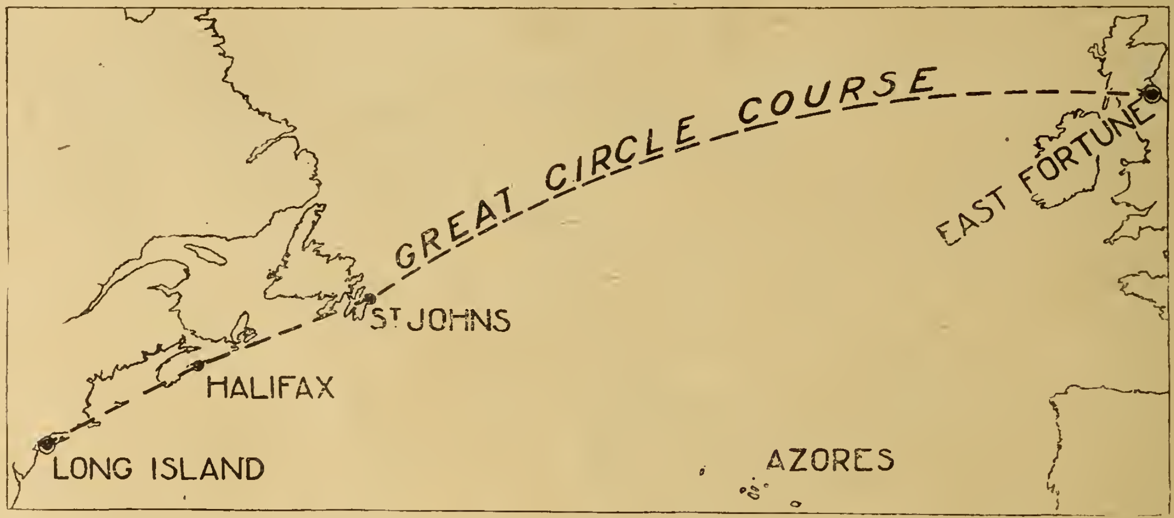
THE plan for sending an airship across the Atlantic which has long been under contemplation, at first by the Admiralty, and subsequently by the Air Ministry, has in the meantime been the subject of research and thorough preparation. Beyond the element of adventure which appeals to the imagination of all, this project of traversing by air a distance of 6,200 miles on the outwards and home journeys, over what is notoriously the seat of some of the worst weather in the world, if successful, must be regarded primarily as an achievement of organisation.

By now the R 34 is well on her way, the start having been made at 2.48 a.m. last Wednesday (within 48 mins. of the official time) from the Airship Station at East Fortune, in Scotland, for the United States, to return after a short stop at Hazelhurst Field, Long Island, New York. This venture, under the auspices of the Air Ministry, has for its object something more than to prove that the Atlantic can be crossed by lighter-than-air craft in continuous flight; it is hoped that it will demonstrate the practical advantages to be derived from aerial communication between Britain and America, and its possibility as a commercial proposition.

That the accomplishment of the flight will largely depend upon the weather conditions over the Atlantic is obvious; and it is quite possible, if adverse conditions are encountered, that the airship may have to return and await a more favourable moment.

It was originally intended to carry out a non-stop flight from England to Newfoundland and back, but it has since been decided that a landing will be made in the United States. Since, however, there is no Shed on the American continent large enough to accommodate an airship of this class, the R 34 will have to be moored in the open in order to replenish supplies. Two officers and a party of men of the R.A.F. are in America to superintend the preparation of the necessary arrangements, which, by the way, have been carried out in conjunction with the United States Navy Department, which has placed the landing ground at the disposal of the Air Ministry and has provided the large landing party required and all necessary stores. The country's thanks are due both to the United States Government for its interest and practical assistance, and to the Aero Club of America for their help in furthering the project.

The actual distance of the course to be followed in each direction is 3,100 nautical miles, the speed it is proposed to maintain being 40 knots, equivalent to 46 miles per hour (air speed). But so much depends on the weather that to attempt a definite estimate of the duration of the flights is not possible. For the outward journey the time required may be upwards of 100 hours or more if the speed is reduced, whilst that for the return flight may be considerably less, perhaps about 50 hours, owing to the assistance that will probably be afforded by the westerly winds prevailing over the course.



THE EAST TO WEST CROSSING OF THE ATLANTIC BY R 34: Sketch map of the air route to be taken by this British rigid airship during its approaching flight.

As a wish has been expressed that R 34 should mark her arrival over Canada, it has been arranged that if weather and other conditions permit she will pass at a low altitude over Halifax and drop a message. A bag of mails will be carried to the United States.

Details of R 34

It may, therefore, now be interesting to describe briefly the type of airship, R 33 and R 34, which will undertake the venture. Both were designed by the Admiralty and constructed by contractors. R 34 is the work of Sir William Beardmore and Co., Ltd., Inchinnan, near Glasgow, and R 33 of Messrs. Sir William Armstrong, Whitworth and Co., Ltd., Barlow, Yorks.

The gas-containing hull of the airship comprises a skeleton streamline framework of polygonal cross-section, built of light metallic girders. This framework is divided into chambers in which drum-shaped gas-bags are enclosed. The whole is covered with sheets of doped linen, stretched tightly over the framework. The length of R 34 is 643 ft. with a maximum diameter of 78 ft. 9 ins., and the dimensions of R 33 are almost identical. The gas-bags, 19 in number, contain, when full, nearly 2,000,000 cubic ft. of hydrogen gas, giving a nominal lift of about 60 tons. Each has an automatic gas release valve, and some are also fitted with a hand-controlled valve in order, if necessary, to discharge gas for a descent.

Along the inside of the bottom of the hull is the keel, forming a kind of tunnel through the chambers. It gives access for the passage of the crew from one gondola to another, and contains the petrol and oil tanks and water ballast bags. A portion of it is screened apart to form a dining and recreation room for the crew. Four gondolas are attached to the underside of the hull, the navigating compartment being situated in the leading portion of the forward gondola. All the controls of the airship are centred in this compartment or cabin, which is connected by telephones, telegraphs, and voice pipes with the other gondolas and the various stations of the crew. In it, also, is the wireless cabinet.

Five Sunbeam engines of the "Maori" type of 275 h.p. each drive the airship. Detached, but adjoining the navigating compartment of the fore gondola, is an engine room containing a single motor driving, through clutch transmission, a propeller. Approximately amidships two small gondolas are suspended side by side, each housing an engine, driving a propeller, reversing gears being fitted between the engine and propellers of these gondolas for reducing the speed whilst landing. The sternmost gondola contains two engines geared to drive one large propeller. There are thus five engines and four propellers. The airship is controlled by elevators and rudders which are attached to cruciform stabilising fins at the tail of the vessel. Its actual weight is slightly over 30 tons, and in favourable conditions it can carry nearly 20 tons of useful load, including crew, petrol, oil and ballast.

The Crew

Six officers and 20 N.C.Os. and airmen of the R.A.F. under the command of Maj. G. H. Scott, A.F.C., form the navigating crew of the R 34 and in addition three officers, one an officer of the U.S. Navy, will be carried to America as passengers, whose services can be called upon if necessary. The total complement on board will therefore be 30, their names being :

Officers.—Maj. G. H. Scott, A.F.C. (Captain), Capt. G. S. Greenland (1st Officer-Pilot), 2nd Lieut. H. F. Luck (2nd Officer-Pilot), 2nd Lieut. J. D. Shotter (Engineer Officer), Maj. G. G. H. Cooke, D.S.O. (Navigating Officer), Lieut. Guy Harris (Meteorological Officer), 2nd Lieut. R. F. Durrant (Warrant Officer), Brig.-Gen. E. M. Maitland, C.M.G., D.S.O. ; Lieut.-Com. Z. Landsdowne, U.S. Navy ; Maj. J. E. M. Pritchard, O.B.E. ; Sergt.-Maj. II W. R. Layes (1st Coxswain) ; Flight-Sergt. W. J. Robinson (2nd Coxswain).

Riggers.—Sergt. H. M. Watson, Corpl. F. Smith, Corpl. R. J. Burgess, L./Acting Corpl. E. P. Browdie, L./Acting Corpl. J. N. Forteath.

Engineers.—Flight-Sergt. R. W. Ripley, Flight-Sergt. N. H. Scull, Flight-Sergt. W. R. Gent, Sergt. T. W. Thirlwall, Sergt. A. G. Evenden, Corpl. J. H. Gray, Corpl. E. P. Cross, L./Acting Corpl. G. Graham, L./Acting Corpl. J. S. Mort, Acting Corpl. 2 R. Parker, Acting Corpl. 2 J. Northeast.

W./T. Operators.—Corpl. H. R. Powell, Acting Corpl. 1 W. J. Edwards.

In large airships, such as R 34, the crew is divided into watches, which take alternate spells of duty and rest, as is the old-established custom of the sea. On the journeys across the Atlantic the watches will be divided into spells of 4 hours duration. The first and second officers of the airship will take command, under the Captain, in alternate periods of watch keeping, following the precedent of the routine on board His Majesty's ships. The riggers correspond to the seamen of a marine craft, the first and second coxswains being the two senior riggers. The group of riggers is divided into two watches, one under each coxswain, and their duties during flight usually comprise height control, steering (lateral control) and keeping watch in the keel. In the Trans-Atlantic flight, the second of these duties will be performed by two officer passengers. In their periods of leisure the crew will take their meals and obtain recreation in the quarters for officers and men in the keel which are furnished with mess tables and all necessary conveniences, including a gramophone to help relieve the monotony. Sleeping hammocks are slung between the girders along the keel.

The food carried includes a two days' supply of fresh meat, and a three days' supply of bread, sufficient in all for five days full rations. A reserve of emergency rations, consisting of biscuits and chocolate, will suffice for a further three days, if necessary. It is worthy of note that the daily diet per man consists of 16 ozs. of bread (or biscuit), 6 ozs. of meat, 4 ozs. of cooked bacon, and a like amount of cooked potatoes, cheese, fruitarian cake and chocolate, supplemented by an allowance of jam, toffee, sugar, tea, condensed milk and condiments. The total weight of each man's daily ration is 51½ ozs., possessing a heat value of 4,695 calories. Food and water can be heated in boilers, of which there are three fitted in the exhaust pipes of the engines. Each is capable of boiling a gallon and a half of water in 8 mins. It will be the duty of one of the riggers to act as cook, whilst the engineers will tend the boilers. Eighty galls. of fresh water are carried in tanks ; and one ton of water in one of the ballast bags is also fit for drinking. As a protection against extreme cold the crew will wear silk underclothing, thick woollen garments, and a wind-proof flying suit overall. An interesting feature of the flying suit is that it is combined with a parachute harness, which permits full freedom to the wearer. Parachutes and lifebelts are also provided in appointed places for each member of the crew.

Atlantic Load

It is impossible to determine exactly beforehand the load with which the airship will leave the ground, as this is affected by the state of the atmosphere and purity of the gas—*e.g.*, a low temperature and high barometer would give the airship greater lift than a high temperature and low barometer by reason of the greater density of the air. The load carried, therefore, must be adjusted to suit the conditions under which a start is made. To obtain the most favourable conditions for lift, and because the wind is usually more settled after sunset, the start will probably take place during the night.

An estimate of the possible load is as follows, but it must be understood that the quantity of petrol is subject to reduction :—

Petrol, 18·0 tons ; oil, 1·0 tons ; water, 3·5 tons ; crew, 4·0 ; total, 26·5 tons.

In allowing for the weight of a man complete with his food and comforts, it has been calculated that 300 lbs. is a fair average. This is of interest, as it gives some idea of the approximate allowance that may be made for each passenger in future commercial airships.

Fuel Consumption, Speed and Height

At the cruising speed of 40 knots, which is attained by running three engines out of the total number, the petrol consumption is slightly over 1 gallon per mile—a remarkably low figure, when it is considered that each engine is rated at 275 h.p., and that the airship weighs close upon 60 tons when fully loaded.

An economy in fuel consumption can be effected by flying at lower speeds, as is indicated by the following table which is based on all the engines being run :—

Engine Speed.	Airship's Speed (knots).	Petrol Consumption. (Gals. per hr.)
1,800 r.p.m.	47	65
1,600 r.p.m.	42	50·8
1,400 r.p.m.	36	47·4

At the commencement of the outward and homecoming journeys the total weights will be adjusted to allow of a rise aerostatically to about 1,000 ft. During the voyages, variations in the temperature and barometric pressure of the atmosphere, notably those which occur between day and night, will have the effect of altering the equilibrium height of the airship, and as petrol and oil are consumed it will, subject to control, have a tendency to rise. One of the problems with which the Captain will have to cope is concerned with the effect of sunshine in raising the temperature of the gas above the temperature of the air ; this phenomenon, which is known as super-heating, is accompanied by expansion of the gas, with consequent loss through the automatic gas valves and a tendency of the airship to rise. If the vessel is allowed to rise, further loss of gas will ensue.

The planes and shape of an airship combined with its velocity give it the power to counteract a certain amount of difference in lift from the equilibrium point. This can be effected either by using the control planes, with the airship trimmed level, or by shifting weights, such as petrol or a number of the crew, along its length in order to trim the ship up or down by the bows so as to counteract heaviness or lightness, slight variations being corrected by the planes. By careful attention to the trim it is possible to keep the airship at a constant altitude, and the ill-effects that would result if superheating were not controlled are overcome. In 24 hours the vessel will go through a series of changes of lift more or less on these lines, the extent of the change of temperature of air and gas depending entirely upon the weather. The anticipation of the state of the airships buoyancy is one of the pilot's duties that calls for the greatest experience and judgment.

At its destination the vessel may, at the discretion of the Captain, be able to ascend to about 12,000 ft. The height attainable will be dependent upon the amount of load (and gas) expended and the state of the atmosphere. Long Island will probably be approached at an altitude of 2,000 ft.

Navigation

The navigation of airships admits of more precise methods than are possible in the case of aeroplanes. It is more closely allied to navigation on the sea, though far more complicated, because the swiftly flowing, variously directed winds with which the air navigator has to reckon are without parallel in sea navigation. It, therefore, demands a higher degree of skill. On the accuracy of the work of the navigator of R 34 will depend largely the success of the flight. It must be realised, of course, that whatever its speed an airship is affected by the wind—*i.e.*, the movement of the air in which it floats—so that slight variations in wind force or direction, taking into account its high velocity, would after some hours flying cause large errors in the estimated position of the airship. Over the North Atlantic there is always wind. Apart from the general slow movement of the whole body of air eastward, which in itself is a handicap to an aircraft flying from Britain to America, there is, a constant succession of cyclonic disturbances throughout the whole of the year. These depressions frequently form over or near the American Continent and pass slowly across the Atlantic towards Europe with the general wind drift.

Essentially, each depression has the form of a roughly circular revolving mass of air with the atmospheric pressure decreasing towards the centre. In the northern hemisphere the direction of rotation is counter-clockwise so that to the north of the disturbances the wind circles to the west. Also, south of the track of these depressions, between the United States on the one side and the Bay of Biscay and Spain on the other, there is almost invariably an area of high pressure, that is, an anti-cyclone. In this area the conditions are the opposite of those in a depression, the wind revolving in a reverse direction, so that to the north the winds have a tendency to move from west to east as they do on the adjacent south side of the depression.

The position of this high pressure area is influenced by the passage of the depression to the north of it, and although it is sometimes referred to as being centred in the neighbourhood of the Azores it is, in fact, seldom stationary and moves within the limits of latitudes 30° and 50°, bounded to east and west by Europe and America. It will be seen, therefore, that in order to obtain easterly winds to favour the outgoing journey it is necessary to go either to the north of the depression or to the south of the high pressure system. In the case of the voyage of R 34 it is proposed to take the northerly course. As a rule, it would be necessary to seek farther north than Iceland for these east winds, but a number of occasions occur when they come much more to the south, and it is in such conditions as these that R 34 would gain the greatest assistance from the wind.

The advantage to be derived from the direction of the wind, however, is frequently more than counterbalanced by the fact that in a depression there is generally a vast amount of cloud ; indeed, clouds may extend from within 500 ft. of the surface to heights exceeding 30,000 ft., while the cloud area may cover hundreds of miles. Fog is prevalent in the Atlantic during the whole of the year and particularly during the present warm months, but, owing to the height of the fog banks, its effects on air navigation are less marked than is the case with low clouds.

The navigator of R 34 will attempt to follow the "great circle" course from the north of Ireland to St. Johns, Newfoundland, that is, the portion of a line girdling the earth that connects the two places, appearing as a curved line upon a Mercator's chart, thence to Long Island *via* Halifax, if possible. He will deviate from this course in order to obtain more favourable weather conditions, but will keep to it as far as possible. It will take the airship to the north of the shipping lane to New York, but close to the track of ships bound to or from the St. Lawrence in Canada.

One advantage possessed by the air navigator over the seaman, is his ability to determine the course he is "making good" by observing with the aid of a Drift Bearing Sight the direction of motion of his craft relative to the sea or land below. At the present season of the year he is helped by the long period of daylight, amounting to 18 hours out of the 24. At night, or when visibility is bad, smoke bombs or flares can be dropped on to the sea to serve as a definite point of observation for determining the drift. The angle between the course steered and the course "made good" and the airship's air speed being known, the speed and direction of the wind can be calculated if readings are taken when travelling in two directions separated by 45° or more. But apart from these methods of navigation by "dead reckoning" the position of the airship can be determined with fair accuracy either by celestial observation by sextant, in the manner customary in marine navigation, using the sun by day and the stars by night, or by the wireless direction-finding apparatus. With this instrument it is possible to determine the direction of signals received. The point of interception of such bearings from known points on a chart gives approximately the position of the airship. Both celestial observations and wireless direction-finding are liable to error, but the mean of several observations should give a close approximation of the true position.

Meteorology

The condition of the weather must obviously be the first consideration for Captain and navigator, and the responsibility of the meteorological officer on board will be no light one. It will be his task to furnish reports of the weather around and ahead of the airship to enable the navigator to form an opinion as to the most favourable course to set. The Air Ministry has already in existence an extensive organisation of weather reporting, created for the benefit of competitors in the Trans-Atlantic flight competition. The Admiralty are also arranging to assist the R 34 by stationing two battle cruisers at certain pre-arranged points in the Atlantic. A meteorological officer from the Air Ministry will be on board each of these vessels to take customary observations, and to test the wind at different altitudes by means of kites and pilot balloons. The meteorological officer accompanying the R 34 will compile his own weather charts from reports transmitted to him by wireless. The latter will comprise the observations from the battle cruisers, from the United States Navy, Canada, Newfoundland, Ireland, Bermuda, Scandinavia and from the Azores and the ships in the Atlantic, as well as the synoptic report of the British Isles which is issued four times daily and an official bulletin of conditions in the Atlantic, both existing and probable, compiled by the Air Ministry twice daily. On the return flight he will also take into consideration the daily weather reports signalled by wireless from the Eiffel Tower.

Observations carried out from the airship itself will also be of value, and in this connection two methods have been proposed by which the meteorologist will be able to determine roughly the barometric pressure at the surface of the sea. One, which constitutes an innovation of unproven efficacy, has as its object the determination of the exact height of the aircraft above the sea, so that the barometric pressure below can be calculated from the reading in the car. It consists of firing a gun and calculating the height from the time taken to hear the answering echo of the report from the surface of the water. Fog or low clouds detract from the reliability of this system. Alternatively, a maximum reading barometer, which indicates and records the highest atmospheric pressure into which it has descended, may be lowered from the airship to near the surface of the sea.

Wireless Telegraphy

Apart from naval craft few or no seagoing vessels are equipped with a wireless telegraphy installation comparable in range and utility with that of the R 34. A combination of instruments has been devised to enable the airship to communicate with any wireless station or any warship within a range of over 1,000 miles, and other ships carrying wireless within a range of 100 miles. A wireless telephone attachment will also be carried which will permit speech to all types of wireless receivers up to a radius of 50 miles. Reference has already been made to the wireless-direction-finding apparatus, which it is hoped will prove of considerable value in navigation. All possible means for maintaining wireless communication with the airship in flight have been organised and co-ordinated, and it is hoped that communication will be maintained throughout the whole period of the voyage from the stations at the Air Ministry, East Fortune, Pembroke, Ponta Delgada in the Azores and St. Johns in Newfoundland.

The Marconi Wireless Telegraphy Co. have also kindly placed at the disposal of the Air Ministry their very complete organisation of wireless facilities over the North Atlantic, including the free use of their private telegraph lines and the two high-powered Trans-Atlantic stations at Clifden in Ireland and Glaco Bay in Nova Scotia. These stations will be utilised at routine times for transmitting signals to the airship from Britain and from the United States, and for sending messages across the Atlantic in connection with the flight. To ensure the reception by R 34, whatsoever her position, of messages passed by this route, arrangements have been made whereby the Glaco Bay Wireless-Telephone station will intercept and repeat all messages emanating from Clifden addressed to R 34, and conversely Clifden will repeat all messages for R 34 from Claco Bay. The airship will also use these two stations for "direction-finding." It will be seen that several wireless routes may be employed ; the selection of the quickest route will be made by the Air Ministry.

The Engineers

The duties of the engineers will perhaps be the most arduous of those of any of the crew. There is something peculiarly fascinating in the work of these men, whose task it will be to keep the motors running day and night for the many hours of the journey. They will have, of course, their alternate four-hour spells on and off duty. Two engineers are allocated to each engine and two to directing the distribution of petrol, which has to be pumped from the separate tanks along the keel to the storage tanks above each engine. A constant watch has to be kept that the engines are not starved, and petrol has to be drawn from the tanks with due attention to the Captain's instructions, so as to keep the airship in her necessary fore and aft trim.

Many long endurance cruises have been achieved by airships, but none which offered difficulties from the mechanical standpoint equal to those involved in the Trans-Atlantic passage. One of the possible causes for trouble against which provision has had to be made is the coagulation of the lubricating oil in the supply tanks, owing to the extreme cold which may be encountered, for instance, when passing over an ice-field, or at night. To eliminate this difficulty, so far as is practicable, special tanks are placed in the gondolas and through a coil inside these is circulated hot water from the engine cooling systems. The idea is to utilise the main tanks in the hull when that is possible and to fall back on the warmed oil only when the flow from the main tank fails.

One inherent advantage possessed by airships over aeroplanes is the possibility of executing engine repairs during flight, and for this purpose a number of spare parts are carried on board the R 34. Included with countless other minor parts, there are such items as two blocks of cylinders, connecting rods, pistons, valves, half a dozen magnetos and a gross of sparking plugs, sufficient to repair almost any simple engine defect. That the engineering staff must be equipped for every emergency was recently demonstrated on one of the trial flights, when it happened that a leather joint in an oil circulating system burst. Wooden plugs were at hand to stop the ends of the parted joint, and rubber connections and pipe clips of all sizes were also in readiness—but there was no leather. The engineer officer at once cut out the tongue of one of his boots and within a few minutes the engine was again running. In the event of an engine having to stop for repairs during the Atlantic flight there is a possibility of the water in the radiator freezing if the temperature is low. This will be guarded against.

In America

On arrival in the United States the airship will be moored in the open and will probably not remain longer than is absolutely necessary for taking in gas, fuel and stores, and for the adjustment of engines. This may be completed in 10 hours, or at the most, it is hoped, 24 hours.

If the weather is favourable it will be possible to bring the vessel close to the ground and refill gas bags and fuel tanks without difficulty, otherwise it may be necessary to anchor her clear of the ground by means of a "three-wire" mooring gear. This is a "tripod" of three cables, attached at the apex to a swivel under the bows of the airship, and arranged so that the airship swings head to wind and its lift counteracts the force of the wind. Weather reports from all sources will continue to be furnished regularly to the meteorological officer of the airship, who will be assisted by the meteorological officer at Newfoundland. It is hoped to start the flight so as to ensure the prevalence of good weather conditions at Long Island and the commencement of the return voyage without delay.

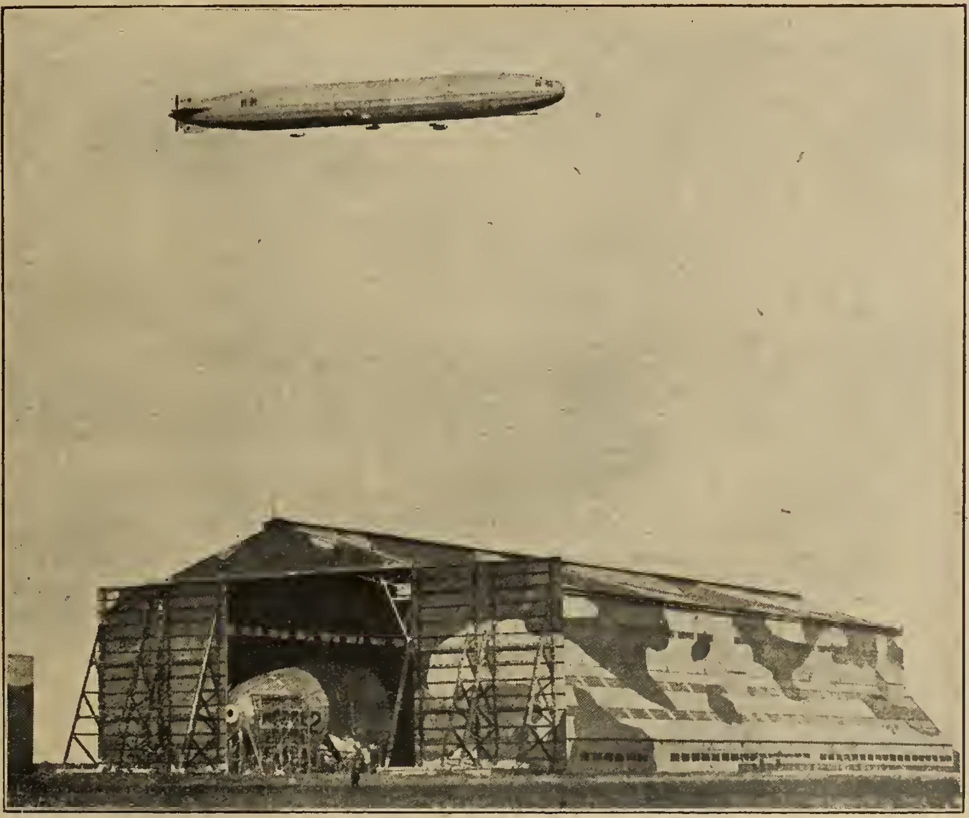
The Homeward Journey

The return journey will present fewer difficulties than the outward. As stated, the winds will probably be considerably more favourable, so that the duration of the flight and the strain on the personnel and engines will be less. Also, there will be an advantage in flying to the southward of disturbed weather, which will reduce the chance of any trouble due to the effects of cold and precipitation, as, for instance, rain, sleet and snow.

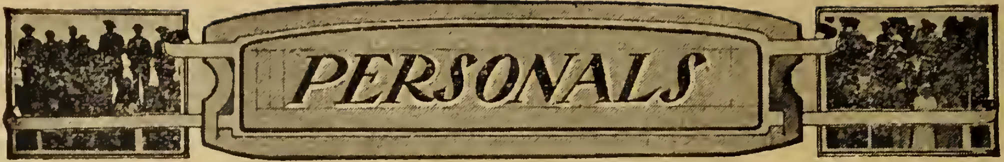
A Journalistic Record

A very fine object-lesson is afforded of the superiority of the aeroplane in times of emergency over other orthodox forms of communication, in the hustle which Mr. Ward Price, the *Daily Mail* correspondent, indulged in on Peace-signing day, last Saturday. Immediately after the signature of the Peace Treaty in the Hall of Mirrors, Mr. Price motored to Buc, and, there taking an aeroplane, reached London in time to write a complete story of the happenings for the edition of the *Weekly Dispatch* published at 3.30 on Sunday morning. By way of contrast, the Paris Post Office was congested with telegrams, some of which took 24 hours to reach London.

Through Mr. Ward Price's flight the *Weekly Dispatch* was enabled to publish a much fuller account of the signing than any other Sunday paper, in addition to a whole page of photographs taken during the afternoon, which were also brought by aeroplane.



The R. 31 over her camouflaged shed.—As the first giant airship made in this country, a few particulars of the R. 31, which was built by Messrs. Short Bros., may be of interest. She has a length of 615 ft., and a total capacity of 1,550,000 cub. ft., to lift 47 tons; she is fitted with five Rolls-Royce engines, totalling 1,500 h.p. Running through the keel there is a triangular structure of girders which forms a passage-way, from each side of which there are suspended the petrol tanks, water ballast bags and, in war time, bombs. The Rolls-Royce engines are in five units, two in the forward cars, two amidships, and one in the after car. The propellers, each 17 ft. diameter, are direct-driven, whilst the engines amidships have a reversing gear. The control is under the ship at the forward end, and she is navigated and controlled from this car, which also contains the wireless cabin. The ship is divided into 21 compartments, each of which contains a gas bag. These gas bags practically fill the whole of the hull, but there is a clear air space between the outer cover and gas bags which tends to keep the gas at an even temperature. At the top of the forward end of the ship there is fitted the gun platform, whilst machine guns are also fitted at various points on the top of the walking way at the tail end and in all the cars. A complete electric lighting outfit is provided, a telephone exchange is fitted from the control car to all parts of the ship. During flight, hot food is supplied to officers and crew by means of an apparatus fitted to the exhaust pipe from the engines. A parachute is supplied to each member of the crew. These parachutes are stowed at various points of the ship.



PERSONALS

Married

Lieut. F. H. Abell, R.A.F., son of the late F. H. Abell, of Cape Town, was married on June 9 at All Saints', Bulkeley, Egypt, to Gertrude I., daughter of John T. Atkin, of Bulkeley, Egypt.

Lieut.-Col. Osborne Arthur Butcher, D.S.C., R.A.F., was married on June 16, at All Souls', Langham Place, to Beatrice Viola, younger daughter of the late Edward Dorman Hodgson, of the Middle Temple, Barrister-at-Law, and Mrs. Dorman Hodgson, of 12, Montpelier Place, Brighton, and The Sycamores, Newick, Sussex.

Capt. Donald Singleton Evans, R.A.F., son of Mr. and Mrs. W. H. Evans, of Buntingford, Herts, was married on June 25 to Gladys Katie, daughter of the late Mr. and Mrs. Thomas Ayling, of Southsea, Hants.

Maj. Hugh Garnett, R.A.F., was married on June 18 at St. James' Church, Emsworth, to Enid, widow of C. J. R. Dawkins, 9th Welsh Regt.

Capt. Frank Douglas Holder, M.C., the Buffs and R.A.F., younger son of Mr. and Mrs. E. Holder, of Purley, Surrey, was married on June 18, at the Cathedral Church, Chelmsford, to Cynthia Olive, only daughter of Mr. George W. P. Hart, of Chelmsford.

Donald F. Tysoe, R.A.F., was married on June 24 at Christ Church, Lancaster Gate, W., to Ethel Milne Fernyhough.

To be Married

The engagement is announced between Lieut. C. F. Barton, R.A.F., of Toronto, Canada, and Mary Letitia Driffield Lee, younger daughter of the Rev. Frederick and Mrs. Lee, of Woodton Rectory, Bungay.

The engagement is announced between Lieut. W. N. Cumming, R.A.F., eldest son of Robert Cumming, 20, Bute Gardens, Hillhead, Glasgow, and Phyllis Maude, youngest daughter of Mr. and Mrs. W. Martin, Inverness Court Hotel (late of Hampstead).

The engagement is announced between Capt. Gerard Fane, D.S.C., R.A.F., son of Mr. Sidney Fane and Mrs. Fane, and Rhoda, daughter of Mr. and Mrs. Nicholas Bacon, of Raveningham Hall, Norwich.

The engagement is announced between Capt. N. L. Garstin, R.A.F., son of Mr. F. C. Garstin, C.C. and R.M., Stutterheim, Cape Province, South Africa, and Maria Ossorio, only child of the late F. de P. Ossorio, of Manila, and Mrs. F. de P. Ossorio, 2, Boyne Park, Tunbridge Wells.

The marriage arranged between Capt. A. Knight, M.B.E., North Lancs. Reg. and R.A.F., and Charlotte Beatric, only daughter of Dr. and Mrs. Ditkowski, of Paris, will take place at Brompton Oratory on Tuesday, July 8, at 2 p.m.

The engagement is announced between Lieut. R. B. Lovemore, D.S.O., R.A.F., elder son of Mr. and Mrs. W. B. Lovemore, of Swaziland, South Africa, and Miss Gwendolen Amy Edwards, only daughter of Mr. and Mrs. H. C. Edwards, of Sussex House, Raynes Park.

The engagement is announced between Capt. Denis C. W. Sanders, R.F.C., eldest son of Gordon Sanders, M.D., Villa Martha, Cannes, France, and Nancy, widow of Lieut. Ivan B. Sprot, Cameron Highlanders, and daughter of Sir George and Lady Berry, 31, Drumsheugh Gardens, Edinburgh.

The engagement is announced between Capt. R. M. Catterson Smith (late R.A.F.), younger son of Mr. and Mrs. Catterson Smith, of Edgbaston, to Caroline Mabel, eldest daughter of the late Mr. and Mrs. Ryland, of Baskerville House, Harborne, Birmingham.

The engagement is announced between Capt. R. C. M. Smith, formerly of the R.F.C., elder son of Mr. and Mrs. Stephen Smith, of 67, Park Hill, Clapham Park, and Lilian, younger daughter of the late George L. E. Raggett and Mrs. Raggett, of 99, Philbeach Gardens, Earl's Court.

The engagement is announced between Capt. Harold. Alfred Whistler, D.S.O., D.F.C., Dorsetshire Regt., attached R.A.F., second son of the Rev. A. J. Whistler and Mrs. Whistler, of Warkton Rectory, Kettering, and Hélène Marguerite, second daughter of M. J. Gottignies and Mme. Gottignies, of Marchienne-au-Pont, Belgium.

The engagement is announced between Capt. Raymond Whitaker, the Rifle Brigade and R.A.F., son of Mr. and Mrs. Arthur Whitaker, of 52, Cadogan Square, and Hilda Margaret Sharp, daughter of Lieut.-Col. and Mrs. G. E. Sharp, of The Close, Salisbury.

◆ ◆ ◆ ◆

" Going Away " by Aeroplane

Last week a marriage took place at Chorley Wood between Mr. R. Hamilton, an Indian Civil Servant, and Miss Norah Standen, the couple afterwards travelling by an Avro three-seater limousine, piloted by Lieut. R. S. Park, for their honeymoon, to Fowey, Cornwall. Leaving the church at 3.30 p.m., they landed at Bournemouth at 4.45 to take in petrol, and leaving at 5.30 p.m., reached Fowey two hours later. The actual flying time for the total distance of 240 miles was 2 hours 35 minutes.

Luggage was stowed in the back of the machine, and the bride carried with her a book to read, but deponent sayeth not the number of pages actually perused.

A Business Trip to Ireland

A " flip " of quite a different character to the honeymoon event recorded above was the journey the other day of Mr. Gordon Selfridge to Dublin and back in an Airco machine, piloted by Capt. Gathergood, the winner of this year's Aerial Derby. Upon his arrival in Dublin Mr. Selfridge said that the journey over was devoid of any untoward incident.

" We passed two storms and went round one," he said. Speaking of the future of commercial flying, he suggested that if one could fly from London to Dublin in three and a half hours, as he did, it should not be difficult to live in Dublin and do business in London.

He predicted that " we shall all be flying across the Atlantic in another three, four or five years, perhaps less."

On his return, *via* the air, to Hendon Mr. Selfridge said: " By using an aeroplane as a super-special train I have been able to transact business with a rapidity which would have been impossible by the use of any other vehicle. The double journey between London and Dublin by train and steamer would have taken me about 20 hours. By aeroplane I have made this journey, of roughly 700 miles, in 6¾ hours. The average speed was just over 100 miles an hour.

" If one can make a pioneer flight like this before flying routes have been fully organised, it shows what possibilities there are in high-speed aerial transport to the business man when he is in a hurry."

All of which, coming from such a very live business man, is highly encouraging.

The Enterprise of the " Evening Standard "

Very commendable and worthy of great results is the enterprise of the proprietors of the *Evening Standard*, in despatching regularly their newspaper by means of Avro machines to Dover, Deal, Eastbourne, Brighton, Seaford and other south coast towns. By this method the paper is obtainable at these popular resorts practically at the same time as in the London suburbs, about 50 minutes roughly being occupied in the journey from Hendon. Lieut. George Lusted, A.F.C., was the pilot for inaugurating the programme, and, judging by reports, this smart work is highly appreciated.

" R. 34 " to Carry Mails?

According to information received in Halifax, N.S., the Admiralty has instructed the captain of the dirigible " R. 34 " to pass over Nova Scotia and, if possible, Halifax, on its Transatlantic flight (unless weather conditions should necessitate a more southerly course), and to drop on its way a bag of letters from Great Britain addressed to prominent Canadian officials.

THE ROYAL AIR FORCE

London Gazette, June 24

Flying Branch

Capt. W. St. J. Scott-Scott to be Capt., from (S.O.); April 10.

Lieut. W. D. Harris to be Lieut. (A.) from (O.); Jan. 8.

Sec. Lieuts. to be Lieuts.:—J. McFarlane; April 26, 1918 (substituted for notification in *Gazette* of April 11). L. E. O. Lounds; May 30, 1918 (substituted for notification in *Gazette* of March 7). H. J. Fuller; June 14, 1918 (substituted for notification in *Gazette* of Feb. 4). C. H. G. Sanders; Oct. 4, 1918 (substituted for notification in *Gazette* of March 7). J. G. Prestwick; Oct. 18, 1918 (substituted for notification in *Gazette* of March 7). H. R. Hill, M.C.; Nov. 16, 1918 (substituted for notification in *Gazette*, May 23).

K. E. M. Holmes (Sec. Lieut., R.G.A., T.F.) is granted a temp. commn. as Sec. Lieut. (A.); Sept. 19, 1918.

C. H. Matthews (Sec. Lieut., Hamps. R., T.F.) is granted a temp. commn. as Sec. Lieut. (O.); Oct. 25, 1918.

316207 Flt. Cadet W. W. Brander is granted a temp. commn. as Sec. Lieut. (K.B.); Oct. 6, 1918.

The following relinquish their commns. on ceasing to be employed:—Capt. (Hon. Maj.) J. A. Dennistoun (Maj., Manitoba R.); Nov. 25, 1918. Lieut. G. S. O'Brien (Lieut., Can. Cyclist Corps); Feb. 14. Lieut. G. W. Blaiklock (Lieut., Quebec R.), Lieut. (Hon. Capt.) A. R. Fairbairn (Capt., C. Ont. R.), Lieut. J. E. Hanning (Lieut., Can. Engrs.), Lieut. H. G. Kent (Lieut., C. Ont. R.), Lieut. N. I. Sheppard (Capt., Alb. R.), Lieut. (Hon. Capt.) W. H. Shoenberger (Capt., C. Ont. R.), Maj. F. V. Woodman (Maj., Sask. R.); March 31. Lieut. C. J. L. Laurence (Lieut., C. Ont. R.); April 14. Lieut. W. M. E. Chester (Lieut., C. Ont. R.); April 16. Sec. Lieut. (Hon. Lieut.) J. C. Snelgrove (Capt., Can. R.); April 29. Capt. P. M. L. Edmunds (Lancers); May 19. Sec. Lieut. (Hon. Capt.) G. H. Gillis, D.F.C.. (Capt. Can. A.P.C.); June 5. Lieut. A. Dodds (Lieut., N. Staffs. R.); June 7. Lieut. S. H. Short (Lieut., Can. F. Art.); June 10. Lieut. H. Towse (Lieut., Manitoba R.); June 11. Sec. Lieut. E. Hill (Lieut., C. Ont. R.); June 12.

(Then follow the names of 175 officers who are transfd. to the Unemployed List under various dates. We regret that owing to great pressure on our space it is impossible to reprint this portion of the List.—ED.)

Maj. F. E. Sandford, A.F.C., is temporarily transfd. to the Unemployed List; June 16.

Sec. Lieut. (Hon. Capt.) A. Cumming relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Capt.; May 29.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—J. A. Chubb, W. Gaunt (contracted on active service), G. R. Halliday; June 12.

Lieut. C. F. Wolley-Dod (Lieut., Notts. and Derby. R.) resigns his commn., and is permitted to retain his rank; May 16.

Lieut. C. B. R. Macdonald (Capt., R.E.) resigns his commn.; June 18.

Sec. Lieut. J. S. McGeown relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; June 12.

Sec. Lieut. C. E. Irving is antedated in his appointment as Sec. Lieut. (A.); June 1, 1918.

The date of appointment of Sec. Lieut. T. Mundy and Sec. Lieut. E. A. Murray to be Lieuts. is March 8, and not May 8, as stated in the *Gazette* of May 23.

The rank of Sec. Lieut. C. D. Clark is as now described, and not as stated in the *Gazette* of May 30.

The initials of Lieut. L. G. Hall are as now described, and not as stated in the *Gazette* of April 4.

The surname of Maj. (actg. Lieut.-Col.) A. K. Tylee, O.B.E., is as now described, and not "Tyler," as stated in the *Gazette* of May 9.

The notifications in the *Gazette* of March 7 concerning the undermentioned officers are cancelled:—Sec. Lieut. A. Holdsworth, Sec. Lieut. C. W. Phillips, Sec. Lieut. T. D. Sykes.

The notification in the *Gazette* of March 18 concerning Capt. D. Plaistowe is cancelled. (Notification in the *Gazette* of April 4 to stand.)

The notification in the *Gazette* of March 28 concerning Lieut. J. Ll. Davies is cancelled.

The notification in the *Gazette* of April 11 concerning Sec. Lieut. C. D. Metcalfe is cancelled. (The notification in the *Gazette* of April 29 to stand.)

The notification in the *Gazette* of April 29 concerning Lieut. W. G. Barlow is cancelled.

The notification in the *Gazette* of May 16 concerning Sec. Lieut. M. D. McTaggart is cancelled.

The notification in the *Gazette* of June 3 concerning Lieut. A. R. Cowan is cancelled.

Administrative Branch

Capts. to be graded for purposes of pay and allowances of Majs. whilst employed as Majs.:—W. R. Mackenzie, D.S.C., P. J. Wiseman; May 1.

Capt. (actg. Maj.) J. Selwyn to be Capt., from (S.O.) and relinquishes the actg. rank of Maj. on reduction of establishment; March 24.

T. I. Birch (Capt. and Qtr., R.W. Surr. R.) is granted a temp. commn. as Capt.; Oct. 30, 1918, with seniority from April 1, 1918.

Lieut. E. R. Wilkinson to be actg. Capt. whilst employed as Capt., from July 21 to April 30.

Lieut. D. H. Macintyre to be Lieut. from (A.); June 4.

Sec. Lieut. J. Cobley to be Lieut.; April 25, 1918. (Substituted for the notification in the *Gazette* of Feb. 14).

Sec. Lieuts. to be actg. Lieuts., without pay and allowances of that rank. whilst employed as Lieuts.:—E. J. Gordon, from Feb. 5 to Feb. 28. T. Caine, from Feb. 20 to April 30. Sec. Lieut. J. W. A. Legge-Willis to be Sec. Lieut., from (K.B.); May 2,

F. V. Russ is granted a temp. commn. as Sec. Lieut.; June 20.

Lieut. J. H. Lester relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; May 26 (substituted for notification in *Gazette* June 6).

(Then follow the names of 29 officers who are transfd. to the Unemployed List under various dates.)

Maj. Sir J. Eardley-Wilmot, Bt. (Rif. Bde., S.R.), relinquishes his commn. on account of ill-health caused by wounds; June 20.

Capt. L. E. Eeman relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; March 8 (substituted for the notifications concerning this officer in the *Gazettes* of March 7 and 28).

Lieut. (Hon. Capt.) H. J. Petty relinquishes his commn. on account of ill-health contracted on active service, and is granted the rank of Capt.; May 31.

Lieut. H. P. L. Gardner (Norfolk R., S.R.) relinquishes his commn. on account of ill-health contracted on active service; June 21.

The notification in the *London Gazette* of April 1 concerning Lieut. J. K. Line is cancelled.

The notification in the *London Gazette* of June 13 concerning Sec. Lieut. (Hon. Capt.) A. N. Wyatt is cancelled.

Technical Branch

Lieut.-Col. H. Blackburn to be Lieut.-Col. from (S.O.); April 2.

Capt. A. Garrard to be actg. Maj. while employed as actg. Maj., Grade (A), from April 1, 1918, to April 30.

Capt. (actg. Lieut.-Col.) G. Waddell to be Capt., Grade (B) from (S.O.), and to relinquish the actg. rank of Lieut.-Col.; Sept. 22, 1918.

Lieut. W. J. Bunting to be actg. Capt. while employed as Capt., Grade (A), from Nov. 1, 1918, to April 30 (substituted for the notification in the *Gazette* of May 9).

Lieut. E. W. Chatterley to be actg. Capt. while employed as Capt., Grade (B), from Oct. 2, 1918, to April 30.

Lieut. W. G. Stuart to be Lieut., Grade (A) from (Ad.); Aug. 19, 1918.

Sec. Lieut. S. G. Newport to be Lieut.; March 24 (substituted for the notification in the *Gazette* of April 11).

Sec. Lieut. (Hon. Lieut.) D. R. Mitchell to be graded for purposes of pay and allowances of Lieut. while employed as Lieut., Grade (B), from May 1 to May 14.

Lieut. N. A. Ayres to be Sec. Lieut., Grade (A), from (Ad.); Nov. 1, 1918, and to be Hon. Lieut. (substituted for the notification in the *Gazette* of Nov. 22, 1918).

Sec. Lieut. W. W. Hammond to be Sec. Lieut., Grade (B), from Grade (A); June 25 (substituted for the notification in the *Gazette* of June 13).

Sec. Lieut. (Hon. Lieut.) E. A. Horan (Lieut., N.Z. Forces, Otago R.) relinquishes his commn. on ceasing to be employed; June 4.

(Then follow the names of 30 officers who are transfd. to the Unemployed List under various dates.)

Lieut. P. N. Shone (Lieut., S. Staffs. R.) resigns his commn., and is permitted to retain his rank; June 25.

The notification in *Gazette* May 7, 1918, concerning Lieut. G. P. Harding, M.C., is cancelled.

Medical Branch

Transferred to the Unemployed List:—Capt. F. A. Hampton; April 23. Capt. N. S. Gilchrist; April 30. Lieut. F. S. Drewe; May 30.

The notification in *Gazette* April 18 concerning Sec. Lieut. L. W. Jones is cancelled.

Chaplains' Branch

Principal Chaplain for Presbyterians.—Rev. W. Moffat (A.C.D.) is granted a temp. commn. as Chaplain, with the relative rank of Lieut.-Col., and is granted the relative rank of Col. while employed as Principal Chaplain; March 7, seniority Jan. 1 (substituted for notification in *Gazette*, Feb. 4).

Memoranda

Sec. Lieut. (Hon. Lieut.) R. V. J. S. Hogan to be Lieut.; April 2, 1918.

(Then follow the names of 53 Overseas Cadets granted Hon. Commns. as Sec. Lieuts.)

Maj. J. F. Dyer (Capt., Bt. Maj., E. Lancs. R.) relinquishes his commn. on ceasing to be employed; June 9.

Lieut.-Col. (Hon. Col.) L. Munro (Col., Spec. List) relinquishes his commn. on ceasing to be employed,. and is permitted to retain the rank of Col.; June 16.

The following relinquish their hon. commns. on ceasing to be employed:—Temp. Hon. Capt. F. C. Lea; March 31. Temp. Hon. Lieut. J. L. Napier; June 16. Temp. Hon. Lieut. H. P. Dickinson; June 25.

The notification in the *Gazette* of April 1 concerning Capt. F. A. Ford is cancelled.

(Then follow the names of five officers who are transfd. to the Unemployed List under various dates.)

London Gazette, June 27

The following temporary appointment is made:—

Deputy Director.—Lieut.-Col. I. M. Bonham-Carter, O.B.E., and to be actg. Col. whilst so employed; June 8, vice Col. B. C. H. Drew, C.M.G.

The following temporary appointments are made:—

Staff Officer, 1st Class.—(Air) Lieut.-Col. G. I. Carmichael, D.S.O.; June 23.

Staff Officers, 3rd Class.—(P.) Capt. A. M. Waistell, D.S.C.; Jan. 21. (T.) Lieut. C. T. Inman; May 16, vice Lieut. D. C. Sutherland.

Flying Branch

Capt. W. R. Read, M.C., A.F.C., retains the grading for purposes of pay and allowances of Maj. whilst employed as Maj. (A.); June 5.

Capt. J. S. Wheelwright, D.S.C., to be Capt. (A'Ship.) from (T.); May 1.

Lieut. (Hon. Capt.) I. G. Roberts to be actg. Capt. whilst employed as Capt. (A.), from Dec. 18, 1918, to April 30.

Sec. Lieut. L. Michell, M.C., to be Lieut.; June 8, 1918 (substituted for notification in *Gazette*, March 7).

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieut. (A.):—C. H. Swan; July 13, 1918. P. H. Leigh; Aug. 24, 1918.

The following relinquish their commns. on ceasing to be employed:—Lieut. R. L. Tribe (Lieut., R.G.A.); June 20, 1918. Lieut. W. J. Blitch, D.C.M. (Lieut., W. Ont. R.); Oct. 19, 1918. Lieut. G. T. Henderson (Lieut., R.A.S.C.); Nov. 1, 1918. Lieut. H. F. Merritt (Lieut., Northumb. Fus.) Feb. 26. Sec. Lieut. (Hon. Lieut.) E. A. Bradshaw (Lieut., C.A.S.C.); April 14. Sec. Lieut. (Hon. Lieut.) L. S. Dell (Lieut., R.F.A.); May 14. Capt. G. O. Johnson, M.C.; May 15. Sec. Lieut. (Hon. Lieut.) J. D. Le Grove (Lieut., W. York. R.), Lieut. J. P. Nickalls (Lieut., R.F.A.); June 2. Lieut. W. H. S. Towell (R.N.); June 6. Lieut. N. Partridge (Lieut., Manitoba R.); June 9. Capt. F. W. L. V. Fraser, O.B.E., M.C. (Capt., Sea. Highrs.); June 12. Sec. Lieut. J. Brewster (Sec. Lieut., R. Berks. R.); June 13.

(Then follow the names of 153 officers who are transfd. to the Unemployed List under various dates. We regret that owing to great pressure on our space it is impossible to reprint this portion of the List.)

Maj. A. D. Bell-Irving, M.C. (Gordon Highrs.) relinquishes his commn. on account of ill-health contracted on active service; June 24.

Maj. A. C. Clarke (Capt., Welsh R.), resigns his commn., and is permitted to retain his rank; June 28.

Maj. A. Leamon-Berry is cashiered by sentence of General Court-Martial; June 6.

The following Capts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—J. E. Brewin; June 13. L. H. F. Irving (contracted on active service); June 18.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—S. F. Napper; June 12 (substituted for notification in the *Gazette* March 21). L. R. Sinclair (contracted on active service); June 17. L. F. Cocks (contracted on active service); June 19. C. W. G. Ratsey (contracted on active service); June 23.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—J. R. Johnson; May 9 (substituted for notification in the *Gazette* Feb. 21). W. N. Matthews; June 19.

Sec. Lieut. A. F. V. Clark is removed the Service; May 9.

The appointment of Sec. Lieut. G. P. Kells is antedated to Aug. 26, 1918.

The initials of Lieut. G. A. Brooke are as now described, and not G. M., as stated in the *Gazette* April 29. The rank and initials of Sec. Lieut. H. Gatfield are as now described, and not "Lieut. H. H. Gatfield," as stated in the *Gazette* April 29. The initials of Lieut. R. W. P. Goodwin are as now described, and not as stated in *Gazette* of May 2. The Christian names of Lieut. Harvey Allan Miller are as now described, and not "Harry Allan," as stated in *Gazette* of June 17. The Christian names of William George Edwards are as now described, and not "William Edwards," as stated in *Gazette* of Aug. 6, 1918. The surname of T. C. Beeken is as now described, and not "Becker," as stated in *Gazette* of Feb. 14. The surname of Lieut. S. A. Oades, M.C., is as now described, and not "Oudes," as stated in *Gazette* of April 29. The surname of Lieut. P. C. Norton is as now described, and not "Morton," as stated in *Gazette* of April 29. The surname of Sec. Lieut. W. K. J. Shirlaw is as now described and not "Shirlam," as stated in *Gazette* of April 29. The surname of Lieut. L. C. Jarrett is as now described, and not "Janett," as stated in *Gazette* of May 2. The surname of Lieut. A. R. Browne is as now described, and not "Brown," as stated in *Gazette* of April 29. The surname of Sec. Lieut. J. J. Comerford is as now described, and not "Comerfield," as stated in *Gazette* of May 6.

The notification in *Gazette* of June 6 concerning Lieut. (actg. Capt.) H. C. Sootheran is cancelled.

The notification in *Gazette* of Feb. 4 concerning Lieut. A. G. Niven is cancelled.

The notification in *Gazette* of April 15 concerning Sec. Lieut. W. T. Neilson is cancelled. (*Gazette* notice of May 27 to stand.)

Administrative Branch

Sec. Lieut. C. E. Yates to be actg. Capt. whilst employed as Capt., from Jan. 15 to April 30.

Capt. J. F. Hay to be graded for purposes of pay and allowances of Lieut. from (S.); Jan. 8 (substituted for notification in *Gazette* of Feb. 25).

Lieut. A. S. Budge to be Lieut., from (K.B.); April 17.

Lieuts. to be Lieuts., from (S.O.):—G. Verden; May 18. (Hon. Capt.) P. V. G. Van der Byl, M.C.; June 1.

Sec. Lieut. E. A. Williams to be actg. Lieut. whilst employed as Lieut., from Sept. 16, 1918, to April 30.

Sec. Lieut. J. H. Blackey to be Sec. Lieut., from (A.); June 5.

Sec. Lieuts. to be Sec. Lieuts., from (K.B.):—H. F. Turner, R. G. Smith; April 17.

Sec. Lieuts. to be Sec. Lieuts., from (O.):—H. S. Gargett, and to be Hon. Lieut.; June 3. C. W. Clutson; June 4.

The following are granted temp. commns. as Sec. Lieuts.:—W. Brown, T. G. Cemery, C. L. Helsdon, T. H Jolley, R. N. Tomkins, H. J. Vale; June 24.

AVIATION IN PARLIAMENT

Post-War Conditions of R.A.F. Service

MR. RAPER, in the House of Commons on June 24, asked the Under-Secretary of State to the Air Ministry if he can now make a statement as to post-War conditions of service in the Royal Air Force?

The Under-Secretary of State for Air (Maj.-Genl. Seely): The final consideration of this question is now proceeding, and will, I hope, be completed very shortly.

Mr. Raper: Is the hon. and gallant gentleman aware of the fact that the uncertain state of the future conditions of the Air Force prevents a large number of ex-officers of the Air Force arriving at a decision as to their future career?

Maj.-Genl. Seely: I am fully aware that it is a most urgent matter to come to a decision on this question. If my hon. and gallant friend will put down a question in a fortnight's time I hope to be able to give him a full statement.

Air Ministry (Staff)

MR. ARNOLD asked the Under-Secretary of State to the Air Ministry the number of the staff of the Air Ministry on May 31, 1919, as compared with the number on the date of the Armistice, November 11, 1918?

Maj.-Genl. Seely: The number of persons of all types employed in the Air Ministry at the Armistice was 4,646 and on May 31 3,289. It will be understood that the large amount of work due to demobilisation has necessitated the retention of a large clerical staff.

The Women's Royal Air Force

LIEUT.-COMDR. KENWORTHY on June 25 asked the Under-Secretary of State to the Air Ministry what was the numerical strength of the Women's Royal Air Force, officers and other ranks, respectively, no November 1, 1918, and on June 1, 1919?

The Under-Secretary of State for Air (Maj.-Genl. Seely): The figures are as follows:—

November 1, 1918, 496 officers, 25,062 other ranks.

June 1, 1919, 442 officers, 20,419 other ranks.

The figures for November 1 include 24 officers and 1,543 other ranks Women's Royal Naval Service serving at Women's Royal Air Force Stations and subsequently transferred to that force.

Lieut.-Comdr. Kenworthy: Will the right hon. gentleman consider the hastening of the demobilisation of these ladies, in order to give employment to discharged unemployed soldiers?

Maj.-Genl. Seely: Yes, Sir; that is being borne in mind. The process of reduction is continuing. Of course during the very rapid demobilisation of the men of the Royal Air Force we depend principally upon the women to carry us through this difficult period.

Air Navigation

CAPT. WEDGWOOD BENN on June 26 asked the Under-Secretary of State for Air (1) whether any sextant suitable for taking bearings in the air is in use or being experimented with; (2) what liaison exists between the Air Ministry and the Admiralty with a view to applying to air navigation the experience of the Navy; (3) what is the staff of the Air Navigation School; and whether it includes any qualified marine navigators; (4) what progress is being made in instruction in taking bearings in the air?

The Under-Secretary of State for Air (Major-General Seely): At the moment the whole system of instruction in aerial navigation is being revised, and the schools of aerial navigation re-organised; and in this process we shall certainly keep in close touch with all those whose experience of aerial or marine navigation is likely to be of assistance, and endeavour to perfect, as far as possible, all mechanical aids to navigation, such as sextants. Experiments with various types of sextant are already being carried out with this object.

At the present moment there is great hope of the early development of a satisfactory artificial horizon sextant and experiments are now being carried out at the Royal Air Force experimental establishments with a view to its early perfection. I would add that the officers who are dealing with this question will be very glad if my hon. and gallant friend will give them the benefit of his advice and criticism.

Capt. Benn: Is the Air Force taking full advantage of the navigating experience of the Admiralty? That is the point.

Major-General Seely: Yes, Sir. I think we may say we are working in absolutely close co-operation with them, and many of the officers dealing with this matter have themselves sea experience.

Capt. Benn: Are any of the instructors in the navigation schools naval officers?

Major-General Seely: Speaking from recollection, many of them aro or have been in the Navy. I should like to have a precise question on that point.

Lieut.-Comdr. Kenworthy: Are there any navigating officers among the instructors?

Major-General Seely: I must have notice as to the precise number of navigating officers. My hon. and gallant friend is aware that many of our Air Force officers guiding us in this matter are naval officers.

Capt. Benn: Are they naval officers or members of the Royal Naval Air Service, which is different?

Maj.-Gen. Seely: Both.

Aeroplanes (Cypress Wood)

MR. REMER asked the Under-Secretary of State for Air whether, in view of the fact that the use of cypress on aeroplanes cost the nation over a quarter of a million sterling, he will appoint a small Committee of Enquiry to go into the whole circumstances?

Maj.-Gen. Seely: The matter has already been fully investigated. The decision to use cypress was taken by the Department on expert advice as a war measure to meet a pressing emergency. I see no reason for a special Committee of Enquiry.

Mr. Remer asked the Under-Secretary of State for Air whether his attention has been called to a minute in his Department proving that one of his present advisers on timber was the official responsible for sanctioning the use of cypress; and what action he intends to take?

Maj.-Gen. Seely: I do not know to what document my hon. friend refers in the first part of the question. But, in any case, I do not think any further action is required.

Timber Transport

MR. REMER asked the Under-Secretary of State for Air whether large quantities of timber were dispatched by rail from Glasgow to London for no other purposes but to be stored; and whether, in view of the fact that traders are complaining of congestion on the railways he will take steps to see that no waste of transport facilities is incurred?

Maj.-Gen. Seely: I am unable to trace the incident referred to; but if my hon. friend will supply fuller particulars I will have further enquiries made.

Flying Boats

LIEUT.-COMDR. KENWORTHY asked the Under-Secretary of State for Air what is the cost for construction of the R 34 type of airship; what is the cost of its shed; what is the personnel required at the shed for handling the airship, etc.; what is the estimated total monthly cost of the airship when in commission, including pay of personnel; and what is the cost of the N 3 B type of flying boat seaplane, 1919, pattern?

Maj.-Gen. Seely: The first part of the question is for the Board of Admiralty, and perhaps the hon. and gallant member will address the question to them. The cost of the latest flying boat built to N 3 B specification is £9,000 complete with engines; the specification is, however, not a new one.

Lieut.-Comdr. Kenworthy: What is the cost of the shed?

Maj.-Gen. Seely: Questions as to the shed of the airship should be addressed to the Admiralty. They ordered the ships, although the Air Ministry had control of them for experimental purposes. The actual details of the contract price should be asked of the Admiralty.

Lieut.-Comdr. Kenworthy: What is the personnel? Has the right hon. gentleman information as to the number of persons necessary to handle this airship?

Maj.-Gen. Seely: I have suggested that on that point also the question should be addressed to the Admiralty. I included that in the first part of the answer. I think they will be able to give the information required.

Capt. Benn: Are we to understand from that answer that the Air Ministry has not complete control over the lighter-than-air material?

Maj.-Gen. Seely: Yes, that is so. At present we have not complete control of lighter-than-air ships. With regard to personnel, we are responsible for that. The matter is complicated, but it will be adjusted in a very short time.

Dogs (Importation)

COL. WESTON on June 26 asked the Under-Secretary to State to the Air Ministry, in view of the official report that 64 dogs had been illegally imported, what precautions are taken to guard against dogs kept in an aerodrome being infected with rabies in the event of a dog being imported?

Maj.-Gen. Seely: The irregular importation of dogs is strictly forbidden, and under existing Orders should be impossible. I am sending my hon. and gallant friend a copy of the Order.

Col. Weston asked the Parliamentary Secretary to the Board of Agriculture, in view of the official report that at one aerodrome there had been 64 dogs illegally imported, whether he had received any proof of a case of illegal landing by means of aeroplane?

Mr, Pratt: The Board of Agriculture have received no official report of the illegal landing in this country of any dog by aeroplane?

Royal Naval Volunteer Reserve (Anti-Aircraft Corps)

MR. LAMBERT asked the First Lord of the Admiralty whether petty officers and men who served in the Royal Naval Volunteer Reserve (Anti-Aircraft Corps) (Defences of London), 1914–16, are entitled to a war gratuity?

Dr. Macnamara: I would refer my right hon. friend to the reply given to the hon. member for Rotherhithe on March 3 last, in which I stated that men who rendered whole-time service in the Royal Naval Anti-Aircraft Corps are eligible for the naval war gratuity. Those who served for half-time only are debarred unless they subsequently served in the Army or Navy, in which case they would be eligible for a gratuity assessed on the whole of their war service.

THE BROCK BULLET CLAIM

THE Royal Commission on Awards to Inventors sat at No. 2, Queen Anne's Gate Buildings, Westminster, on June 30, Mr. Justice Sargant presiding, when amongst the claims was one on behalf of Mrs. Brock, widow of Commander Brock, in respect of the Brock bullet, which was used in attacking and destroying Zeppelins.

Mr. Albert, a brother-in-law of the late Com. Brock, appeared on behalf of the claimant, and stated that the claim was brought on the definite instructions of Com. Brock, contained in a letter written a few days before he went to Zeebrugge, where he lost his life. It was due to his memory that there should be the fullest public recognition and acknowledgment of what was admitted to be a very valuable invention.

The Brock bullet had not been patented, and no one who knew the late Com. Brock would be the least surprised at that. He was glad to think that the State had unrestricted use of the invention. Apart from that, he was a man of many parts, and as soon as he had achieved success in one direction he turned his attention to another. Com. Brock had remarked that he had finished the Zeppelins, and he was going to do the same thing to the submarines. In 1916 a Conference awarded certain marks to the different types of bullets, taking into consideration the perseverance of the inventor, the civil and military value, and the restoration of public confidence. That Committee decided that the Brock bullet was worth 31¼ per cent. and the Pomeroy bullet 35 per cent.

Mr. Trevor Watson: It was agreed at that time that a Zeppelin should be taken at an arbitrary value of £70,000.

Mr. Albert referred to the history of the invention, and said that it was believed at one time that the Germans had found some means of countering an attack with the bullets then in use, and Com. Brock set to work to find a bullet which would effectively function upon striking the fabric of the Zeppelin. It was in the summer or autumn of 1916 that the first three or four Zeppelins were brought down. A note which had been found among Com. Brock's papers showed that he believed that his bullet had succeeded in firing a balloon at 200 yards' range; that his bullet had been present in every mixture of bullets used against Zeppelins, and that it was the chief factor in destroying the menace.

Com. Brock had attached to his papers two reports by well-known airmen, Lieuts. Sowrey and Brandon. The former wrote that his first two drums of ammunition had apparently no effect, while the third caused the envelope to catch fire in several places. He fired traversing fire along the envelope. That, said Mr. Albert, was very important, because the Pomeroy bullet would only function against a hard substance, and when fire was traversed along the envelope, the Pomeroy bullet, to say the least, had a remote chance of hitting a hard substance.

It was a great misfortune that Lieut. Robinson was dead, because he was the one officer who had congratulated Com. Brock on the success of his bullet. It was known quite well in Com. Brock's family that Lieut. Robinson and his squadron accepted as a fact that the Brock bullet had brought down the Zeppelin. It had been testified that the first three German Zeppelins that were destroyed were attacked with guns whose drums were filled one-third with Brock bullets.

The orders placed by the Minister of Munitions for Brock bullets were 497,000 rounds. The Admiralty had ordered 105,000 rounds. The Military Wing ordered 500,000 rounds, and 497,000 rounds were delivered. They returned 400,000 rounds to Woolwich for disposal, as they considered that the Brock bullet was too sensitive.

In 1916 the Zeppelins were not so very numerous, and our defence was not organised on a large scale. Attacking Zeppelins at night was in its infancy; and it was considered highly dangerous to order an aeroplane to attack a Zeppelin until they had got a good bullet to bring the Zeppelin down.

The Chairman: The Brock bullet was invented solely for the destruction of Zeppelins?—Yes, and it was a bullet that was necessarily restricted to home defence purposes.

Mr. Albert further pointed out that an aeroplane attacking a Zeppelin could not get closer than a certain distance, and what was wanted was a bullet that would function more or less at a safe range. The Buckingham bullet lighted at the muzzle of the gun, while the Brock bullet functioned on impact, and was both explosive and incendiary. The greatest moral and material damage was done to the enemy when it was proved that we possessed effective counter measures. He said that it was possible for an airman to say which type of bullet was functioning when he fired a mixture of Brock, Pomeroy, and tracer bullets. If they could not say so in the case of the Brock bullet, it must be equally true in the case of the Pomeroy bullet, for which an award of £25,000 had been made.

Sir William Pope, Cambridge, giving evidence in support of the claim, said that in 1915 he met Com. Brock and discussed with him the question of the destruction of Zeppelins. The conclusion had been come to that the bullet then being used, the Pomeroy, was ineffective, and they formed the idea that the Germans had introduced some protective device. What was really required was a bullet which would fire on striking the fabric and blow a hole in the fabric of a foot in diameter, to permit the rapid escape of gas. It was quite clear that the bullet must be extremely sensitive. One point in favour of the Brock bullet must be the fact that the Military Wing had returned a large number of rounds. It was far too sensitive for the varied purposes of the Military Wing. As soon as the Brock bullet was introduced, positive results were obtained, and these could only have been obtained if the Brock bullet functioned as it was intended to function.

Col. Fellowes, R.A.F., said that he had been directly connected with the development of the bullets, and at that time the Zeppelin menace was more a naval than an army business. As far as the bullets were concerned, the Buckingham bullet would have brought down a Zeppelin, but they did not know it at the time, and he was not prepared to say that the Buckingham bullet would do it. He was under the impression that the Buckingham bullet was very much less sensitive than the Brock bullet.

The Chairman: Could one Brock bullet blow a hole in the fabric and ignite the gas at the same time?—Yes, I think one Brock bullet would destroy a Zeppelin.

The witness added that he did not think the Pomeroy bullet was sufficiently sensitive to blow a hole in the fabric.

Col. Forbes, of the Aircraft Armoury Department, said that the order was issued to load the drums with Brock, Pomeroy, and Buckingham bullets to give every one a chance. They were rather open-minded about it, he added.

The witness pointed out that, in reference to the statement that a pilot would not be able to distinguish a bullet functioning, he had been asked by the Admiralty for his opinion, and his reply was that if a pilot saw a Pomeroy and Brock explode together he would not be able to differentiate between them. He did not mean to infer anything more. There might be reasons which enabled a man to distinguish certain bullets.

Capt. R. W. B. Billinghurst gave evidence in regard to certain trials which were carried out shortly after the Cuffley Zeppelin was brought down. A mixture of Pomeroy and tracer bullets did not prove effective, while Brock bullets alone fired a balloon after about six shots.

Mr. Trevor Watson, on behalf of the Admiralty, paid a warm tribute to the services rendered to the country by the late Com. Brock. Nothing in his life was more characteristic of him than the manner of his leaving it. He had come to the conclusion that there was a German range-finder which was better than anything we had got, and he pleaded to be allowed to go to Zeebrugge because it would give him an opportunity of finding out. It was while he was examining this range-finder on the Mole that he met his death.

The Chairman said that he thought the case was one that the Commission ought to deal with on its merits. The decision of the Commission would be announced to the Treasury in due course.

◆ ◆ ◆ ◆

A Canadian Air Board

UNDER the Act passed this Session the Government has appointed an Air Board, of which Mr. A. L. Sifton, Minister of Customs, is chairman, and Lieut.-Col. Biggar vice-chairman, while the other members include General Mewburn, Minister of Militia, Mr. C. C. Ballantyne, Minister for Naval Affairs, and Dr. Coulter, Deputy Postmaster-General. The inclusion of the last-named indicates that aerial mails will be considered.

The Board has the supervision of all matters connected with aeronautics, and the control and management of aircraft necessary for the conduct of the public service, the fixing of air routes, and regulations for a commercial air service.

SIDE-WINDS

Important additions have been made to the long list of successes that stand to the credit of "K.L.G." sparking-plugs. Capt. Gathergood, winner of the Aerial Derby, had this reliable make fitted to his Airco-Napier, and the second and third prize-winners—Lieut. Nisbet and Maj. Draper—also used them, as did Capt. Sir John Alcock in his Transatlantic flight.

- - -

Those who have admired Mr. Geoffrey Watson's paintings of aeroplanes will be interested to know that there are always examples of his work on view at the Brook Street Art Gallery, 14, Brook Street, New Bond Street, W. 1. The Gallery publish a little booklet giving some reproductions of Mr. Watson's works, and they will be pleased to send a copy to any of our readers who apply to the Secretary, Mr. Chas. Seaborn.

- - -

The annual dinner of the firm and employees of Messrs. William Cole and Sons, Ltd., the well-known aeroplane and body-builders of Hammersmith, took place last Saturday evening at the Cafe Monico. In every sense it was a reunion. The managing director, Mr. Albert E. Cole, was in the chair, and the company numbered some 350 employees and guests of the firm. After the usual loyal toasts had been honoured, Mr. Albert E. Cole dwelt upon the happy intimate relations that had always existed between employees and the heads of the firm, and the mutual confidence thus established from the pre-War days, which the greater stress of War-production, with all its difficulties, had if possible only increased. That spirit, he felt sure, would not only endure in their own case, but was the only one upon which an enduring prosperity could be built for British industry, as between Capital and Labour. All would agree that when, as with the firm of William Cole and Sons, Ltd., every one recognised his own share in the community of interest, all differences or difficulties of the moment, as they cropped up from time to time, would disappear. The two sides of such a business were inseparable, and he was glad to feel that, in the case of his own firm, they always met as friends and partners. Then followed a pleasing interlude, the presentation of silver cigarette-boxes to the pre-War employees of the firm, who were among the first to volunteer in 1914-5; after which a concert—in which all the artistes were from among the employees—filled up the remainder of a very pleasant evening; the talent displayed by most of the performers being quite of professional quality.

- - -

On Saturday last, June 28 (writes "G.H.H."), I allowed pleasure to seduce me from business for a day, the occasion being the twelfth annual excursion of the staff and employees of the Acetylene Equipment Co., Ltd.

At 9 a.m. 100 revellers gathered at Richmond Pier, a launch taking us up river to Chertsey, where we lunched, the *venue* being the Cricketers' Hotel. Dirty work on the part of some Q-ships in a lock *en route* made our arrival a little behind schedule, but the hold-up was soon forgotten in the face of more engrossing business, of a putting-down nature. After the interval we got aboard again and steamed down to Molesey, arriving at the Thames Hotel, Hampton Court, in nice time for dinner.

Several of the company's agents were among the party, and of these a few made little speeches, as bright as they were brief. Mr. Leonard M. Fox, who was in charge of the outing, announced that as the weather had been just as perfect this year as for twelve years past, in future the date must be permanently fixed for the last Saturday in June. Except for one suggested amendment that it should be the last Saturday in each *week*, Mr. Fox's resolution, like the memory of a really great day, was carried unanimously.

* * * *

H.P. Model Aero Club

About 40 of the apprentices and improvers at Messrs. Handley Page's works have formed a model aero club to promote competitions and to give instruction in all forms of aeronautical engineering. Mr. F. Handley Page is President, while Messrs, Theodore Page, R. S. Hubbard, C. W. Meredith and E. Grenfell, are the Vice-Presidents. The Chairman of the Committee is Mr. C. Solly, while Mr. F. R. Grahame Hodgson is Treasurer, and Mr. A. E. Mitchell Secretary. The Club's temporary headquarters are at Somerton Road, Cricklewood.

The Tarrant Triplane Disaster

Mr. J. T. Coggins, Deputy Coroner for Aldershot, on June 26 resumed the inquest on Capt. P. T. Rawlings, D.F.C., and Capt. F. G. Dunn, the two pilots who met their death in the disaster to the Tarrant triplane at Farnborough on May 26.

Mr. Tarrant said that on the morning of the trial flight Capt. Dunn made no adverse comment on the machine, but was very confident of it.

Brig.-Gen. Brooke-Popham, Director of Research, said that on the report of experts he gave sanction for the trial to take place. There had been an official enquiry, but he was instructed to claim privilege for the report.

Evidence was also given by Col. the Master of Sempill, R.A.F., Lieut. C. H. Vickers, R.A.F.

The jury returned a verdict of "Accidental Death."

The foreman said they unanimously felt that something should come out that had not come out. They felt that there was something kept in the background which they should know. Two brave men met their deaths, and they should know the reason why.

Whitehead Aircraft (1917), Ltd.

In the Companies (Winding-up) Court, before Mr. Justice P. O. Lawrence, a petition for the winding-up of Whitehead Aircraft (1917) was presented on June 23 by New Pegamoid, 134, Queen Victoria Street, E.C., and Hobday Brothers, 25, Great Eastern Street, E.C. The petition is to be heard on July 8.

* * * *

NEW COMPANIES REGISTERED

EXPRESS TRANSPORT, LTD.—Capital £50,000, in £1 shares. Objects: To carry on the business of transporters of passengers and goods by land, water or air, etc.

GREAT NORTHERN AERIAL SYNDICATE, LTD., 25, Lord Street, Liverpool.—Capital £10,000 in 5s. shares. Organisers, etc., especially in the business of commercial aviation manufacturers and designers of aircraft, proprietors of schools of aviation, etc. First directors:—C. Sutherland, C. H. Bullen, R. H. Taylor, W. J. Todd, W. E. Cooke, E. G. Noakes, L. E. Stephens.

JOHN BURTON, LTD., 11, Queen Insurance Buildings, Dale Street, Liverpool.—Capital £7,000, in £1 shares. Acquiring business carried on at Liverpool as "Burton Bros.," carriers by land, air and water, etc. Directors: J. T. and W. H. Burton and G. H. Hopkins.

SOUTH OF SCOTLAND ELECTRICAL AND MECHANICAL ENGINEERING CO., LTD.—Capital £5,000. in £1 shares. Makers of aeronautical engines, motors, etc. First directors: H. J. Berry, Edgar Moodycliffe, Samuel W. Marshall, James Clarke McGeorge, junr., and A. G. McGeorge. (Scotch Co.)

WAR TROPHIES, LTD., Peninsular House, Monument Street, E.C.—Capital £5,000, in £1 shares. Dealers in cannon, machine guns, implements of war, aeroplanes, battle souvenirs, trophies, etc. Director: E. G. Palmer.

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages liii, liv, lv and lvi)

NOTICE TO ADVERTISERS.

In order that "Flight" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

and The Aircraft Engineer

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegraphic address: Truditur, Westcent, London.

Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates*:—

United Kingdom.	s.	d.	Abroad.	s.	d.
3 Months, Post Free	7	1	3 Months, Post Free	8	3
6 ,, ,,	14	1	6 ,, ,,	16	6
12 ,, ,,	28	2	12 ,, ,,	33	0

These rates are subject to any alteration found necessary under war conditions.

Should any difficulty be experienced in procuring "Flight" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World.
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 550 (No. 28, Vol. XI.) JULY 10, 1919 Weekly, Price 6d. Post Free, 7d.

Flight
The Aircraft Engineer and Airships
Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2
Telegrams: Truditur, Westcent, London. Telephone: Gerard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. 33*s.* 0*d.*
These rates are subject to any alteration found necessary under war conditions

CONTENTS

Editorial Comment: PAGE
- R 34 .. 897
- Aerial Navigation Schools .. 898
- A Territorial Air Force .. 898
- Air Ministry Publicity .. 900

Flight—and the Men: Mr. Robert Blackburn, F.Ae.S., C.E., M.I.C.E. .. 899
London from Above .. 901
The Curtiss Model 18-B Biplane .. 902
The Royal Aero Club: Official Notices .. 905
The Transatlantic Voyage of R 34 .. 906
Roof-Top Landing Stages for Airships .. 914
Design and Construction of Flying Boats .. 915
Civilian Flying .. 920
The R.A.F. Aid Committee and R.A.F. Prisoners Fund .. 922
Airisms from the Four Winds .. 923
Personals .. 925
In Parliament .. 925
The Royal Air Force .. 927
Side-Winds .. 929
Resettlement .. 930

EDITORIAL COMMENT

R 34

ANOTHER milestone in the story of the air was marked on Sunday last by the arrival of the British airship R 34 at Long Island, after the successful crossing of the Atlantic. Thus, in less than a month, two brilliant records have been placed to the credit of the Empire by the first direct crossing by aeroplane, and now by the journey of R 34, which has completed the first Atlantic voyage achieved by a lighter-than-air vessel.

The great airship had nothing in the way of a "joy-trip." At the latter end of the voyage she encountered a succession of electric storms, which her navigators had to endeavour to avoid, thereby increasing the distance and running their fuel supplies perilously near to exhaustion. How nearly is to be judged by the fact that when she arrived at her destination at Mineola she had but forty minutes' fuel left. At one stage of the voyage she encountered a fitty-knot westerly gale, and for some time made no progress at all. Still, all's well that ends well, and the principal thing is that she safely accomplished the journey and duly arrived at her determined port of destination.

It may be quite natural that a number of the newspapers, here and in America, have tended to hysteria, and have indulged in all sorts of superlatives in connection with R 34's successful voyage. Therein they are wrong, though it is probably the case that the very same happened a hundred years ago, when the first steamship crossed the Atlantic. If the matter is viewed in its true perspective, we shall realise that the successful crossing of the intervening ocean, and the resultant record of the first airship voyage from Britain to America, is in all respects comparable to that of the first steamship, and is not at all in the same category as the flight accomplished by Alcock and Brown last month. The latter demonstrated that it is possible, given a certain amount of luck, to safely pilot an aeroplane across nearly two thousand miles of sea. It has, however, not much immediate commercial value. It is rather the consummation of a very fine sporting effort. The voyage of R 34 is something rather different. Here we have the case of a great airship setting out from her base at an exactly determined time, just as a ship sets sail from her home port. All being well, she was due at her destination at a particular time, but, through stress of weather, she was subjected to a delay which added materially to the time of the voyage, and ran her fuel supplies too close to be pleasant. Nevertheless, she did arrive, after battling with weather conditions that would have wrecked the airship of ten years ago. Ships and steamers are subject to the same delays through adverse conditions of weather, and the records are full of cases of steamers having to burn cargo and wooden fittings because of such delays depleting their bunkers. All these things being as they are, we prefer to regard the voyage of R 34 as being merely the first example of something that will become commonplace in the not very far distant future. It has simply demonstrated what everyone who has studied the development of the airship believed to be possible. Lessons have been learnt that will be of the greatest value in the planning of aerial services—notably that fuel endurance must be increased if the factor of safety is to be satisfactorily high. But we know as an ascertained fact now what was simply a matter of belief before—that the Atlantic crossing can be accomplished even in face of really adverse conditions. Not for a moment do we desire to withhold any of the credit due to General Maitland, Major Scott, and their gallant companions. They were the pioneers of Atlantic flight by airship, and history will always regard them as such. They sailed away into unknown conditions, and, in the words of Major Scott's own wireless message, they "stuck it" when conditions seemed to be all against a successful termination of their journey. It would have been easy for a less determined commander with a less efficient crew to have given up and turned back to Newfoundland in search of the safety that, at one time, did not seem to lie in the prosecution of their enterprise. They succeeded by sheer pluck and that British quality of not knowing when they were beaten. All honour and credit to them for it.

◆ ◆ ◆

Aerial Navigation Schools

General Seely stated in the House a week or two ago that the whole system of instruction in aerial navigation is being revised, and that the schools of instruction are being rapidly reorganised. It is to be hoped that the reorganisation will in fact be rapid, and that some early statement may be forthcoming as to the intentions of the Air Ministry regarding the facilities, if any, which are to be extended to civilian pilots and navigators. The matter is one of vital importance to the future of civilian flying, but it is one that may easily be lost sight of in face of other sides of development. It is only now, when we are beginning to talk of plans for more and more long-distance services, that we are able to realise the enormous importance of a thorough system of training in navigation. During the War, navigation in its proper sense played a very small part in aviation. Distances traversed were relatively short, and navigation was by the comparatively simple methods of maps and landmarks. If, however, aerial services are to be established and maintained between points separated by wide expanses of ocean, it is perfectly obvious that something more than the mere ability to read maps and pick up indicated landmarks will be essential. As a matter of fact, the real art of aerial navigation has received very little attention up to now. Before the War, the civilian pilot had no knowledge, and had received no training at all. The R.F.C. were in very little better case, and the R.N.A.S. alone, owing to the number of naval officers who transferred to the flying branch, had any practical knowledge of the science. The position at the time the R.A.F. was formed by the fusion of the two services was, then, that a proportion of R.N.A.S. officers had received a thorough training in navigation, while a very much larger number had done "courses" at Portsmouth and other centres of instruction. The officers of the R.F.C. generally knew nothing more than courses of aerial map reading had taught them. At once the Air Council decided to institute schools of navigation, though the resultant courses had not, at the time the Armistice was signed, gone very far. In fact, it is not too much to say that the majority of officers of the R.A.F. were still profoundly ignorant of the more scientific side of aerial navigation. There was no help for it. All the energies of the instructional staff of the R.A.F. had to be devoted to the training of fighting pilots and observers to make good the wastage of war and to build up our aerial arm to a position of supremacy over that of the enemy. Now that we are able to turn our thought to the developments of peace flying, the need for a better system of navigational training has become apparent, and the Air Council is giving attention to it.

The main trouble to be grappled with is the dearth of competent instructors. The best method of procedure would seem to be to obtain officers from the Navy who are qualified in navigation, and to train them as instructors, additionally, of course, to those who are now serving, or have served, in the R.A.F., and who are possessed of similar qualifications. If the Navy cannot spare enough qualified officers from their sea duties, we suggest that it might be possible to make up the numbers from among officers of the R.N.R. who have been demobilised from the Navy, and who, by reason of the depletion of the Mercantile Marine by enemy action, are without immediate prospects of employment. However the difficulty is to be surmounted, it is clear that the matter is one of urgency, and that no time should be lost in grappling with it.

◆ ◆ ◆

A Territorial Air Force

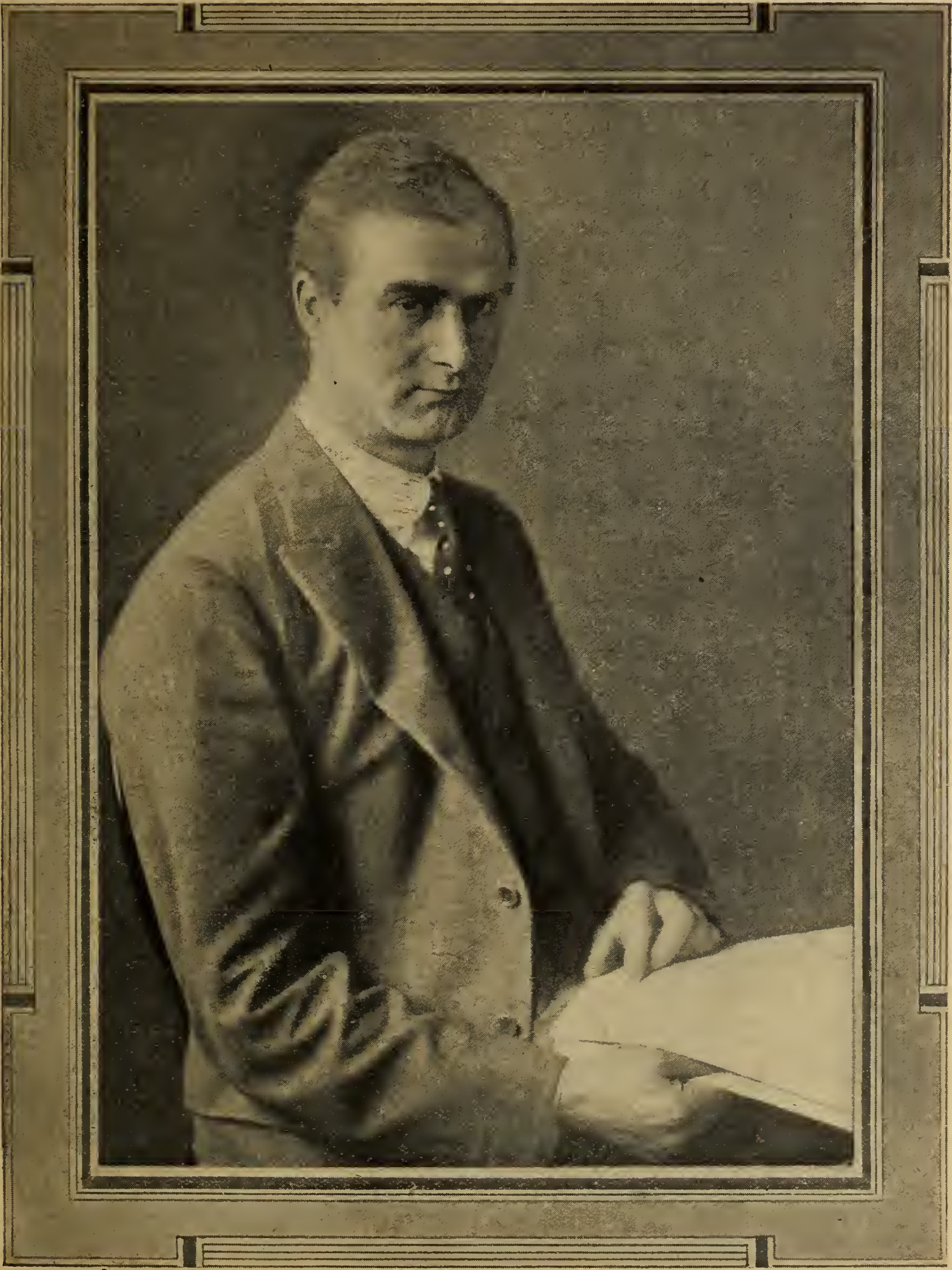
A correspondent of *The Times* suggests that the Government should take in hand the formation of an Air Force Reserve, presumably to more or less supplant the Regular service. He does not make this a point, but if his suggestions were carried out in their entirety that would be the effect, inasmuch as they would render quite superfluous the maintenance of any Regular force at all. That does not detract from the basic merits of the conception, but it is as well to point out the weakness and to lay down at once that it is quite essential that there should always exist at least a small active force for immediate needs in case of war. We cannot do better than quote the suggestion in its entirety. He says:

"My suggestion is that a reserve of the R.A.F. be formed, with aerodromes adjacent to convenient large towns. Individuals accepted for service in the reserve to attend the aerodrome every week and put in a minimum of three hours' flying and three hours' ground instruction. Two weeks a year to be devoted to annual training. Such a scheme would appeal to every athlete and adventure-lover in the country. To be taught to fly, provided with a machine, and allowed to "aviate" for three hours a week free—why, the authorities would have more young men than they would know what to do with. They could have 20,000 flying officers, the cream of the youth of the country, always in training, at the bare cost of the maintenace of the instructional staff and its equipment. So soon as a pilot or observer showed signs of becoming 'dud' and thus failing to pass regularly held tests his engagement would terminate.

"Such a scheme would give to the Government a huge flying *personnel*, ready for instant use in emergencies, at a minimum cost and without interfering with the civilian careers of those it employed."

The point the writer seems to have overlooked is that if such a reserve training were offered broadcast it must, as we have indicated, almost automatically

Flight—And the Men



"Flight" Copyright.

Mr. ROBERT BLACKBURN, F.Ae.S., C.E., M.I.C.E.,
Managing Director of the Blackburn Aeroplane and Motor Co., Ltd.

result in the elimination of an active force. What youngster would offer himself as a candidate for a regular Air Force commission, with its attendant disabilities of responsibility and submission to constant discipline, if he knew he could get his three hours' flying every week at the expense of sitting down to lectures for a similar period? Very few, we imagine.

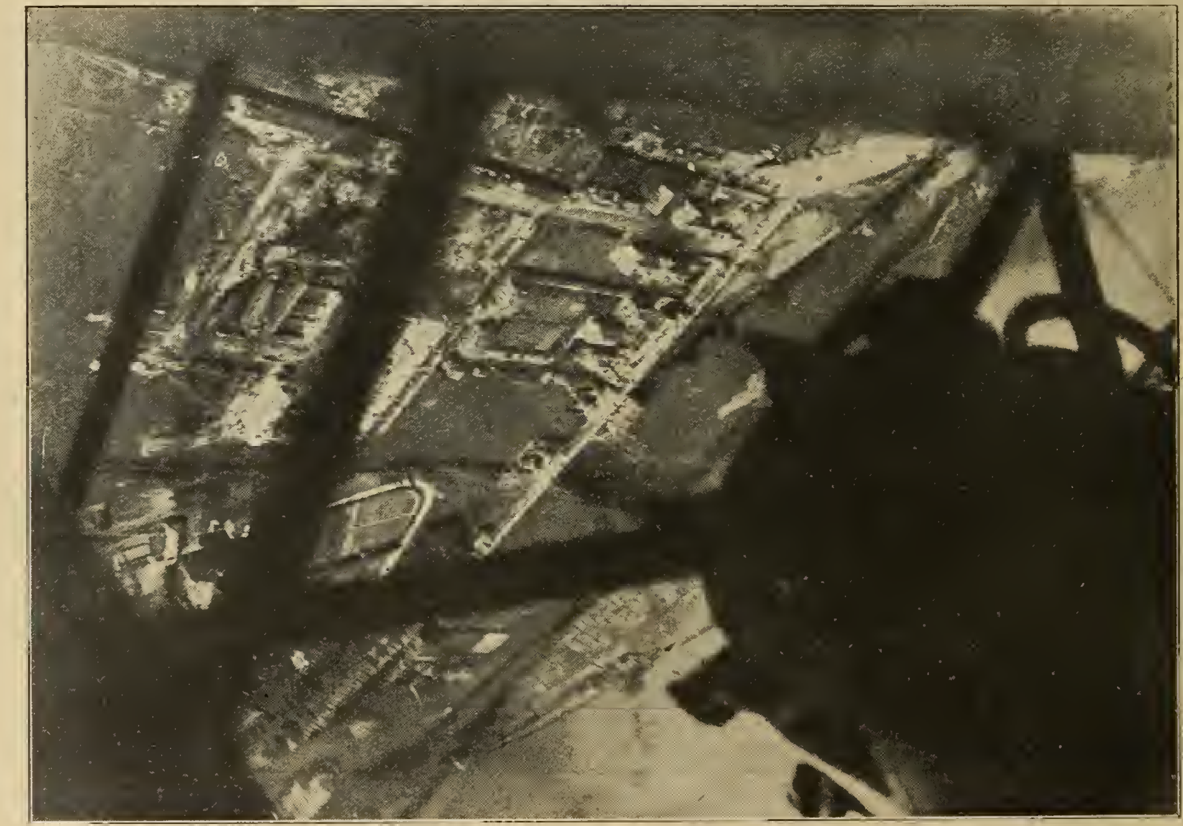
It must not be supposed that we are in any way against the constitution of an adequate Air Force Reserve. On the contrary, we were, we believe, the very first to advocate a system similar to that of the Territorial Force in order that the country should not entirely lose touch with the men who have fought our battles in the air, and in order also that we should at all times maintain an adequate second line of aerial defence, ready to reinforce the active service units of the R.A.F. in case of war, and to provide the first means of replacing casualties. Pruned and adapted to the exigencies of the nation's needs, the scheme outlined by *The Times* correspondent is perfectly right in its conception. That it errs on the side of being too expansive is possibly a fault on the right side, on the principle that by asking a lot much may be given. Certainly it seems essential that the Government should, as early as possible, make up its mind as to what is to be done towards the constitution of such a Flying Reserve. It is clear that we must have a reserve, and it is equally clear that it can in the first instance be best drawn from the younger pilots and observers who have already served in the R.A.F. The time to catch them is now, before the keenness for flying has worn off, and when they would jump at the chance of maintaining their connection, through an Aerial T.F., with the R.A.F. If the matter is too long delayed it will be found that the best of these men will, in the meantime, have taken up other interests and pursuits, and it will be infinitely more difficult to get them back.

• • •

Air Ministry Publicity

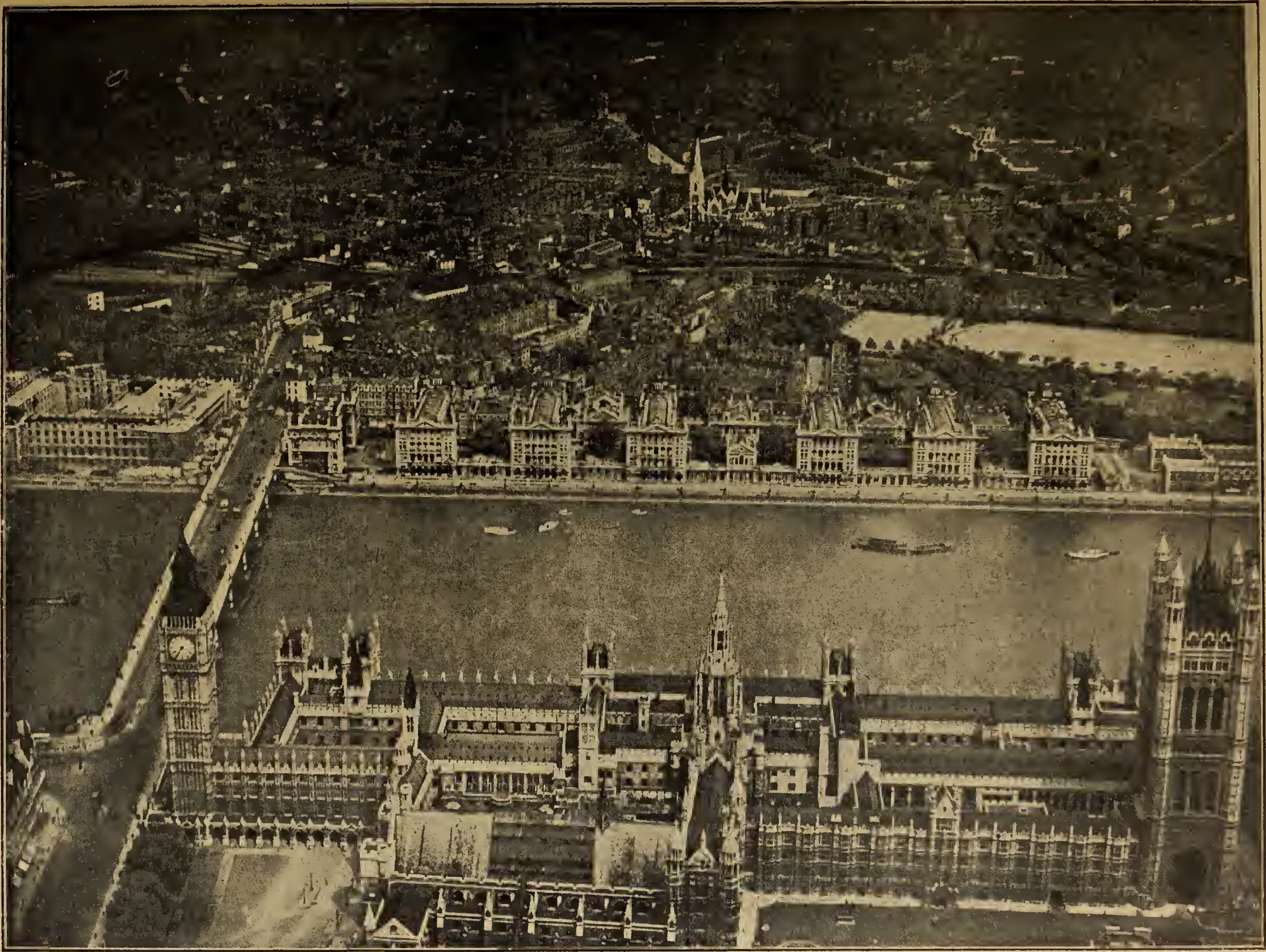
In our issue of last week we spoke in terms of praise of the action of the Air Ministry in constituting a Publicity Department for the purpose of informing the public of the most interesting features of the work now going forward. Unfortunately, we are quite unable to congratulate the Ministry on the *communiqué* issued last week-end on the subject of the accuracy of Atlantic weather forecasts. Headed "Air Ministry News Story No. 29. For Immediate Publication," the appetite is whetted by the anticipation of something really useful or informative. Perusal, however, shows that it is a particularly lame attempt, of no interest to anyone, to show what fine fellows are the Ministry's meteorological experts. We have absolutely no criticism to offer of the work of the meteorological department, which is probably up to the very best standard permitted by present-day limitations of knowledge. What we do think, however, is that the issue of such a "News Story" is not quite worthy of a publicity department of a great Ministry. It is so obviously an effort to say something when the interests would have been better served by silence that it excites pity rather than blame. The effort is amateurish, and seems to indicate that the department needs to learn the lesson that when there is actually no news to give out it should be content to hold its peace and not to endeavour to manufacture fictitious interest.

◇ ◇ ◇ ◇



"Flight" Copyright.

A photographic record when in a spinning nose-dive, taken from a Boulton and Paul "Bourges." Note the effect of the ground appearing to be above the machine



REAL VIEWS OF LONDON: The Houses of Parliament and St. Thomas's Hospital as photographed by the Aircraft Manufacturing Co., Ltd., to illustrate Mr. Holt Thomas's speech at the London Society on June 26. This photograph is quite a study in detail, showing as it does such landmarks as Westminster Bridge, Waterloo Station, L.C.C. Hall, Christ Church, Bethlehem Hospital, Lambeth Palace grounds, etc., etc.

THE CURTISS MODEL 18-B BIPLANE*

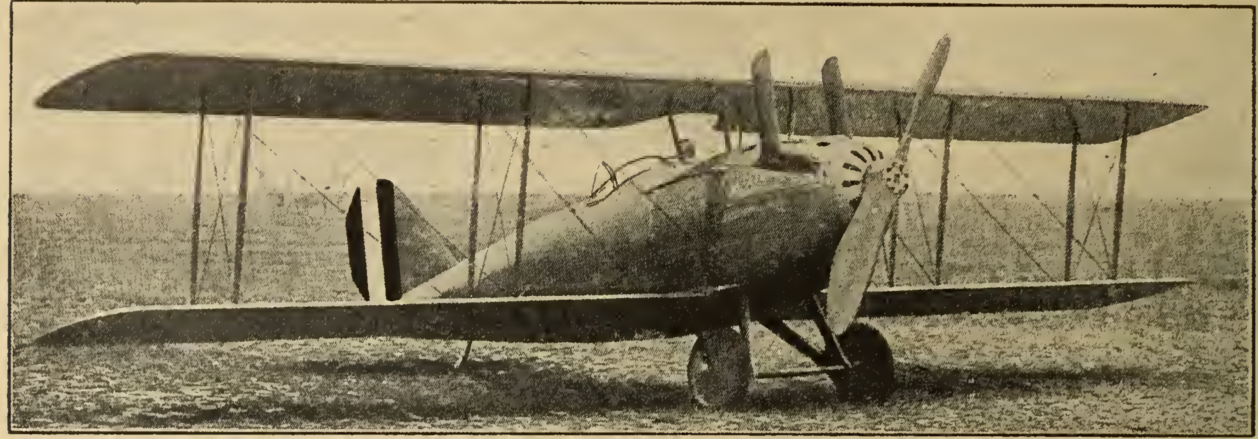
AFTER the successful trials of the Curtiss Model 18-T Triplane (described in FLIGHT, May 29 last), the two-seater 18-B Biplane was brought out by the Curtiss Engineering Corp. This machine is built around the same *fuselage* and power plant as the triplane, but having a lesser overall height the gunner has a wider arc of fire. The housing of the engine is particularly neat, it being entirely encased by cowling with the streamlined exhaust stacks projecting upwards. The cowling around the engine is removable, giving access for adjustment and repair.

As in the triplane, all interplane bracing cables are of true streamline section, and where cables cross one another they are clamped by streamlined blocks.

A peculiarity of this machine is in the employment of *ailerons* on the lower plane only. These *ailerons* are operated by steel tubes running through the lower plane and directly connected to the control column. This arrangement eliminates entirely all outside control-cables and rigging. Rudders and elevators are operated by levers enclosed in the *fuselage* termination, thereby doing away with all outside control cables. There are no external braces for the stabiliser or fin.

The main planes are rectangular in plan form, and have no dihedral or sweepback. They are built up in five sections, three for the top and two for the lower. The centre section over the body is 2 ft. 6 ins. wide, and the outer sections of both top and bottom planes are 17 ft. $5\frac{7}{8}$ ins. span. As indicated in the accompanying scale drawings, the ribs are spaced about 6 ins. apart, and instead of the usual two main spars, the Curtiss 18-B employs five—the idea being to more evenly distribute the loading on them.

The chord of the upper plane is 4 ft. 6 ins., and the front main wing spar is located 9 ins. from the leading edge, the fourth spar, which carries the rear body and interplane struts, being 2 ft. 9 ins. from the leading edge. The chord of the lower plane is 4 ft., and its forward main spar is similarly placed 9 ins. from the leading edge, the other spars being spaced $7\frac{5}{16}$ ins. apart.

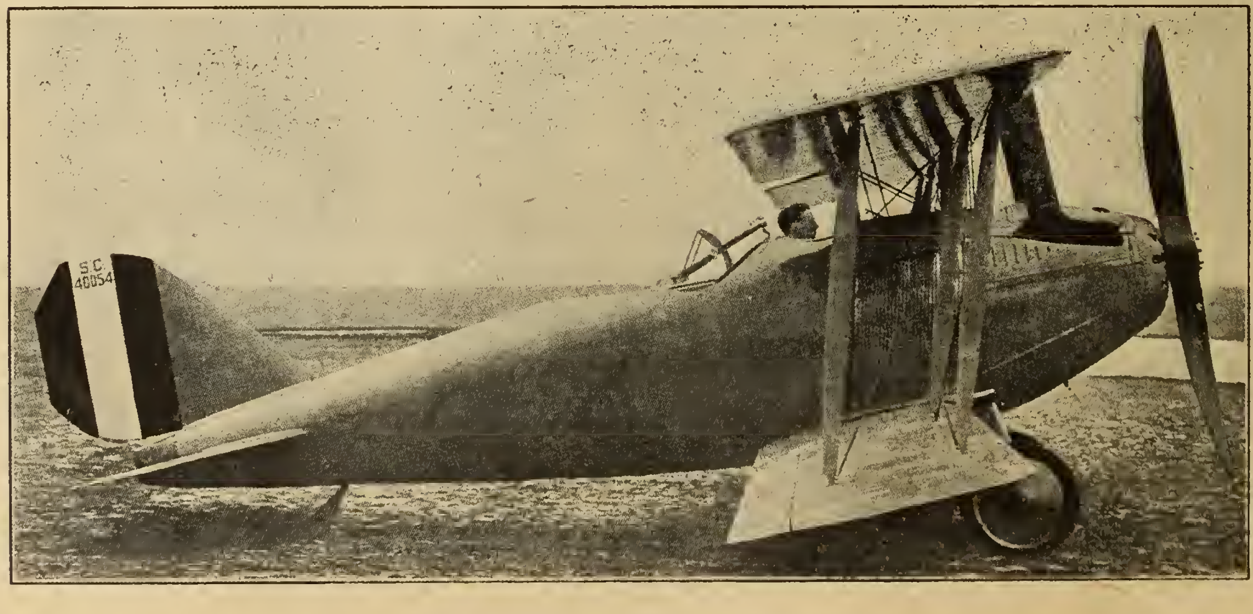


Three-quarter front view of the Curtiss 18-B biplane.

The *ailerons* on the lower plane have a very high aspect ratio, being 13 ft. $5\frac{1}{16}$ ins. in length and $10\frac{3}{4}$ ins. chord. The intermediate interplane struts are centred 6 ft. $1\frac{1}{2}$ ins. from the body struts, the outer interplane struts being 7 ft. $8\frac{1}{2}$ ins. from former, leaving an overhang of 3 ft. $7\frac{3}{8}$ ins.

The *fuselage* is of monocoque construction, finely streamlined, and 21 ft. in length. The pilot's cockpit is just below the trailing edge of the top plane, and aft of the pilot is the gunner's compartment so arranged that a wide range of fire is provided for the two Lewis machine guns, one of which is located on a rotatable scarff ring surrounding the cockpit, and the other fires through an opening in the underside of the *fuselage*.

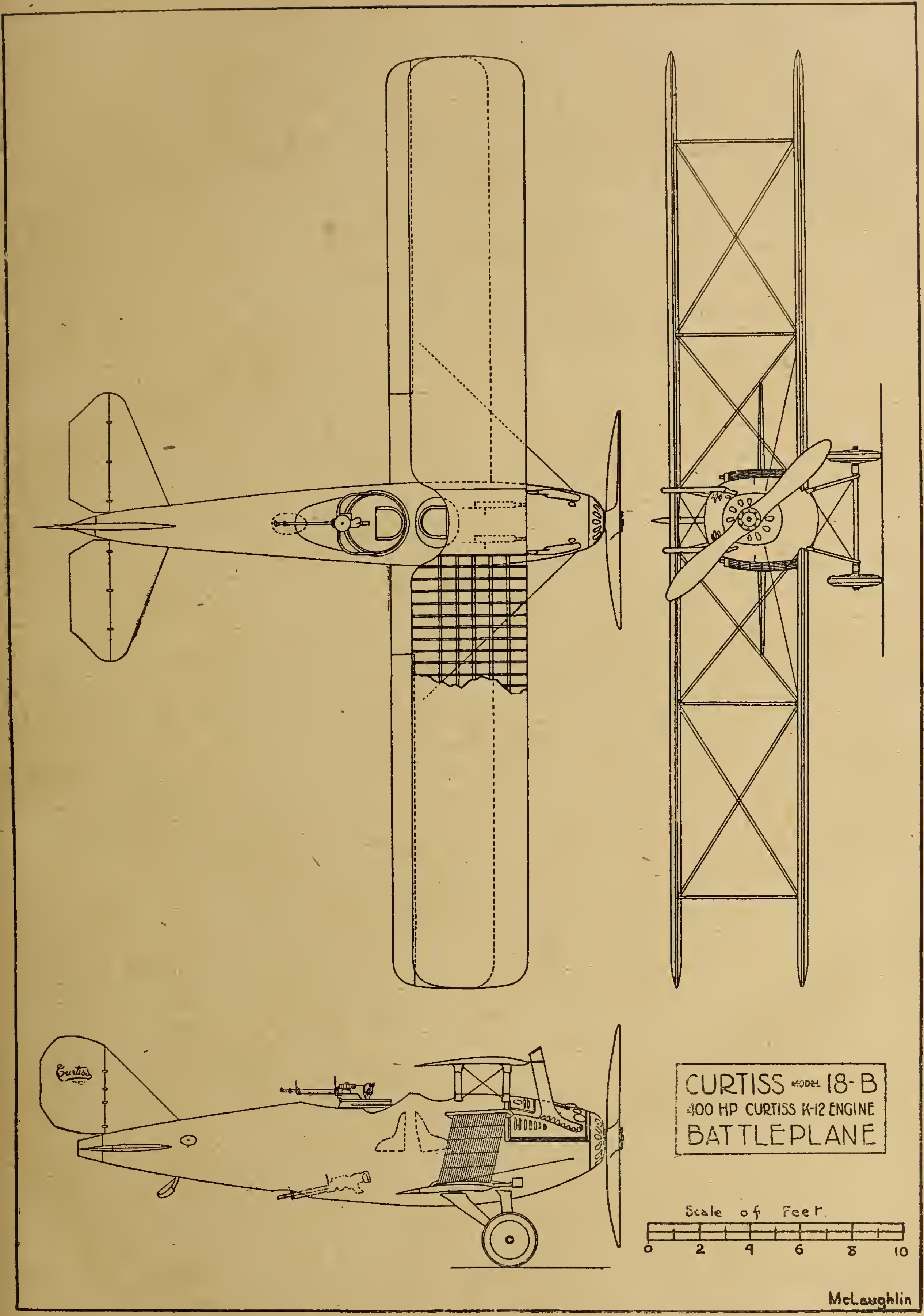
The landing gear is of the V-type, and is similar to that on the 18-T Triplane. The track of the wheels is 4 ft. $11\frac{1}{8}$ ins., the wheels themselves being 2 ft. 2 ins. diameter. The axle is located 3 ft. $8\frac{3}{4}$ ins. from the nose of the *fuselage*, and 4 ft



Side view of the Curtiss 18-B biplane.

---

* Courtesy *Aerial Age*, U.S.A.



THE CURTISS MODEL 18-B BIPLANE.—Plan, side and front elevations to scale.

1½ ins. below the line of thrust. With the machine in flying position, the centre of gravity of the machine occurs at a point 1 ft. 4.6 ins. behind the axle. When at rest on the ground, a straight line from the wheels to the tail skid makes an angle of 11° 15′ with the centre line.

The tail consists of a small divided horizontal stabilizer with elevator flaps hinged to the trailing edges, a triangular vertical fin (3 ft. by 3 ft. 6 ins.) and an unbalanced rudder (3 ft. 10 ins. by 2 ft. 7$\frac{11}{16}$ ins.).

The engine is a Curtiss model K-12 12-cylinder V-type, with cylinders cast *en bloc*. Aluminium is used extensively in its construction. The bore and stroke is 4½ ins. and 6 ins. respectively, and the rated horse power at 2,500 r.p.m. is 400. Ignition is by two high-tension double spark "six-cylinder" magnetos, located at the forward end of the engine, and driven through flexible couplings by beveled gears from a vertical shaft. Two Duplex carburettors are used, located between the groups of cylinders. They are supplied with an auxiliary altitude hand-controlled air valve, and also with non-back-firing screen.

Without oil or water, the engine weighs 680 lbs.; the dead-weight per rated horse power being 1.7 lbs. The petrol consumption is at the rate of ·55 lbs. per brake horse power per hour, and the oil, .03 lbs. per brake horse power per hour.

The tractor screw is 9 ft. in diameter, and when the machine is in flying position, the tips clear the ground by 8½ ins.

The general specifications of the 18-B biplane are as follows :—

Span, top and bottom planes ..	37 ft. 5¾ ins.
Overall length	23 ft. 4 ins.
Overall height	8 ft. 10¼ ins.
Chord, top plane	4 ft. 6 ins.
Chord, bottom plane	4 ft.
Gap	5 ft.
Stagger	1 ft. 4½ ins.
Weight, fully loaded	3,001 lbs.
Useful load	1,013 lbs.

Performance

Service ceiling	22,000 ft.
Maximum ceiling	23,000 ft.
Climb in 10 minutes	12,500 ft.
Climb in 10 minutes (light load)	16,000 ft.

	Sea Level.	5,000 ft.	10,000 ft.	15,000 ft.	20,000 ft.
High speed (m.p.h.) ..	160·5	158·5	157·5	155	152
Low speed (m.p.h.) ..	59	68·2	73·6	79·8	86
Economical (m.p.h.) ..	80	85	92	100	118
Rate of climb (ft. per minute)	2,390	1,690	1,040	580	210
Time of climb	0	2·5	6·3	12·9	27
Endurance (high speed) ..		283 miles		1·75 hours	
Endurance (economical speed)		536 ,,		6·7 ,,	

◆ ◆ ◆ ◆

THE STRESSES IN BRACED STRUCTURES WITH RIGID JOINTS

In regard to the article by Mr. John Case under above title, published in our issue of May 29, 1919, we have received the following queries :—

Sir,—It is with great interest that I have read Mr. John Case's article in Flight on "The Stresses in Braced Structures with Rigid Joints," and hope to use the vital information therein practically in the near future. For some time it has appeared to me that the general practice (in small machines) of rigidly, or semi-rigidly attaching interplane struts to the top or bottom of the main spars is not a good one, and this especially so in all metal design.

Being a young engineer, and not the pure mathematician that might be desired, I now write in the hope of being enlightened on a few points, should you be sufficiently interested, and for which I can assure you I shall be more than obliged.

(i) Am I right in understanding that if in para. 7 "General Equations," all the couples are taken as zero, the case reduces to that of a structure in which every individual element has pin jointed ends ?

(ii) Secondly, that if in Fig. 7, M′. 23, M. 12, M. 01, M′23, etc., are all zero, M′. 3, etc., will then equal M. 2, etc., respectively, and the case will reduce to that having continuous spars with pin jointed struts ; *i.e.*, the one you appear to recommend.

(iii) The results of the simple case worked out in para. 3 are very convincing, but surely the couples acting on the strut BB′ in Fig. 1, where the spars ABC and A′B′C′ are continuous throughout the joints, would not be so serious.

An actual example of this case also would make your theory more conclusive.

(iv) Finally, should not the two equations (25) be as follows :—

$$M_{12} = M'_2 - M_1$$
$$\text{and } M^1{}_{12} = N_1 - N_2{}^1$$

and not as printed.

Yours faithfully,

B. A. Duncan.

Ely, Cambs.

Sir,—I was much interested in Mr. John Case's article in Flight of May 29 on "The Stresses in Braced Structures with Rigid Joints" as I am at present engaged on work of a somewhat similar nature. I note that he mentioned in the article that the trigonometrical and hyperbolic functions required in solving problems of the nature referred to have been tabulated by Mr. Arthur Berry, but does not mention in what book or periodical these tables have been published. I should be very much obliged if you could supply this information.

G. W. Higgs Walker.

Hendon, N.W.

We have submitted these queries to Mr. John Case, whose replies follow.—Ed.

In reply to Mr. Duncan's queries :—

(i) Yes.

(ii) Yes. $M'_3 = M_2$, etc., unless there be "offset" couples due to the lift-wires. In this case the difference between M'_3 and M_2, etc., will equal the applied couple.

(iv) Yes. I am obliged to Mr. Duncan for pointing out the slip in equations (25) which should read as he says.

(iii) The example which I chose was, deliberately, a rather extreme case for the purpose of calling attention to what may be a serious matter, and also because it was easy to work out. When the spar is continuous over a strut the couples applied to the latter will certainly be reduced ; from one or two cases which I have worked out one can say that the effect is of the order of half that shown in the example given. This would be serious enough, for it must be remembered that, when the load on a strut is approaching anywhere near the crippling load, a very small end-couple will be sufficient to bring about failure. Certainly struts do not often break in the air, but that is because they are always more or less pin-jointed ; in practice they deflect long before the crippling load is reached and the addition of any (small) end-couple will greatly increase the stress and hasten failure. In civil engineering—bridges—where the members are all rigidly rivetted together, it is usually the compression members which give trouble ; the collapse of the old Quebec bridge was due to secondary stresses in a compression boom.

With regard to Mr. Walker's query : the tables referred to were compiled by Mr. Arthur Berry, King's College, Cambridge, and have been published confidentially, during the War, in Air Board Publication C.I.M. 9, and in the handbook of Strength Calculations, written by Pippard and Pritchard and published by the Air Ministry. I suppose in due course these documents will be made public.

◆ ◆ ◆ ◆

R 33 Keeping Her Hand in.

By way of keeping up practice, and incidentally to help to give the Victory Loan a fillip the Armstrong-Whitworth rigid airship R 33 this week carried through quite a respectable little tour over England. The trip was timed for about 36 hours, the starting-point being Pulham Air Station at 8 a.m. In less than an hour and a half Swaffham was reached. Peterborough was passed before eleven o'clock, and Grantham and Nottingham by midday. Making Liverpool in the evening, the Victory Loan ship passed seaward. On Tuesday R 33 returned to her moorings, having covered the 900 miles mapped out in 31 hours. Dwellers in the Midland towns passed over were vastly interested in this novel visitor.

Yatesbury and Wyton Aerodromes Closed.

The Air Ministry announces that the R.A.F. Eastern aerodrome at Yatesbury has been closed. All machines landing at Yatesbury should, therefore, use the Western aerodrome. The aerodrome at Wyton has also been relinquished by the R.A.F.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

TECHNICAL AND COMPETITIONS COMMITTEE

A Meeting of the Technical and Competitions Committee was held on Tuesday last, July 8, 1919, when there were present :—Lieut.-Col. F. K. McClean, in the Chair, Lieut.-Col. D. Harries, Maj. R. H. Mayo, Lieut.-Col. Alec Ogilvie, Lieut.-Col. H. T. Tizard, Mr. Howard T. Wright, and Mr. Harold E. Perrin, Secretary.

Jacques Schneider Cup.—The arrangements for the Jacques Schneider Cup were discussed.

It was decided to hold the Race on September 10, 1919, and that the British Competitors must have their machines ready not later than September 1, 1919, in case it is necessary to hold eliminating trials for the selection of the three competitors to represent the British Empire.

The course for the race will be announced later.

Presentations to the Club

The following framed prints have been presented to the Club by Capt. C. E. Bagram :—

Globe Aérostatique de Charles et Robert 1783.

A consultation previous to an Aerial Voyage from London to Weilburg in Nassau, 7th November, 1836.

The following Map has been presented to the Club by Miss Lockyer :—

"Time Map of the World."

The following books have been presented by the Publishers to the Club Library :—

"Airy Nothings," by H. Barber. (Published by McBride, Nast and Co.)
"Aerobatics," by H. Barber. (Published by McBride, Nast and Co.)
"In the Royal Naval Air Service," by Harold Rosher. (Published by Chatto and Windus.)
"Guynemer : Knight of the Air," by Henry Bordeaux. (Published by Chatto and Windus.)
"All about Aircraft." (Published by the Car Publishing Co.)
"Aircraft in War and Commerce." (Published by the Car Publishing Co.)
"The Kingdom of the Air." (Published by the Car Publishing Co.)
"V.C's. of the Air." (Published by the Car Publishing Co.)
"The World's Air Routes." (Published by the Car Publishing Co.)

FLYING SERVICES FUND COMMITTEE

A Meeting of the Flying Services Fund Committee was held on Wednesday, June 18, 1919, when there were present :—Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., in the Chair, Mr. Chester Fox and Mr. Harold E. Perrin, Secretary.

Grants and Allowances.—The following Grants and Allowances were made :—

(121) An allowance of £2 a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Flying Corps who had died on active service.

(122) An allowance of £5 a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Flying Corps who had died on active service.

(197) A Grant of £15 to the mother of a Flight Cadet in the Royal Air Force who had been killed on active service.

(200) A Grant of £10 to an Ex-Corporal in the Royal Flying Corps who had been incapacitated on active service.

(201) An allowance of £2 a month for six months to the mother of a Sergeant-Mechanic in the Royal Air Force who had died on active service.

(204) An allowance of £2 a month for twelve months, for the upbringing of her child, to the widow of a 2nd Class Air-Mechanic in the Royal Air Force who had been killed on active service.

(211) A Grant of £5 to the widow of a Private in the Royal Air Force who had died on active service.

(212) An allowance of £1 10s. a month for six months to the mother of a 2nd Class Air-Mechanic in the Royal Naval Air Service who had been killed on active service.

(213) An allowance of £2 a month for six months to the widow of a Chief Mechanic in the Royal Air Force who had died on active service.

(214) A Grant of £10 and an allowance of £2 a month for six months to the widow of a Private in the Royal Air Force who had died on active service.

(216) An allowance of £2 a month for six months to the widow of a Private in the Royal Air Force who had been killed on active service.

(218) An allowance of £2 a month for six months to the widow of a Private in the Royal Air Force who had been killed on active service.

(219) An allowance of £1 10s. a month for six months to the widow of a 3rd Class Air-Mechanic in the Royal Air Force who had died on active service.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

The Handley-Page Accident

The Handley-Page machine which has been waiting for favourable weather at Newfoundland for over two months was beginning to suffer from the effects of standing out in the open. It was, therefore, decided that she should go up and join the "R.34" and accompany her to Mineola. When it was announced that she had abandoned the Transatlantic attempt, the Atlantic City municipality wired an invitation to Admiral Mark Kerr, which he accepted. The machine left Newfoundland and started on her journey to New York. When over Nova Scotia trouble arose with the oil-feed to one of the engines and in spite of the efforts of Maj. Tryggve Gran, who climbed out on the wing to attempt to remedy it, it was found impossible to make good the job while in the air. The machine, however, continued to cruise about for a considerable time, whilst seeking for a suitable landing ground. She finally came down at Parrsborough, Nova Scotia, at daybreak. A Reuter message from Parrsborough says that the Handley-Page's lights were first seen off the harbour mouth at two o'clock in the morning, after which she cruised overhead until daybreak. The pilot then tried to effect a landing on the race track, but the machine overran the track and struck a wire fence, puncturing her tyre. Subsequently she encountered a tree, which threw the machine's head round. As a result one of the wheels of the under-carriage was wrenched off. The Handley-Page finally crashed nose down and is now standing on end, with the pilot-house smashed and the right wing slightly damaged.

In connection with the mishap of the Handley-Page it is of interest to learn that Messrs. Rolls-Royce, Ltd., have received the following telegram from Admiral Mark Kerr, who was in charge of the machine : *Engines were splendid. When oil-feed pipe broke engine worked for at least two hours.*

Officers' Gratuities—Investment in Victory Loan

The Air Ministry announces :—

It has been decided that the gratuities to which regular and temporary officers of the Army and Air Force at present serving will become eligible may *now* be invested in either Victory Bonds or Funding Loan.

Officers who have not already made arrangements with their agents or bankers to take up War Loan in anticipation of the receipt of their gratuities, and who wish to take advantage of this concession, should immediately inform (by telegram if necessary) their Army and Air Force agents stating the precise sum they wish invested. Applications must be received on or before July 12, the day the Loan closes, and must clearly state that the investment is to be made from the officer's gratuity, and that the amount required is in addition to any sum for which he may already have applied. The investment will be handed over to the agents on the officer's behalf for issue with any balance of gratuity. Gratuity so invested will bear interest as from August 4, 1919. Income Tax will not be deducted at the source.

AIRSHIPS

THE TRANSATLANTIC VOYAGE OF R 34

THE Transatlantic voyage has at last been accomplished by an airship. The R 34 has arrived at Mineola, Long Island, under her own power, after being in the air for 108 hours 12 minutes. In connection with this splendid achievement it may be of interest to recall an unsuccessful attempt made nine years ago.

A Previous Attempt

We are referring to the Wellman airship "America," on which Mr. Walter Wellman intended to make the trip from Atlantic City to London. It may be remembered that previously Mr. Wellman had made an attempt to reach the North Pole by airship, the venture, however, being unsuccessful, and the airship coming to grief. The rebuilt airship, "America II," had a length of 228 ft., and a maximum diameter of 52 ft., while her capacity was about 350,000 cub. ft. The power plant consisted of two engines of 80 h.p. each. A smaller engine of about 10 h.p. supplied air to the balloonets. The two engines were mounted transversely in the keel of the airship, each driving two airscrews through bevel gearing. The screws of the aft engine were of the swivelling type to allow of steering in a vertical plane and also to give direct lift or anti-lift when the airship was about to ascend or alight. There was a long keel extending nearly the whole length of the envelope, and in this enclosed keel were the crew's quarters. Slung underneath the keel was a lifeboat stocked with provisions. The most novel feature of the Wellman airship was the equilibrator, which was intended to keep the airship at a more or less constant altitude, and which consisted of 30 cylindrical tanks strung together on a steel cable of some 330 ft. length. As the airship tended to rise she had to support an increased length of this cable, while if she lost lift she descended and a greater proportion of the cable became submerged in and supported by the sea. Ingenious as this arrangement was, it ultimately proved to be the undoing of the airship.

Brig.-Gen. E. M. Maitland, C.M.G., D.S.O.

After waiting for favourable weather Mr. Wellman decided to make a start, and at 8 o'clock on the morning of Saturday, October 15, 1910, he announced that everything was ready and that the conditions were favourable. He, therefore, climbed aboard with his companions, including Capt. Murray Simon (pilot), Mr. Melvin Vaniman (engineer), Mr. Jack Irwin (wireless operator), and Messrs. F. B. Aubrey and Louis Lond (mechanics), and in the presence of an enthusiastic crowd the "America II" rose from her moorings at Atlantic City and headed out to sea where she was soon lost in a thick fog. During the day numerous messages were received by wireless from the airship, and everything seemed to indicate that good progress was being made. On the following (Sunday) morning the airship was reported off Nantucket, and Mr. Wellman's message was "Going O.K." After that no further news was heard of the airship until the Tuesday afternoon, and there was naturally a great deal of anxiety felt at the absence of news. Finally on the Tuesday afternoon, a wireless message was received from the R.M.S. *Trent* saying that in answer to a distress signal by the airship the *Trent* had stood by and had rescued the crew. When it was found that the equilibrator, from which so much had been expected, prevented the airship from being steered properly and also gave rise to serious vibration on account of being dragged through a rising sea, preparations were made for launching the lifeboat, and after the airship had been brought down close to the sea the crew got into the boat and were later picked up by the *Trent*. The airship after being relieved of so much weight, rose to a great height and soon disappeared. Thus ended this plucky attempt to cross the Atlantic by airship, and it has remained for a British airship, manned by a British crew, to accomplish this feat.

The Successful Voyage of R 34

After many hours of anxiety, chiefly caused by the knowledge that the fuel supply must be running low, the R 34 and her gallant crew arrived at their destination at 3 p.m. (British Summer Time) on Sunday last, July 6. The landing of the airship is thus described by *The Times* special correspondent:—

"With the band playing 'God Save the King' and thousands of spectators standing bareheaded, the R 34 dipped groundwards and dropped anchor at 10 o'clock this morning, after a voyage which up to late last night even experts feared might end in disaster.

"It was at 8.55 that the news that the giant airship was overhead brought the thousand inhabitants of Garden City and Mineola into the streets to see the R 34 slowly circling overhead as she manœuvred herself in position for landing. The number was clearly visible on her side, and her great bulk was gleaming in the morning sunshine.

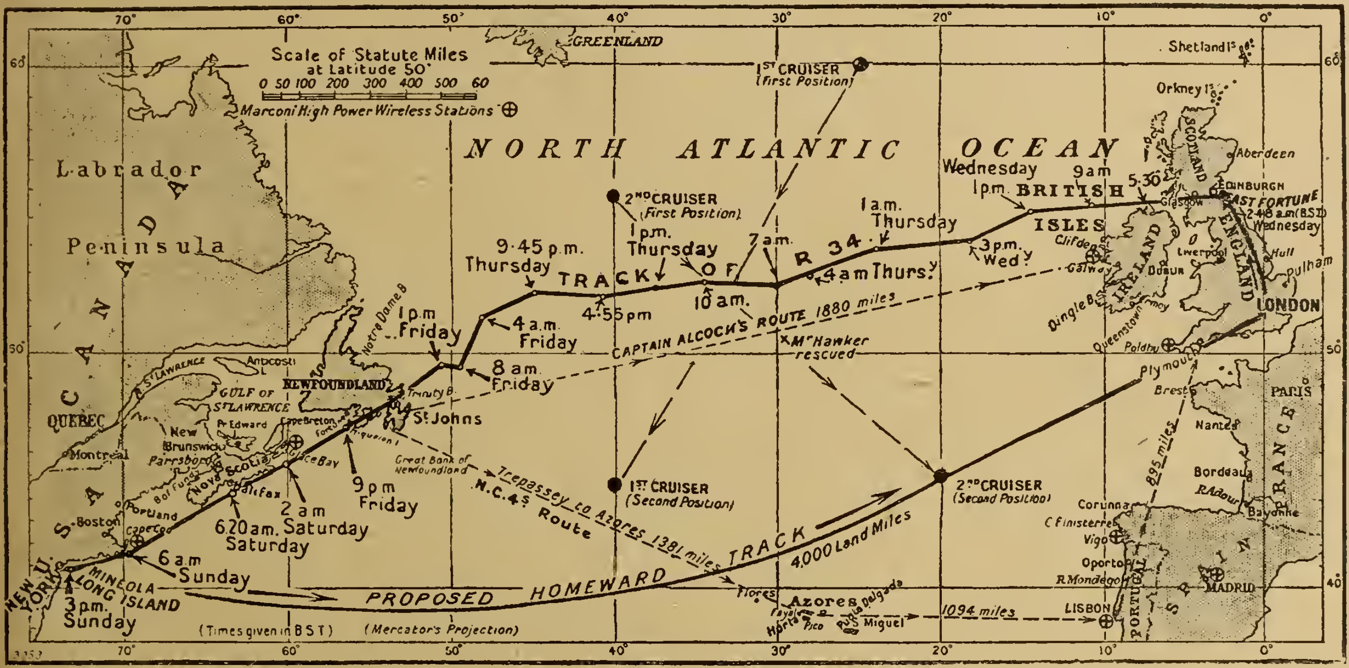
"Almost immediately streams of motor-cars appeared on the roads leading to the aerodrome. A few minutes later a shout went up as a tiny object detached itself from the rear gondola and floated earthwards. It was Maj. John Pritchard, who had jumped out in a parachute to give landing instructions. He came to earth in front of the grand stand and was taken to headquarters on a motor-cycle.

"Meanwhile the R 34 continued to circle above Roosevelt Field. Soon she released a quantity of ballast from the stern, her nose dipped, and, shutting off the forward propeller, she came slowly earthwards. At a height of about 300 ft.

she dropped an anchor, which the landing parties seized and began to haul her to earth. At one minute past ten the first gondola touched the ground, the long and perilous voyage over. She had just enough petrol left to have enabled her to fly 40 minutes more.

"One of the first to descend from the forward car was Gen. Maitland, who was greeted by officers of the United States Air Service, headed by Gen. Minoher, Director of Aeronautics. Gen. Maitland was smiling and cheerful, though he appeared tired. 'We are all pretty fit,' he said, when asked how he had fared on the journey. Describing the voyage, he said they had been much worried by winds, 'and last night two thunderstorms shook us up badly,' he added. The fog troubled them little. The total time of the voyage was 108 hours 12 minutes, it was a non-stop flight, made entirely under their own power. As soon as the landing parties had made the airship fast, the crew descended to solid ground and immediately began to stretch their legs. Hot coffee, food, soap and water were their immediate needs, and these were supplied on the spot in plenty.

"The ship is absolutely none the worse for her journey and suffered no damage in landing. It is hard when looking at her to realise that she has just completed so vast a journey and will in 48 hours calmly undertake another.



CROSSING THE ATLANTIC BY AIRSHIP: The course of R 34 in her journey from East Fortune, Scotland, to Mineola, Long Island, New York, a distance of 3,130 sea miles, accomplished in 108 hours. The R 34 ran into heavy storms off Newfoundland and Nova Scotia. From a *Times* map of July 7, and incorporating the British cruisers' positions and, approximately, the proposed homeward track of R 34.

"Her appearance this morning took every one by surprise after a night of anxious waiting. The last messages received had reported her in distress over the sea, using up her last few gallons of petrol. Late last night 200 men with supplies of petrol and hydrogen were dispatched from here by special train to Montauk, at the northern extremity of Long Island, in case the ship succeeded in reaching there. However, she sailed calmly into sight early this morning and made a successful landing as the climax of a triumphal voyage.

"Now she lies at rest in the middle of Roosevelt Field, while motor cars from every part of Long Island disgorge thousands of people who have come to behold the latest wonder of the world."

On the accompanying sketch map, prepared from the chart published in *The Times* of July 7, the various positions of the R 34 as indicated by wireless messages are shown. In order to render the map more complete we have added the approximate course which the airship proposes to follow on her return journey. It is hoped that on this she will pass over London on her way back to her starting point at East Fortune. The following messages from the airship herself, and from ships and wireless stations, form a very good record of the progress of the R 34 from the time she started from East Fortune (on July 2, 2.38 a.m. British summer time) until her arrival at Mineola at 3 p.m. (B.S.T.) on Sunday, July 5:—

Wednesday, July 2,

5.30 a.m.—The British airship R 34 passed over Rathlin county Antrim, at 4.30 G.M.T. (5.30 British summer time) this morning.

9.0 a.m.—The R 34 at 8 a.m. G.M.T. (9 a.m. British summer time), was 10 deg. 40 min. W., 55 deg. 20 min. N. The airship was then taking a course due West at a speed of 40 knots.

11.5 a.m.—Going through thick fog. Everything doing well. Time of despatch 10.05 G.M.T. (11.5 a.m. British summer time).

1.0 p.m.—The R 34 is reported by wireless to have reached at 1 p.m. to-day (British summer time) the position 55 deg. 07 N., 14 deg. 50 W. She was then proceeding at a speed of 32 knots in a thick fog. The officer in charge reports all well.

3.15 p.m.—A wireless message from the R 34, at 3.15 p.m. (British summer time), gave the airship's position as 53 deg. 50 N., 17 deg. 50 W. The course then being taken was West true and the speed 31 knots.

5.30 p.m.—The following signal has been received from R 34: "Position at 4.30 p.m. G.M.T., 53.50 N., 18 W.; all well."

The Air Ministry adds: "The position given in the previous signal is probably incorrect and may possibly have been wrongly transmitted. The position indicated in the above message is very probably correct."

7.23 p.m.—The Air Ministry announced at 6.23 p.m. G.M.T.: "In answer to a wireless message sent from East Fortune this afternoon to R 34, asking whether she was getting sufficient weather reports, the following reply has been received: 'Yes, thanks. We are in touch with Ponta Delgada (Azores), with St. John's (N.F.), and with Clifden, Ireland.'"

8.0 p.m.—The ss. *Suffern* reports having sighted the R 34 at 7 p.m. Greenwich mean time in the position 54.30 North, 18.20 West, steering South, 80.00 West true.

9.15 p.m.—The Air Ministry announces that Maj. Scott reported that at 8.15 p.m. G.M.T. R 34 was flying westward at 30 knots and at a height of 2,000 ft.

Untimed.—British ship, code signed G.B.R. (name unknown) reports:—"Following message from R 34: 'Flying at 2,000 ft.; brilliant sunshine above clouds. Give me your position.' Position given 54.30 N., 18.20 W. Answer: 'Arrive about Friday morning. Report speaking us.'"

Thursday, July 3.

Midnight (1 a.m. B.S.T.).—54.05 N., 24.15 W.

4.0 a.m.—The Air Ministry states this morning that the British airship R 34 wirelessed at 3 a.m. G.M.T. position 52.50 N., 28.10 W.

7.11 a.m.—R 34 reported her position at 6.11 a.m. G.M.T., 52.30 N., 30 W. (Just more than half-way.)

10.0 a.m.—A wireless message radiated by the R 34 at 10 o'clock (British summer time) indicates that her position at that hour was approximately 52 deg. 50 min. North and 34 deg. 30 min. West. The airship was then cruising above the fog.

1.14 p.m.—The Air Ministry announces: The Commander-in-Chief of the Atlantic and Home Fleet has communicated the following message by wireless to the Air Ministry:—H.M.S. *Renown* heard R 34 wireless signals strength 7 (that is, fairly loud and readable signals) at 12.14 G.M.T.

7.30 p.m.—A wireless station on this side of the Atlantic reports having heard H.M.S. *Tiger* speaking with the R 34 in the position 54.20 North, 40 West. All apparently O.K. at 6.30 p.m. Greenwich Mean Time.

Friday, July 4

The airship's progress from midnight, July 3, is shown by the following reports. The times given are B.S.T.:—

4 a.m.—48.40 W., 51.20 N.

8 a.m.—49.30 W., 48.40 N.

1.0 p.m.—50.25 W., 49.05 N. Clear sky, low fog. (Doubtful message: verification asked for.)

2.2 p.m.—Message from R 34 *via* St. John's:—"Flying 3,000 ft. above mist. Sun shining. All O.K."

2.17 p.m.—"2,900 gallons of petrol. All engines running well. 50.20 W., 49.04 N." (Received *via* Western Union Cable Co.)

UNTIMED.—From R 34 *via* St. John's:—"Probably be over St. John's at 4 p.m."

UNTIMED.—From St. John's, R 34, after making land at Notre Dame Bay, changed her course to the south, and was expected to pass at low altitude over St. John's at 5.30 p.m.

9.0 p.m.—From R 34. 55.14 W., 46.55 N. Course west, 45 knots. All well.

Saturday, July 5

1.0 a.m.—59.40 W., 45.45 N.

6.20 a.m.—Going well near Halifax.

MORNING.—R 34 encountered heavy electrical storms over Newfoundland and Nova Scotia.

10.0 a.m.—R 34 sighted over Parrsborough, Nova Scotia.

3.59 p.m.—Signal from R 34 asking for assistance received. Destroyers detailed and R 34 informed accordingly.

7.50 p.m.—R 34 sends the following wireless message:—"Position 45.21 N., 64.00 W. Course true south-west. Running out of fuel after flight (from) Britain. Please tell me if your destroyers coming."

Sunday, July 6

12.9 a.m.—R 34 170 miles north-east of Boston.

2.40 a.m.—United States destroyer *Bancroft* established contact with R 34 and accompanied her across the Gulf of Maine.

4 a.m.—R 34 sends following wireless message:—"Position of R 34 67.30 W., 43.20 N. Course S.W.S. Flying at 1,500 ft. Come and meet us. Making for Boston. Very short petrol."

6.10 a.m.—Message from R 34: "Position now approaching Matdha's Vineyard."

6.30 a.m.—Message from R 34: "We are sticking it. Think we will be O.K."

6.38 a.m.—"Will land Montauk and take on petrol."

1.35 p.m.—"Passed Montauk Point; making for Hazlehurst Field, Mineola. Expect land 2, Greenwich time."

3 p.m.—R 34 landed at Mineola, Hazlehurst Field, Long Island, with only 40 minutes' petrol left.

The outward voyage of R 34 is described in the official log, issued by Gen. Maitland at Mineola on July 6. The log of the homeward journey will, we understand, be published at the earliest opportunity after Gen. Maitland's arrival on R 34 in this country. The log history is as follows:—

"The distances covered were as follows:—East Fortune to Trinity Bay, 2,050 sea miles; Trinity Bay to New York, 1,080 sea miles.

"It was originally intended that the flight should take place at the beginning of June, but owing to the uncertainty as to the Germans signing the Peace Treaty the British Admiralty decided to detain the airship for an extended cruise over the Baltic and along the German coast. This flight occupied 56 hours under adverse weather conditions, during which time an air distance of roughly 2,400 miles was covered.

"At the conclusion of this flight the ship was taken over from the Admiralty by the Air Ministry and quickly overhauled for the journey to the United States. The date and time of sailing decided upon were 2 in the morning of Wednesday, July 2, and Press representatives were notified by the Air Ministry to be at East Fortune the day previously. At 1.30 in the early morning of July 2 the airship was taken from her shed, and actually took the air 19 minutes later, starting on her long voyage exactly 18 minutes in advance of the scheduled time.

"The story of the flight itself is entered in the log as follows:—

"1.42 a.m., Wednesday, July 2.—R 34 slowly arose from the hands of the landing party and was completely swallowed up in low-lying clouds at a height of 100 ft. When flying at night, possibly on account of the darkness, there is always a feeling of loneliness immediately after leaving the ground. This sense of loneliness was on this occasion accentuated by the faint cheers of the landing party coming upwards through the mist long after all signs of the earth had disappeared.

"The airship rose rapidly to 1,500 ft., at which height she emerged from the low-lying clouds and headed straight up the Firth of Forth toward Edinburgh. A few minutes after 2 o'clock the lights of Rosyth showed through a break in the clouds, thus proving brilliantly that correct allowance had been made for the force and direction of the wind, which was blowing 20 miles an hour from the east. It should be borne in mind that, when an airship sets out for a long-distance voyage carrying the maximum allowance of petrol, she can only rise to a limited height at the outset without throwing some of it overboard as ballast and that, as the airship proceeds on her voyage, she can if so desired gradually increase her height as the petrol is consumed by the engine.

An airship of this type, when most of its petrol has been consumed, can rise to a height of about 14,000 ft. For this reason the next few hours were one of the most anxious periods of the flight, for Maj. Scott who, owing to the large amount of petrol carried—4,900 gallons, weighing 15.8 tons—had to keep the ship as low as possible and at the same time pass over Northern Scotland, where the hills rise to a height of over 3,000 ft.

"Owing to the stormy nature of the morning, the air at 1,500 ft., the height at which the airship was travelling, was most disturbed and bumpy, due to the wind being broken up by the mountains to the north and causing violent wind currents and air pockets. The most disturbed conditions were met at the mouth of the Clyde and south of Loch Lomond, which is surrounded by high mountains, and looked particularly beautiful in the grey dawn light. The islands at the mouth of the Firth of Clyde were quickly passed. The North Coast of Ireland appeared for a time, and shortly afterwards faded away as we headed out into the Atlantic.

"The various incidents of the voyage are set down quite simply as they occurred, more or less in the form of a diary. No attempt has been made to write a connected story. It is felt that by recording each incident in this way, most of them trivial, a few of vital importance, a truer picture of the voyage will be obtained.

"Time, 6 a.m., July 2.—The airship is running with four engines at 1,600 revolutions, the forward engine being given a rest. Air speed 38 knots. Land miles per hour made good 56.57. Course steered, 298 degrees. Course made good, 289 degrees. Wind N.E., 15½ miles per hour. Height, 1,500 ft. Large banks of fleecy cloud from the Atlantic gradually blotting out view of the sea. At first we were above these clouds, but gradually they rose higher and we ploughed our way into the middle of them.

"7 a.m.—Nothing but dense fog. This was estimated by Harris (Capt. Guy Harris) to go down to within 50 ft. of the water and up to a height of about 5,000 ft. Suddenly we catch a glimpse of the sea through a hole in the clouds, and it is now easy to see that we have a slight drift to the south, which was what was estimated by both Scott and Cooke. A few minutes later we find ourselves above the clouds. Our height is still 1,500 ft., beneath a sky with clouds of about 8,000 ft.

"We are therefore between two layers of clouds, a condition in which Alcock and Brown found themselves on more than one occasion in their recent flight. An excellent cloud horizon now presents itself on all sides, of which Cooke at once takes advantage. These observations—if the cloud horizon is quite flat—often prove a valuable rough guide, but they cannot be regarded as accurate unless one can also obtain a check on the sun by day or the moon and stars by night. Cooke reckons it easy to make as much as a 50-mile error in locating one's position when using a cloud horizon as a substitute for the sea horizon.

"7.30 a.m.—Breakfast, which consisted of cold ham and a hard-boiled egg each, bread and butter, and hot tea. We breakfast in two watches, generally about 15 in each. Conversation during breakfast reverted to the recent flight up the Baltic, and in the adjoining compartment was a gramophone entertaining the crew to the latest Jazz tunes, such as the 'Wild, Wild, Women.'

"Gen. Maitland here gives a list of the *personnel* of the R 34, and continues :—

"11 a.m.—Still ploughing our way through fog at 1,300 ft. The sea is completely hidden by clouds, and there is no visibility whatsoever. We stopped the forward and two aft engines, and are now running only the two wing engines at 1,600 revolutions, thus giving us an air speed of 30 knots, or 33.6 miles per hour. This is the airship's most efficient speed, as she only consumes on two engines 25 gallons of petrol per hour. The wind is blowing east at seven miles per hour, and so we make good 40 miles per hour and are resting three engines.

"Maj. G. G. H. Cooke is now on top of the airship, taking observations from the sun and using the cloud horizon with the sextant. The sun is visible to him, but not to us, the top of the ship being 85 ft. above us down in the fore control cabin. Our position is reckoned to be long. 14.40 W., lat. 55.10 N., which is equivalent to 400 miles from the starting point at East Fortune and 200 miles out in the Atlantic from the north-west coast of Ireland. We are in wireless touch with East Fortune, Clifden, and Ponta Delgada, and messages wishing us good luck are received from the Air Ministry, H.M.S. *Queen Elizabeth*, and others.

"11.45 a.m.—Lunch was excellent, consisting of beef stew, potatoes, chocolate, and cold water.

"12 noon.—This being my watch off duty, I turned in for four hours' sleep before the coming of the next period of duty, which is only two hours in this case, as it is the first of the two dog watches.

"Here Gen. Maitland described the living arrangements for the crew and the storage supplies, which include drinking water and 4,900 gallons of petrol, the total weight of the supplies being 24.32 tons. He continues :—

"Life in the keel of the large rigid airship is by no means unpleasant. There is very little noise and vibration except directly over the engines, and also a total absence of wind, and, except at the early hours of dawn, greater warmth than in the surrounding atmosphere.

"Getting into one's hammock is rather an acrobatic feat, especially if the hammock is slung high, but this becomes easy with practice. Preventing oneself from falling out is the thing one must be careful about. In a Service airship like the R 34 there is only the thin outer cover of fabric on the underside of the keel on each side of the walking-way, and the luckless individual who tips out of his hammock would, in all probability, break right through this and soon find himself in the Atlantic.

"Gen. Maitland continues :—It is surprising the amount of exercise one can get on board an airship of this size. The keel is about 600 ft. long, and one is constantly running about from one end to the other. There are also the steps in the vertical ladder to the top of the ship for those who feel energetic or have any duty up there. By the time it comes to one's turn to go to bed one generally finds that one is very sleepy, and the warmth of the sleeping bag and the hum of the engines soon bring sleep.

"3.15 p.m.—The sea is now visible at intervals through the clouds. It is of a deep blue colour, with a big swell on. Our shadow on the water helps us to measure the drift angle, which both Scott (Maj. G. H. Scott) and Cooke worked out to be 21 deg. We are running the forward and two aft engines and resting the two wing engines. We are making good 49 miles per hour. Durant, the wireless officer, reports just speaking to St. Johns, where signals are rather faint, but we are receiving quite clear signals, as we are still in touch with East Fortune and Clifden, and have been exchanging signals with the Azores. Since reaching the Irish coast our communications seem quite satisfactory. There have been remarkable rainbow effects on the clouds. One complete rainbow encircled the airship itself and another encircled the shadow, both being of very vivid colouring.

"3.45 p.m.—We had an excellent tea, consisting of bread and butter and greengage jam and two cups of hot tea, the water being boiled over the exhaust pipe cooker fitted to the forward engine. Fruitarian cake was also tried for the first time. It had a rather sickly taste, but is very nourishing. We would one and all give anything for a smoke. Greenland (captain), the first officer of the ship, is vainly trying to discover the culprit who used a toothbrush for stirring the mustard at lunch.

"4.30 p.m.—Still in fog and low clouds, and the sea is not visible. We have hardly seen any sign of the Atlantic since leaving the Irish coast, and we are beginning to wonder if we shall see it all the whole way across.

"5 p.m.—The tramp steamer, *Ballygally Head*, outward bound from Belfast, destination Montreal, picked up our wireless. She only heard us, and did not see us, as we are well above and completely hidden by the clouds.

"5.30 p.m.—Messages have been received from both the battle cruisers *Tiger* and *Renown*, which were previously sent by the Admiralty to assist us with weather reports and general observation. They reported respectively as follows :—*Tiger*—'Position 36 deg. 50 mins. North, 36 deg. 50 mins. West; barometer 1,027 millibars, falling slowly; thick fog.' *Renown*—'Position 60 deg. North, 25 West; barometer 1,027 millibars, falling slowly; cloudy visibility four miles.' Harris's deductions from these reports are to the effect that there is no steep gradient, and therefore no likelihood of a strong wind in that part of the Atlantic.

"6 p.m.—Scott increased the height to 2,000 ft., and we are well over the clouds, with a bright-blue sky above us.

"6.40 p.m.—We put back the clock half an hour to corrected Greenwich time. It is now 6.10 p.m. G.M.T. Position, latitude 3 deg. 50 min. North, longitude 20 deg. West. We have covered 610 sea miles, measured in a direct line, in 17 hours, at an average speed of 36 knots. The depth of the Atlantic at this point is 1,500 fathoms. At this rate, if all goes well, and if the depression from the south does not interfere, we should see St. Johns—if visible and not covered with fog as it usually is—by about midnight on July 3.

"6.55 p.m.—A wireless message from the Air Ministry *viâ* Clifden states that the conditions are unchanged in the British Isles. The anticyclone is persistent in the Eastern Atlantic, and a new depression is entering the Atlantic from the south. This confirms Harris's forecast, and is admirable proof of the value of cloud forecasting.

"7 p.m.—The clouds have risen to our height, and we are now driving through them with no sign of the sky above or the sea beneath. Scott reckons that the wind, which is north-east by east, is helping us slightly. The airship is now very heavy owing to the change of temperature, and is 12 deg. down by the stern. We are running all five engines at 1,600 revolutions, and our height is 3,000 ft.

"8 p.m.—We are just on the top of the clouds, alternately seeing the sun and then plunging through thick banks of cloud. The sun is very low down on the western horizon, and we are steering straight for it, making Pritchard (Maj. G. E. M. Pritchard) at the elevators curse himself for not bringing tinted glasses. The ship is now on an even keel.

"8.30 p.m.—Scott decided to go down underneath the clouds and increase the speed on all engines to 1,800 revolutions to do so. It is dark, cold and wet in the clouds, and we have shut all the windows. We see the sea at 1,500 ft. between patches of clouds. It is rather bumpy. We now find ourselves between two layers of clouds, the top one 100 ft. above us, and the lower 500 ft. below us, with occasional glimpses of the sea.

"9 p.m.—The setting sun gradually disappears below the lower cloud horizon, throwing a wonderful pink glow on the white clouds in every direction. Course steered, 320 deg.; course made good, 299. Air speed, 44 knots. Speed made good, 55 miles per hour. All through this first night in the Atlantic the ordinary airship routine, navigating, steering, elevating, and also maintaining the engines in smooth running order goes on watch and watch as in the day-time. The night is very dark. The airship, however, is lighted throughout. The radium paint used on the instruments is so luminous that in most cases the lighting installation is unnecessary.

"8.20 a.m.—3.7.—Clock put back another hour to correct time to Greenwich. Position, 35.6 W., 53 N. Cook got the position by observation from the sun and a good cloud horizon. He considers it accurate to within 30 or 40 miles. Our position is over the westbound steamship route from Cape Race to the Clyde, and we are momentarily crossing the east-bound route from Belleisle to Plymouth. We are well over half-way from Ireland to Newfoundland, and are back again on the great circle route, having been slightly south of it owing to drift, the effect of the northerly wind.

"12.45 p.m.—Durrant is speaking to ss. *Canada* on the spark wireless, so there may be a chance of our seeing her shortly, as the sea is temporarily visible. The second wireless operator obtains directions on our directional wireless, so we may know in what direction to look for her. All we know at the moment is that she is somewhere within 120 miles. Capt. David, the commander, wishes us a safe voyage. We gaze through our glasses in her direction, but she is just over the horizon.

"2 p.m.—Slight trouble in the starboard amidships engine—cracked cylinder water-jacket. Shotter made a quick and safe repair with a piece of copper sheeting, and the entire supply of the ship's chewing-gum, which had to be chewed by himself and two engineers before being applied.

"4.30 p.m.—Now on the Canadian summer route for steamers bound for the St. Lawrence, *viâ* Belleisle Strait and the well-known Labrador current. There are already indications of these cold currents in the fog which hangs immediately above the surface of the water. Scott and Cook spend much time at the chart table, measuring angles of drift and calculating the course. Aerial navigation is more complicated than navigation on the surface of the sea, but there is no reason why, when we know more about the air and its peculiarities, it should not be made just as accurate.

"5 p.m.—Harris unwisely shuts his hand in the door of the wireless cabin. Injury painful, but not serious. Flow of language not audible to me, as forward engine happened to be running.

"6.30 p.m.—We are gradually getting further and further into the shallow depression reported yesterday coming from the South Atlantic. For the last four hours the sea has been rising. Now the wind is south-south-east, velocity 45 miles an hour. Visibility only half a mile. Very rough sea. Torrents of rain. Despite this the ship is remarkably steady. At 8 p.m. Scott decided to climb right through it, and we eventually came out over the top of it at 3,400 ft.

"8.30 p.m.—We now passed the centre of the depression, exactly as Harris foretold. Rain has ceased, and we are travelling quite smoothly again. To the west the clouds have lifted, and we see an extraordinarily interesting sky, black, angry clouds giving place to clouds of grey mouse-colour, then bright salmon-pink and a clear sky, changing lower down on the horizon to darker clouds, with a rich golden lining as the sun sinks low.

"The surface of the sea is invisible, being covered with a fluffy grey feather-bed of clouds slightly undulating and extending as far as the eye can reach. The moon is just breaking through the black clouds immediately above it. East and west the clouds are black, owing to the ominous depression from which we have just emerged, while away to the south the cloud-bed over which we are passing seems to end suddenly and merge into the horizon. We are getting some valuable meteorological data on this flight without doubt, and each fresh phenomenon as it appears is instantly explained by the ever-alert Harris, who has a profound knowledge of his subject.

"9 p.m.—One of the engineers has reported sick. He complains of feverishness. A stowaway has just been discovered, a cat smuggled on board by one of the crew for luck. It is very remarkable that nearly every member of the crew has a mascot of some description, from an engineer officer who wears one of his wife's silk stockings as a muffler, to Maj. Scott, the captain, with a small gold charm called "Thumbs Up.'

"4.30 a.m., Friday, July 4.—A wonderful sunrise, the different colours being the softest imaginable—just like a wash drawing.

"7 a.m.—Height 1,000 ft. Bright blue sky above, a thin fog partly obscuring the sea beneath. Sea moderate, but a big swell.

"The fog bank appears to end abruptly 10 miles towards the south, where the sea appears clear of fog. It is a very deep blue, and standing out conspicuously is an enormous white iceberg. The sun is shining brightly on its steep sides, and we estimate roughly that it is 300 yards square and 150 ft. high. Another big iceberg is seen in the dim distance. These are the only two objects of any kind we have yet seen on this journey.

"8.15 a.m.—The fog is still clinging to the surface of the water. The water is evidently very cold. There is an extraordinary wave-like appearance in the clouds, which are rolling up from the north. Underneath, on the port beam, there is a long stretch of clear, blue sea, sandwiched between wide expanses of fog on either side, looking just like a blue river flowing between two wide, snow-covered banks. This is caused by a warm current of water which prevents the cloud from hanging over it. This illustrates the rule that over cold currents of water the clouds cling to the surface.

"9.0 a.m.—We are now over a large ice-field, and the sea is full of enormous pieces of ice, small bergs in themselves. The ice is blue-green under the water, with frozen snow on top.

"1.50 p.m.—Land in sight, first spotted by Scott on the starboard beam. A few small rocky islands were visible for a minute or two through the clouds, but were instantly swallowed up again. Altered course to the south-west to have a closer look. Eventually made them out to be the north-west coast-line of Trinity Bay. Our time from Rathlin Island, the last piece of land we crossed off the shore of the north coast of Ireland, to the north coast of Trinity Bay, Newfoundland, is exactly 59 hours.

"2.30 p.m.—We are crossing Newfoundland at 1,500 ft. in thick fog, which gradually clears as we get further inland. Message from St. John's to say Raynham has gone up in his machine to greet us. We replied, giving our position.

"3 p.m.—Again enveloped dense fog. Message from Sentinel giving us our position. We are making good 38 to 40 knots, and heading for Fortune Harbour.

"4.30 p.m.—We passed out of Fortune Harbour with its magnificent scenery into azure blue sea dotted with little white sailing ships, and are now over the two French islands of Miquelon and St. Pierre, steering a course for Halifax.

"7.45 p.m.—Passed over tramp steamer *Seal*, bound for Sydney (Nova Scotia), from St. John's, the first we have seen.

"8.15 p.m.—Clear weather, Sea moderate. Making good 30 miles per hour with three engines. The northern point of Cape Breton Island is just coming into sight; lighthouse with four flashes.

"Saturday, July 5, 2.30 a.m.—Very dark, clear night. The lights of Whitehaven show brightly on the starboard side, and we can make out the lights of a steamer passing us to the east. Strong head wind against us. Making no appreciable headway.

"7.0 a.m.—Scott decided to turn inland to avoid the south-west wind barrage blowing up the coast. Crossed coast at Goose Island and Country Harbour. Miles and miles of endless forests. Here and there a clearing with a hut or two, and a few cows and an acre or so of cultivated land. Any number of small rivers and lakes.

"10.20 a.m.—We came down as low as 800 ft. over huge forests of lovely resinous small pines, the scent of which we inhale with delight. The stacked tree-trunks look like bunches of asparagus from above put end up. We saw a big brown eagle. We all agree that we must come to Nova Scotia for shooting and fishing.

"12.30 p.m.—Lunch. The petrol question has become distinctly serious. Shotter has been totalling up the available petrol resources with anxious care. We have 500 miles to go to New York, and, if we do not get any wind or bad weather against us, we will do it all right with two engines, assisted occasionally by the third engine. We can't afford to run all five at once owing to the petrol consumption. Lieut.-Com. Lansdowne, of the United States Naval Airship Service, sends a signal on behalf of 'R.34' to the United States authorities at Washington and Boston to send destroyer to take us in tow in case we should run out of petrol during the night.

"The idea is that we could then be towed by a destroyer during the hours of darkness and at dawn cast off and fly to Long Island under our own power. Let us hope that this won't be necessary. It is now rainy and foggy, which is the kind of weather that suits us now, as rain generally means no wind.

"3.0 p.m.—Passed Haute Island in the Bay of Fundy.

"3.30 p.m.—For some little while past there have been distinct evidences of electrical disturbances. Atmospherics are very bad. A severe thunderstorm was seen over the Canadian coast moving south down the coast. Major Scott turned east off his course to dodge the storm, putting on all engines. In this, fortunately for us, he was successful, and we passed through the outer edge of the storm. We had a very bad time indeed, and it is quite the worst experience from the weather point of view that any of us has yet experienced in the air. During the storm some wonderful specimens of cumulo-stratus were seen and photographed. These clouds always indicate a very highly perturbed state of the atmosphere, and look rather like a bunch of grapes.

"7.30 p.m.—We are now in clear weather again, and have left Nova Scotia well behind, heading straight for New York. A particularly fine electrical disturbance at time of sunset.

"9.30 p.m.—Another thunderstorm. Again we have to change our course to avoid it, and every gallon of petrol worth its weight in gold. It almost breaks our hearts to have to lengthen the distance to get clear of these storms.

"July 6, 4 a.m.—Sighted American coast at Chatham.

"4.25 a.m.—Are over the south end of Mahoney Island. Scott wondering whether petrol will allow him to go to New York or whether it would not be more prudent to land at Montauk.

"5.30 a.m.—Passing Martha's Vineyard, a lovely island, beautifully wooded. Scott decided he could just get through to the landing at Hazelhurst Field, but that there would not be enough petrol to fly over New York. Very sad, but there is no alternative. We will fly over New York on the start of our return journey on Tuesday night, weather and circumstances permitting.

"Landing 1.54 p.m., Greenwich mean time, or 9.54 a.m. United States summer time, at Hazelhurst Field, Long Island.

"Total time entire voyage 108 hours 12 mins."

While General Maitland's log briefly indicates the progress of "R.34" from time to time, it will be of interest to record what in the meantime took place ashore, where great anxiety was naturally felt for the safety of the airship and as to whether or not she would have sufficient petrol to reach Mineola. The *Times* correspondent at Mineola describes what was taking place there during the last part of the journey and says :—

"The 'R.34' landed at Mineola at 9.55 this morning under her own power.

"The landing came as a relief after a night of anxious waiting. Yesterday evening there was real anxiety at Roosevelt Field. Despatches came in that the airship was cruising slowly south-west along the Canadian coast into head winds. Dismal pictures flitted into the watchers' minds of possibilities of her running with none too much petrol to spare into thunderstorms brought on by the great heat under which this part of the Continent is sweltering. The vicious currents at the Bay of Fundy were anxiously canvassed.

"The climax came when a message was received at 9.36 p.m. by one of the Navy wireless stations, saying 'Rush help, making for Boston, from Bay of Fundy at 23 knots. Come quickly. Gasolene giving out. Send ship.' At 11 p.m. anxiety was relieved by another message by way of the Ottercliff wireless station, which, though it indicated a great shortage of gasolene, showed that there was good hope of landing. The message ran :—Following received from 'R.34' :—'Position "R.34" 67.30 W., 43.20 N. ; course S.W. by S. by magnetic compass ; flying 1,500 ft. Come and meet us ; making for Boston. Rush ; very short of gasolene.'

"U.S. Naval Help

"Could a landing be made near Boston was then the question uppermost in everybody's mind. Its answer was not reassuring, and the anxious vigil continued. It was, however, assuaged somewhat by the knowledge that the American Navy was doing everything possible. As soon as the two messages given above were received Admiral Benson, Chief of Naval Operations, sent out instructions.

"A message from the Ottercliff station filed at 11.30 p.m. read as follows :—'U.S. *Bancroft* trailing the "R.34."' Then came the news that another destroyer had seen the airship. 'U.S. *Stevens* at 11.3 p.m., Washington time, reports position 45.50 N., 66,50 W.' Orders were sent from Washington to the *Stevens* to proceed at full speed toward the dirigible's position, trying to establish radio communication. Early this morning this message came from the *Bancroft* showing that the 'R.34' might be able to reach Chatham. It read :—'To Commandant, First Naval District : position 41.52 N., 58.04 W., headed for Chatham at 23 or 24 knots. "R.34" thinks fuel will hold.' Later the Ottercliff Naval Station reported this intercepted message from the *Bancroft* to 'R.34' :—'We see you are heading for Chatham, course 230 deg., speed 23 knots. Keep me informed your movement.' Finally at 2 a.m. came this message from the airship :—'Will land Montauk. Will report later.' The message was received with great relief. The spot at Chatham on Cape Cod, near Boston, where Major Scott had thought of landing, though a dirigible base, is not fitted for large ships, and it was feared that it might be impossible to berth her there. Had Maj. Scott put in there, he would have done so with the intention, according to a message received from him, of fuelling, and proceeding to Mineola, possibly to-day.

A Dangerous Landing Place

"The decision to go on to Montauk Point, on the eastern end of Long Island, was due to messages from Mineola to Major Scott pointing out the danger of Chatham and the comparative advantages of Montauk, where there are ample supplies of hydrogen and fuel, a good landing place, and plenty of vessels about in case of an enforced descent into the sea. It was also accessible for the men who had been trained to handle 'R.34' on landing—an important consideration. Indeed, news that Chatham or Boston might be the landing place had caused something like a panic among those responsible for the safe berthing of the ship, some of whom set out, on hearing the news, to rush as fast as possible to Boston.

"It was with the idea that the landing would be at Montauk whither a number of men were hurriedly despatched to manage the landing, that such of the anxious watchers as slept last night went to bed. They were relieved, but not happy, for great uncertainty could not but surround a landing at an unexpected place. It is clear that 'R.34' must have had a very bad time of it on the last lap. She had two days and nights of dodging storms and fogs over one of the most inhospitable of seas. She was running short of hydrogen and of fuel. Her long-distance wireless refused to work at the end. Nevertheless, as her messages show, she was determined to stick it out to the end."

Messages of Congratulation

His Majesty sent the following message of congratulation to Officer Commanding "R.34" through General Sir F. H. Sykes :—

"I am commanded by His Majesty to transmit the following message to you :

"Heartiest congratulations to yourself and crew of 'R.34' on your splendid achievement, and best wishes for a safe return. Your flight marks the beginning of an era in which the English-speaking peoples, already drawn together in war, will be even more closely united in peace."

The following messages of congratulation were also sent :—

From Mr. Winston Churchill.—"All congratulations to Major Scott and his gallant companions on their conquest of the Atlantic. Henceforward East Fortune and Long Island are signal names in the history of flying. May the return be as prosperous as the outward journey."

From General Sykes, Controller-General of Civil Aviation.—"Heartiest congratulations on your successful voyage and sincere wishes for safe return. I sincerely hope the flight will be the forerunner of Transatlantic commercial traffic by air."

From the Air Council.—"The Air Council desire that their appreciation be conveyed to Brig.-Gen. Maitland, Maj. Scott and officers and crew of "R.34" of the manner in which they successfully crossed the Atlantic and dealt with subsequent difficulties."

From the Air Staff.—"Well done. We fully appreciate your difficulties since the crossing to Newfoundland was actually completed. Further congratulations on establishing a world record for time in the air.—GROVES, Brig.-Gen., Deputy-Chief Air Staff."

From the Chief of the Air Staff.—"In the name of all ranks of the R.A.F. I desire to express our appreciation of your feat. Airmen can realise your airmanship, navigation, and endurance.—TRENCHARD, Maj.-Gen., Chief of Air Staff."

The Return Journey

At the time of writing no definite decision has, apparently, been made regarding the time of the start of the return journey, which was at one time thought to be taking place during Tuesday last (July 8), but July 9 or 10 is probably nearer the date. However, according to reports from Mineola the airship nearly came to grief during the early morning of July 7, when, it is reported, owing to the expansion of the gas the airship became almost unmanageable, and at times lifted the men of the landing party off their feet. Finally the strain grew so great that the mooring ring in the nose of the airship broke, and the nose shot up into the air, the airship being now anchored by the aft gondola only. While the airship was in this precarious position some members of the crew succeeded in climbing into the airship through the aft gondola, making their way into the nose whence a rope was lowered and the landing party succeeded in bringing the airship into a horizontal position once more. When the mooring ring tore away some slight damage was done to the nose of "R.34" but this is not thought to be serious, as the ballonets are not damaged. It will, however, take some little time to make the necessary repairs, although naturally the commander of the airship is anxious to get away as soon as possible, which will probably be during Wednesday.

The Lessons Learned from the Transatlantic Voyage of "R.34"

In our Editorial comment we are referring to the lessons that are to be learned from this great trip of the "R.34," and the effect which it will have on the future development of commercial airship aviation. Suffice it to publish here some of the deductions that have been made by members of the crew of "R.34" and by others equally qualified to judge. Maj. Pritchard, who by the way, arrived some little time ahead of his fellow travellers by the expedient of dropping in a parachute in order to be on the spot to superintend the landing operations, expressed the following views to a correspondent of *The Times* :—

"Personally, all this sort of howl and congratulations seem to me out of place. This journey in itself is not so wonderful. The thing to praise is the past work which has made it possible."

He confessed a moment later that he and his brother officers were all so tremendously absorbed in technical questions during the journey and so keenly interested in their solution, that they had no interest left for the purely human aspect of their adventures. He continued :—

"What I want to emphasise first is that airships are supreme for long-distance travel by air. Aeroplanes are for quick, short flights, and there is no competition between the two, any more than there is between an Atlantic liner and a cross-Channel boat. If you want a really reliable long-range air vessel it must be a rigid ship. In the flight we have just completed the flight was tremendously longer than any ever attempted before by a heavier-than-air machine. It must be remembered that we took only 59 hours to do the purely Atlantic part of the trip, though the whole flight here has occupied 108 hours. Of our difficulties I will speak to you in a minute, but first I want to point out that our return journey will be infinitely easier. By air, for the purposes of airship travel, America, figuratively speaking, is a thousand miles nearer England than England is to America. Winds are invariably against the traveller to America, and in his favour going from America."

A Reuter message says that shortly after the landing the officers and crew of "R.34" had luncheon with American Army and Navy officers, when Gen. Maitland predicted that within a few years airships five times as big as the "R.34" with a lifting capacity of 200 tons, would not only cross the Atlantic regularly but would establish trade routes in the Mediterranean and in the Pacific.

Maj. Cooke, the navigating officer, said : "The weather situation in the Atlantic must be investigated thoroughly before trans-oceanic travel by air between England and America can be made safe and practicable. With the limited information we now have regarding the weather conditions, Transatlantic travel is highly dangerous. I consider it almost a miracle that we completed the trip successfully after what we went through last night."

Lieut.-Com. Lansdowne, U.S.N., observer on board the "R.34," whose story of the trip is printed in the *Daily Telegraph*, makes the following statement :—

"I thoroughly believe that the future of the airship for commercial aviation has been established. I make this assertion from my personal observation aboard the 'R.34,' d I earnestly hope that America in this matter will keep pace with our progressive cousins across the sea. Such co-ordination, I firmly believe, will augment, if that is possible, the close relationship that binds the two great English-speaking peoples."

ITEMS

The Constructor's Congratulations

On behalf of himself and staff at Inchinnan, where "R.34" was built, Sir William Beardmore has wired congratulations to Maj. Scott and crew of "R.34."

Girders of a larger airship, the "R.36," are now being placed in position.

A Stowaway on Board the "R.34"

THE first stowaway of the air was found on board "R.34" when she was some six hours out. He is a youth named Ballantine, scarcely 20 years of age, who had formed one of the crew, but who with others had to be left behind at the last moment in order to keep the load down. This caused him great disappointment, and he resolved to make the trip as a stowaway. He had intended to remain in hiding during the whole trip, but this he was unable to do on account of illness. Incidentally Ballantine was the only man on board who suffered from any illness during the voyage. When he was discovered he was feverish and was given medical attention. It took about two days to pull him around, and he was then made to work his way across. He will not be allowed to make the return journey on board "R.34," but will be sent home by steamer. Although as a matter of form he will have to be court-martialled it is not thought that his punishment will be very severe.

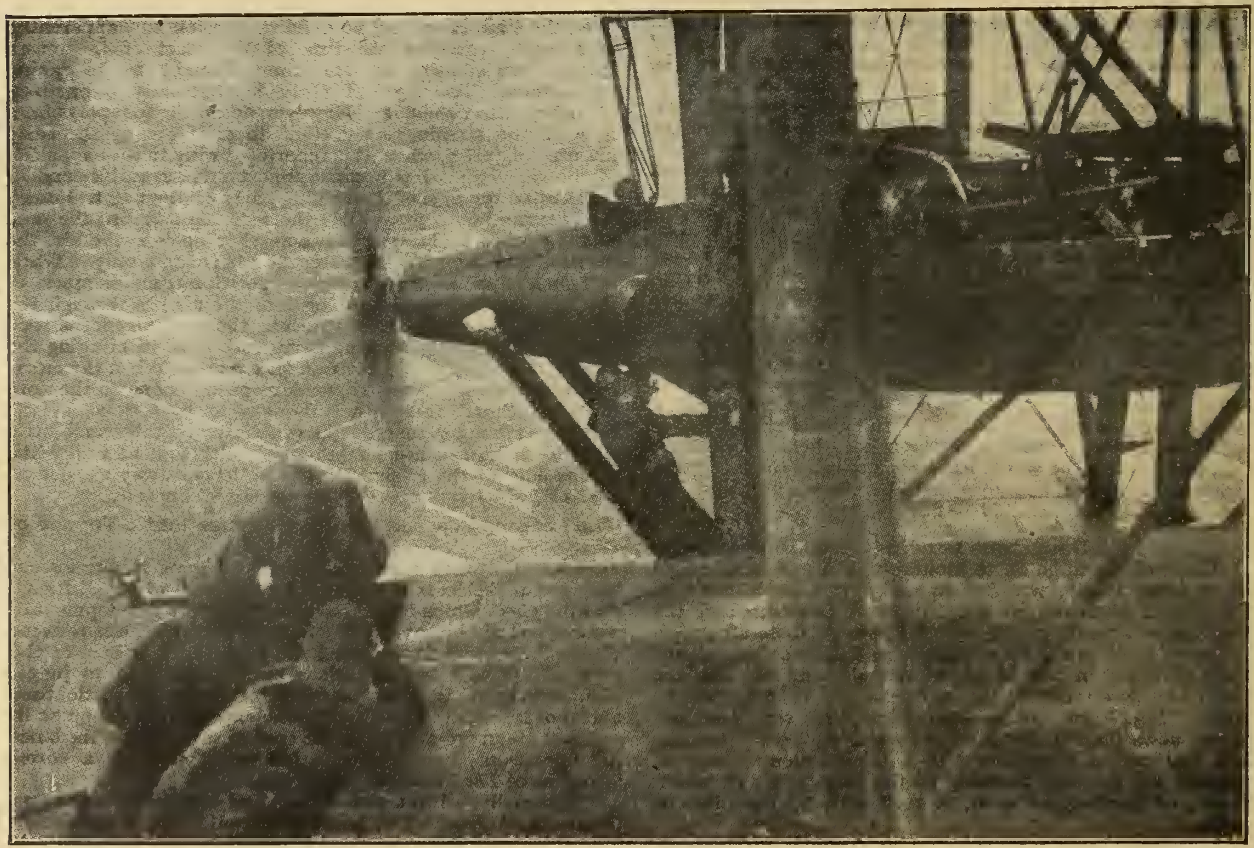
Thanks to U.S. Navy

THE following message has been sent to the British Air Attaché at Washington :—

"Please convey the following to United States Naval authorities :—The Air Council desire to express their most cordial and grateful thanks for the co-operation and assistance that the United States Navy rendered to H.M. Airship 'R.34.'"

To Follow the Return Journey

THE progress of R 34 during the return trip from America to England will be recorded on a large chart of the Atlantic exhibited outside Marconi House, Strand. A model airship will indicate R 34's position according to the latest wireless messages.



ON BOARD A GERMAN GIANT AEROPLANE.—The mechanic is repairing an oil pump defect during flight. The photograph was taken from the port engine *nacelle*.

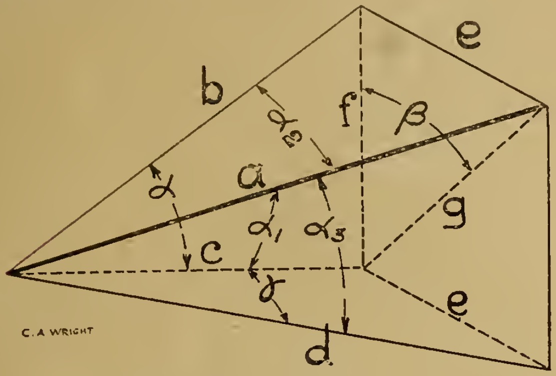
INCLINED STRUTS AND WIRES

BY C. A. WRIGHT

Probably no other machine involves so many "angle" problems as does the aeroplane.

So long as the strut or wire is inclined to any pair of the three co-ordinate planes, the matter is fairly simple.

When, however, it is inclined to all three planes the following trigonometrical relations and formulæ will be found useful when determining auxiliary angles and length of the strut or wire.



Inclined strut or wire line "*a*."

Angle contained by lines *be* = 90°
" " " *fc* = 90°
" " " *fd* = 90°
" " " *fe* = 90°
" " " *gc* = 90°

$$\sin \alpha = \frac{\tan \alpha_2}{\tan \beta} \qquad (1)$$

$$\sin \alpha_1 = \frac{\sin \alpha_2}{\sin \beta} = \frac{\sin \alpha_3}{\cos \beta} \qquad (2)$$

$$\sin \alpha_2 = \sin \alpha_1 . \sin \beta = \cos \alpha_1 . \tan \gamma = \sin \alpha_3 . \tan \beta \qquad (3)$$

$$\sin \alpha_3 = \sin\alpha_1 . \cos\beta = \tan\alpha . \cos\alpha_1 = \frac{1}{\sqrt{\frac{1}{\sin^2\alpha} + \frac{1}{\cos^2\beta} - 1}} = \frac{\sin\alpha_2}{\tan\beta} \qquad (4)$$

$$\sin \beta = \frac{\tan \gamma}{\tan \alpha_1} = \frac{\sin \alpha_2}{\sin \alpha_1} \qquad (5)$$

$$\sin \gamma = \frac{\sin \alpha_2}{\cos \alpha_3} = \tan \beta . \tan \alpha_3 \qquad (6)$$

$$\cos \alpha = \frac{\tan \alpha_2}{\tan \gamma} \qquad (7)$$

$$\cos \alpha_1 = \frac{\sin \alpha_1 . \cos \beta}{\tan \alpha} = \frac{\sin \alpha_1 . \sin \beta}{\tan \gamma} = \cos \alpha . \cos\alpha_2 = \cos \gamma . \cos\alpha_3 = \frac{\sin \alpha_2}{\tan \gamma} = \frac{\sin \alpha_3}{\tan \alpha} \qquad (8)$$

$$\cos \alpha_2 = \frac{\cos \alpha_1}{\cos \alpha} = \frac{\sin \alpha_1 . \cos \beta}{\sin \alpha} = \frac{\sin \alpha_3}{\sin \alpha} \qquad (9)$$

$$\cos \alpha_3 = \frac{\cos \alpha_1}{\cos \gamma} = \frac{\sin \alpha_1 . \sin \beta}{\cos \gamma} = \frac{\sin \alpha_3}{\sin \gamma} = \cos \gamma = \frac{1}{\sqrt{1 + \frac{\tan^2\alpha}{\tan^2\beta}}} \qquad (10)$$

$$\cos \beta = \frac{\tan \alpha}{\tan \alpha_1} = \frac{\sin \alpha_3}{\sin \alpha_1} \qquad (11)$$

$$\cos \gamma = \frac{\cos \alpha_1}{\mathrm{ccs}\ \alpha_3} = \frac{\tan \alpha_3}{\tan \alpha} = \frac{1}{\sqrt{1 + \tan^2\alpha\ \tan^2\beta}} \qquad (12)$$

$$\tan \alpha = \frac{\tan \gamma}{\tan \beta} = \tan \alpha_1 . \cos\beta \qquad (13)$$

$$\tan \alpha_1 = \frac{\tan \gamma}{\sin \beta} = \frac{\tan \alpha}{\cos \beta} \qquad (14)$$

$$\tan \alpha_2 = \sin \alpha . \tan \beta = \cos \alpha . \tan \gamma \qquad (15)$$

$$\tan \alpha_3 = \tan \alpha . \cos \gamma = \frac{\sin \gamma}{\tan \beta} = \frac{\tan \alpha}{\sqrt{1 + \tan^2\alpha . \tan^2\beta}} \qquad (16)$$

$$\tan \beta = \frac{\tan \gamma}{\tan \alpha} = \frac{\tan \gamma}{\tan \alpha_1 . \mathrm{ccs}\ \beta} = \frac{\tan \alpha_1 . \sin \beta}{\tan \alpha} \qquad (17)$$

$$\tan \gamma = \tan \alpha . \tan \beta = \tan \alpha_1 . \sin \beta \qquad (18)$$

$$= a \sqrt{c^2 + e^2 + f^2} \qquad (19)$$

$$= c \sqrt{1 + \frac{\tan^2\alpha}{\mathrm{ccs}^2\beta}} = c \sqrt{1 + \tan^2\alpha + \tan^2\gamma} \qquad (20)$$

$$= e \sqrt{1 + \frac{1}{\sin^2\alpha . \tan^2\beta}} = e \sqrt{1 + \frac{1}{\tan^2\beta} + \frac{1}{\tan^2\gamma}} \qquad (21)$$

$$= f \sqrt{1 + \frac{1}{\tan^2\alpha} + \tan^2\beta} \qquad (22)$$

◆ ◆ ◆ ◆

R.33 and R.34 to Help Victory Loan

The Air Ministry have made arrangements with Victory Loan Headquarters that anyone who this week purchases £5,000 or over of the Victory Loan shall have a free flight. Application should be made to the Victory Loan Headquarters, Salisbury Square, and, if the flights cannot be arranged this week, they will be given after the Loan Campaign is over. The applications must, however, be made this week. Also, the Air Ministry state that they hope they will be able to arrange for the R.33 to meet the R.34 on her return from America, so that London will have the opportunity of seeing the two sister airships fly over the City.

Aeroplanes and Empire Linking-Up

Under the auspices of the Imperial Air Fleet Committee, Lord Norris, ex-Premier of Newfoundland, on Monday addressed a meeting at Birmingham, when the Lord Mayor of that City, Sir Davis Brooks, presided. The Chairman explained that it was desired to stimulate interest in the scheme for raising funds to buy aeroplanes to be given to the Colonies. It was proposed to give the Birmingham aeroplane to South Africa, and already £1,700 towards the total cost of £2,200 had been promised.

Lord Norris said that by giving aeroplanes they were promoting the patriotic sentiments which were necessary to keep the Empire together. We were at the beginning of a new chapter in Imperial history, and it would be well if captains of industry asked themselves how we stood, now that the War was over. In his judgment there never was a time when more careful piloting was required. An Imperial Air Fleet would help to link up the far-flung portions of the Empire and produce some tangible illustrations of our common brotherhood.

Cairo–Karachi Air Mail

A definite project for an India–Egypt aerial mail between Cairo and Karachi, *via* Baghdad, is under consideration by the Government.

And Between India and Australia

General Borton, in an interview at Calcutta, is very enthusiastic over the prospects of the establishment of an aerial post in the future.

General Borton, who about the middle of June returned to Calcutta after a three months' surveying tour, undertaken at the request of the British Air Ministry, to discover the possibilities of establishing an aerial postal service between India and Australia, points out strongly, however, that much remains to be done as regards aerodromes, hangars, meteorological stations, and navigation lighting. He does not think weather conditions, even during the monsoon, will prevent flying, but there is much that can only be learnt by practical flying experience.

An Amballa to Simla Flight

In our issue of June 26, in connection with the above flight, Maj. H. A. Tweedie, A.F.C., was made by a reporter's error to belong to the "Aus. F.C." Mrs. Alec Tweedie points out that Maj. Tweedie, although he has been awarded the A.F.C., "is *not* an Australian and was born in London. He was educated at Charterhouse and Trinity College, Cambridge. "It was the *first* flight," Mrs. Tweedie continues, "across the Himalayas, and he landed on a very small piece of ground, nearly 8,000 ft. above sea level, in the cup of the mountains at Simla. The Indian papers are very enthusiastic." And well they may be. Our congratulations to Maj. Tweedie and to Mrs. Alec Tweedie.

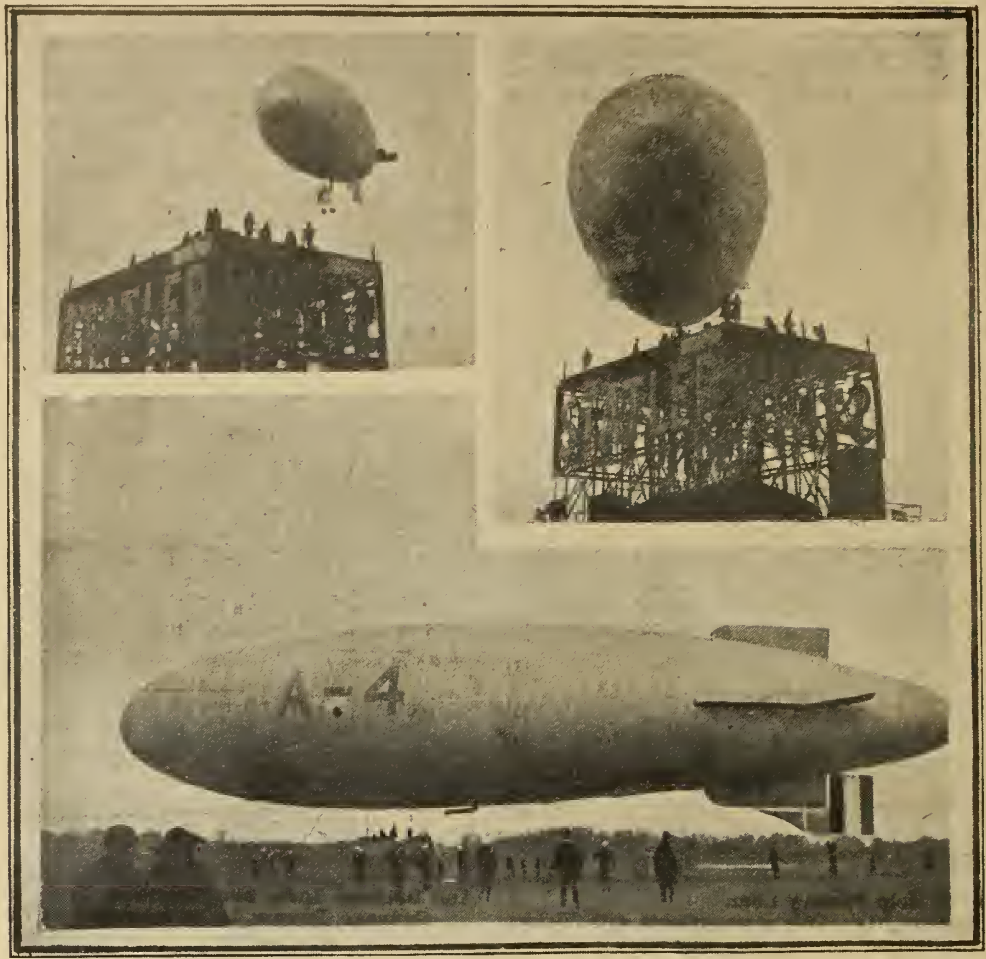
Our Funny Language

Ask your friends the following questions: Did you ever see a stone step? or a pea-nut stand? or a sardine box? or a sausage roll? or an apple turnover? or a hair die? or a day pass by? or a horse fly? or a snake dance? or a ship spar? or a sugar bowl? or a vine run? or a cracker box? or a bed spring? or a rail fence? or a ginger snap? or a skate fish? or a bottle fly? or a man catch his breath? or a bed tick? or a clock run? or ink stand? or a man pull up a river? or a bell push? or a lady's ear ring? or the coal scuttle? or a salad dressing?—*The Joystick.*

ROOF-TOP LANDING STAGES FOR AIRSHIPS

An interesting, and not altogether unimportant, experiment was carried out in America last May, when, on the occasion of the meeting and dinner of the Cleveland section of the Society of Automotive Engineers, one of the U.S. Army "Blimps"—the A-4, built by the Goodyear Tyre and Rubber Company—successfully came "alongtop" a landing stage erected on the roof of the Statler Hotel at Cleveland, Ohio (where the above meeting took place), and landed two passengers from Akron, 50 miles away. The airship returned to the latter place immediately after landing its passengers.

The pilot of the A-4, James F. Shade, was accorded well-deserved applause on his skilful piloting, for the difficulties to overcome in a feat of this description are many, and not at once apparent. The performance was not staged as a "stunt," but was to show the progress that has been made in the development of dirigibles and the skill with which difficult landings can be made by experienced pilots.



ROOF-TOP LANDING STAGES FOR AIRSHIPS.—A successful experiment recently carried out in America. Top left hand corner, the U.S. Army Airship A-4 approaching the landing stage erected on the roof of the Statler Hotel, Cleveland, Ohio. Right, the airship comes "alongtop" and lands two passengers. Bottom, the U.S. Army "Blimp" A-4.

◆ ◆ ◆ ◆

The Airship Club Dinner

Owing to the Peace celebrations taking place on July 19 it has been found necessary to postpone the Airship Officers' Club dinner at the Connaught Rooms until Saturday, July 26. Particulars for those interested, as stated last week, can be obtained from the Hon. Secretary of the Club, 4, Dean Stanley Street, S.W. 1. With the splendid trip of R 34 in mind, the Club should have a very "full house" upon the occasion.

43 Squadron, R.A.F.

An officers' dinner will be held for all members by special request of Billy Dore and Baron Miles at Criterion Restaurant, Piccadilly, 7.30 p.m. Friday, July 18. Ticket 50*s*. each. Those interested should communicate with Capt. John Trollope, Banstead, Surrey, enclosing cheque, before 15th instant. Beds arranged for country members.

A Flying Club in the North Proposed

A proposal is now on foot to organise a flying club at Birkdale and to take advantage of the hard and level sands there for aerodrome purposes. We understand that it is possible to land there at practically any time, and at ordinary high tide there is ample room. Messrs. A. V. Roe and Company have been using the sands for some time, and have found them a satisfactory aerodrome. The objects of the proposed club would be:—

(1) To enable ex-Service pilots to continue their flying.
(2) To popularise flying as a pastime.
(3) To organise flying competitions.
(4) To encourage generally the use of the aeroplane as a means of transport.

Any of our readers who may be interested in the proposed scheme are invited to communicate with Major W. G. McMinnies (late R.A.F.), 18, Gloucester Road, Birkdale, Lancs.

Punch's Summer Number.

Good as *Punch* always was, before the War, it was better during the War. That it will reach yet greater heights after the War is reasonably guaranteed by the 1919 Summer Number, just out, which largely contains matter reflecting the effects worked on the minds of all sorts and conditions of men by the little bit of autography practised at Versailles on Saturday, June 28 last. A better shilling's-worth it would be difficult to select.

DESIGN AND CONSTRUCTION OF FLYING BOATS

By Captain **DAVID NICOLSON**

(Concluded from page 876.)

Construction. Types P. and N.

GENERALLY the hull construction of the P. and N. types consists of a number of stringers disposed, as in Fig. 10, around the more or less circular section of the boat.

Stringers.—The longitudinal stringers A, Fig. 10, are of spruce $2\frac{1}{4}$ ins. moulded amidships tapering to 1 in. forward and $\frac{3}{4}$ in. aft, all sided $\frac{5}{16}$ in. At the top and bottom of each stringer are glued a pair of fillets, one on either side of each stringer, to take the fastenings through the floors and the skin. The writer suggests that I-shaped stringers should be worked out of the solid, forming a lighter and stronger girder.

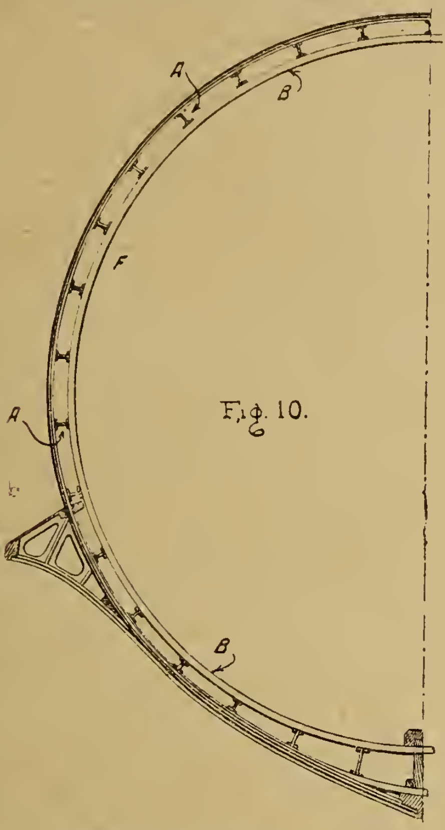


Fig. 10.

The stringers are secured to the interior bent-wood hoops B of rock elm, extending in planes transversely to the longitudinal axis throughout the length of the boat, Figs. 10 and 11. The hoops are doubled in wake of the wing-root spars, and alternately scarphed at the top and bottom. Externally around the longitudinal stringers are a number of bent-wood ribs or timbers of rock elm moulded $\frac{5}{16}$ in., sided $\frac{3}{8}$ in., and spaced 2 ins. apart, except at the bow, where they are fitted as cant timbers and spaced $2\frac{1}{2}$ ins. apart. All timbers are in one piece, bent right round the hull with the ends at the keel, into which they are joggled and glued to the stringers.

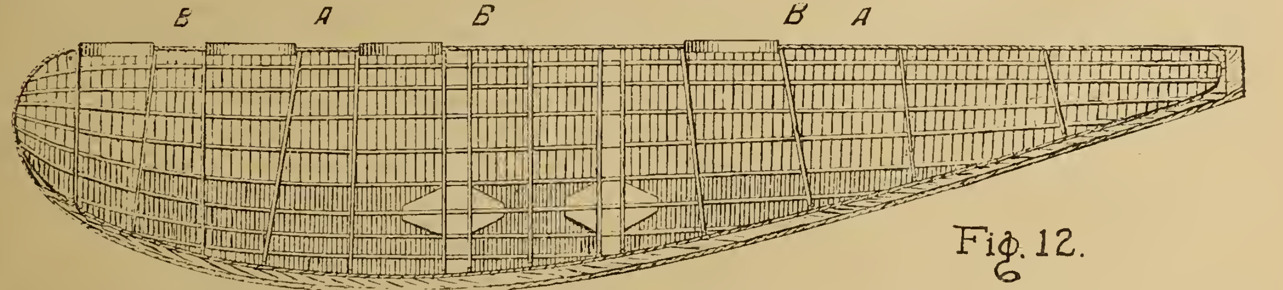


Fig. 12.

Floor-timbers.—The bent floor-timbers are of rock elm $\frac{5}{8}$ in. moulded, sided $\frac{3}{8}$ in. at the centre of the keel, and tapered to $\frac{1}{4}$ in. moulded and $\frac{3}{8}$ in. sided at the ends, all embracing one-quarter of the hull, thus ensuring perfect transverse continuity of strength in the timbers. The keel is of rock elm moulded $1\frac{3}{4}$ ins. and sided 3 ins. at amidships and tapered at the ends. It is in one piece, and runs up to form the stem, and is a great improvement on the construction adopted in the F. type.

Keelson.—The keelson is of spruce, 5 ins. moulded at amidships and tapered to stem, and to 2 ins. at the after end. It is sided $\frac{5}{8}$ in. parallel throughout. The bottom is carefully joggled over the floors, and glued and secured to the keel by two spruce fillets glued and through fastened to the keelson, keel, and floors. The top side of the keelson is rabbeted into the under side of a top member or flange, which is secured by glue and screws. This top member or flange is of spruce moulded $\frac{7}{8}$ in. at the centre and tapering to $\frac{3}{4}$ in., sided $2\frac{1}{2}$ ins. at the centre, tapering to stem forward and to $1\frac{1}{4}$ ins. aft; the keel, keelson, and top member forms a very strong I girder.

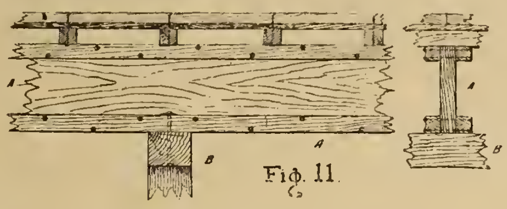


Fig. 11.

The sternpost is of mahogany 3 ins. moulded and sided, and extends to 1 ft. above the hull. Saddle straps of elm are fitted, as shown on Fig. 11; those at the main spars and tail-plane struts are in one piece running round the boat with their ends fastened to the keel, as in the case of ordinary timbers, and of the same thickness. In addition, doublings of English elm are fitted at the wing-root stay plates at the front and rear spars; these are clearly seen in Fig. 12.

These doublings are carried in a fore and aft direction for a length of 30 ins., and are carefully joggled over the timbers and floors. The planking of Honduras mahogany is fitted in narrow widths with close seams. The inner skin $\frac{3}{32}$ in. thick being laid diagonally, while the outer skin, $\frac{3}{16}$ in. thick, of the same material, is laid fore and aft.

Varnished nainsook is laid between the skins; this not only makes a watertight job, but adds to the strength of the stem chine. The inner diagonal skin is held in position with copper pins, the outer being through fastened to the timbers with copper nails, the ends of which are turned on the face of the timbers.

Outside the main structure already described, a double-bottom or water-planing surface is fitted, and known as the step. The water-planes are framed up forward of the main step with three-ply birch and small stiffeners, the frames being spaced 18 ins. apart, and secured to the inner hull planing-bottom with spruce fillets.

Chine.—The chine of rock elm is in one piece, and tapered from $1\frac{1}{2}$ ins. by $1\frac{1}{2}$ ins. at the front step to $1\frac{1}{4}$ ins. by 1 in. at the stem. The stringers are of spruce, all in one piece fore and aft, fitted through the three-ply frames, which are fixed to the stringers by small fillets. The timbers of rock elm of the same size and spacing as in the main hull, with the ends joggled into the chines, are tapered to fit the hull; they are secured to the face of the stringers with glue and light copper pins. The bottom is planked with a double skin of mahogany with varnished fabric between, similar to the main hull.

Fin top.—The fin top is framed with rock elm timbers spaced 2 ins. apart, the ends being joggled into the chines and into a fillet of rock elm. The whole is planked in a similar manner to the inner hull, carefully fitted to the chine and hull-fillet rabbets, and closely fastened with screws. Rubbing plates of $\frac{1}{16}$-in. brass, bent to the shape of the bottom, are fitted along the keel, and the chines are also protected by brass strips fastened to the sides and bottom, with the fore ends let in flush and secured by screws.

The bulkheads when fitted are of waterproof canvas fixed to hoops, the spaces between the hoops and skin being filled in with compressed cork to make a thoroughly watertight job. This part of the structure is elastic, and can be considerably distorted without damage, forming a natural buffer to withstand sudden local shocks or bending moments on the hull structure. A strong point in favour of the small transverse framed hull is its resiliency, as it does not depend for its efficiency upon the rigidity of the parts comprising it.

The following are a few of the advantages of the P. and N. type of hull over the F. type :—

(*a*) A saving of 29 per cent. in bare hull weight in P.5 over the latest hulls of the F.5 class, which are of the same length and power.

(*b*) An increase in torsional stiffness of the after part and probably greater strength generally. This was proved by testing one of the earliest types to partial destruction at the R.A.E., Farnborough, to ascertain the bending moment when supported at the ends, and the effect of crushing by loading the bottom up to 17 lbs. per square inch of its surface.

(*c*) The cost of production compares favourably with the F. type. The man-power hours on the 64-ft. hull is 7,500 or 5·37 per square foot of surface ; while the time required for completion is 14 weeks, the approximate cost being £1 per lb. weight, including stay-tube plates and steel fittings.

(*d*) This system ensures extreme accuracy in the estimating of weights and the centre of gravity, *e.g.*, the smallest boat had an estimated weight of 216 lbs. Two hulls built by different firms only varied by ½ lb. Three hulls of an estimated weight of 430 lbs. actually weighed 436, 437, and 440 lbs. respectively, and were built by three different firms. The greatest variation in position of centre of gravity was ¼ in. from that calculated. The largest yet built, N.4, is 64 ft. in length, and her estimated weight was 2,970 lbs. ; the actual weight being 2,982 lbs., an error of 12 lbs., or less than ½ per cent. The position of the centre of gravity in this case was exactly as designed.

Important Features.

In a flying boat it is necessary for efficiency that it should possess :—

(*a*) A minimum weight of hull consistent with strength.

(*b*) Seaworthiness.

(*c*) A minimum hull resistance.

Military.—A capacity for carrying guns having an all-round fire, and for dropping heavy bombs.

Commercial.—Large passenger and mail-carrying capacity.

(*a*) The military flying boat, not being built under the registration societies' rules, has no unit to limit the reduction in weight, therefore every action is taken to keep the scantlings and fittings very light, so that the boat might carry as much petrol as possible for long-range work, and a large armament. To reduce the weight from the original design was rather a difficult proposition, as some pilots and equipment officers made continual demands for additions such as wireless apparatus, signalling lamps, life-saving apparatus, boat hooks, sea anchor, carrier pigeons, etc., which were found necessary under service conditions.

It should always be borne in mind, however, when designing a flying boat, that its operational value depends entirely upon the weight of the machine when it is empty.

(*b*) Any machine which has to alight on the water, and remain there for any length of time, must be seaworthy. It is here that the flying boat has proved to be a great improvement over the seaplane. It has sometimes happened that a seaplane alighting on rough water has been completely wrecked in a very short time by the force of the waves, while several have been blown over. As seaworthiness depends on the design and construction of the hull, a makeshift between an aeroplane *fuselage* and a flimsy boat is not altogether desirable.

It is as essential that the hull should be designed by a naval architect and constructed by a shipbuilder as the hull of a 20,000-ton steamer, to enable it to fulfil all the conditions of a trying service. Possibly in the near future these boats will be built to rules evolved by registration societies.

(*c*) The form of a flying boat is of the greatest importance not only from the point of view of displacement and stability, but from the standpoint of resistance in smooth or disturbed water, or in the air as affecting speed. Many tank experiments have been carried out to find the most suitable form for certain fixed conditions, and following are some of the conclusions arising from these investigations :—

Hollow V sections keep the spray down, cut the water more easily and cleanly, plane better, reduce shock on landing or when ploughing through broken water, and eliminate the necessity for shock absorbers. In some of the latest boats the forward sections show a V or concave curvature, blending sweetly into a convex form, which has been found desirable in order to give the fore part of the boat buoyancy when she first takes the water.

The bottom of the hull forward should be inclined to the axis of the machine, but the inclination must not be so great as to cause planing before the controls become effective, and this is particularly necessary when running before the wind. If planing is too pronounced, the boat rises on the surface with but very little control available to maintain balance, which might prove fatal, and when running before the wind this is more likely to occur, due to the higher water-speed necessary before the machine can take the air.

Aft, the bottom should rise quickly, as this favours a steepening of the planing bow before suction is eliminated, and allows the tail to be well clear when planing begins. This is particularly noticeable in the F.B.A. boats, a French design in which the naval architect boldly swept the after part of the hull upwards in curve form.

The total resistance of the P. and N. type takes precedence over the F. design. The former types are more stream-lined in shape, and their bows are much finer. The excessive round bow of the F. type was adopted to allow the forward gun to be fired over the stem and below the boat ; but this shape could be greatly improved and yet attain the former object. It will be seen from the sections, Fig. 13, that the area of the F. type bottom is greater than that of the P. type, consequently surface friction in the latter is much less than in the former ; but although this is a disadvantage for the F. boat, it gives a larger water-line area, and should necessity arise for adding extra weights the immersion would be less than in the P. type, which would counterbalance to some extent the disadvantage stated.

As in aeroplanes, the struts and wires are all stream-lined to give the least possible resistance, a feature proved in practice to have a beneficial effect on the maximum speed of the machine.

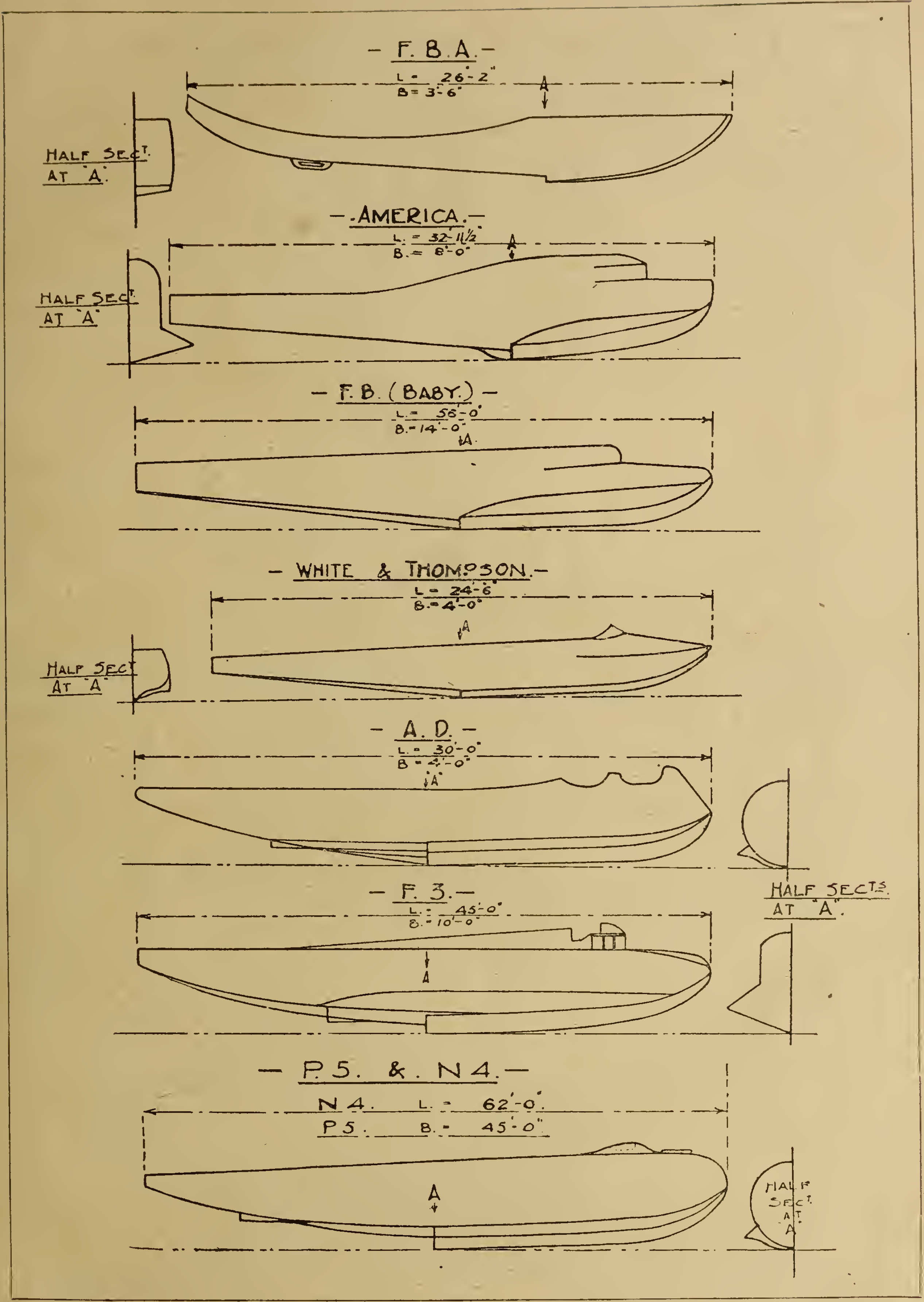
(*d*) The primary object of the flying boats was to bomb submarines, but they also proved useful for patrol and scouting work. Although they were intended for offensive purposes, they were also prepared for defensive action, and were fitted for carrying machine guns. The position of two of these guns has been previously stated ; other two are placed a few feet abaft the rear spar and inside the hull, two larger gun-port openings or doors concealing these weapons from outside view. The latter position is not an ideal one, for they cannot fire below the boat, and their fore and aft radius of fire is limited. It would be an improvement if a watertight hatch were designed in the bottom of the boat, clear of the steps, to enable a gunner, when the boat is in the air, to fire directly downwards into an opponent.

Heavy bombs, in some cases weighing up to 500 lbs., are carried, hanging in a horizontal position at the ends of the wing-root spars ; these are released instantaneously by gear controlled from inside the hull.

(*e*) It may be interesting to review the results attained, and to consider how far these, 12 years after flight became an accomplished fact, are likely to influence future progress. Money, time, and brain power have been spent upon the development of airships, but it is doubtful whether the best of the non-rigid or the rigid types have ever yet justified their cost, and, so far as can at present be seen, no great improvement in this respect is likely to take place. The lift of a lighter than air flying machine can never be greatly increased, even if a gas were discovered weighing zero, as the increased lift obtainable would be practically negligible.

German airships did valuable scouting work for the enemy, but as fighting machines they had a decreasing value. For commercial purposes, it is questionable if the enormous cost of production and maintenance will ever be decreased so that mails and passengers may be carried as cheaply as by other means of transport. Undoubtedly mails will be carried regularly and to a large extent between important seaports in the near future, and there are other ways of profitably employing flying boats—for the purpose of spotting derelicts, fighting forest fires, locating drifting mines, and even for proposed expeditions to the North and South Poles.

The flying boat is probably the only machine by which rapid communication can be opened up in dense forest country intersected by rivers which cannot be navigated owing to



DESIGN AND CONSTRUCTION OF FLYING BOATS

Fig. 13.—The profile and sections of various types of flying boats

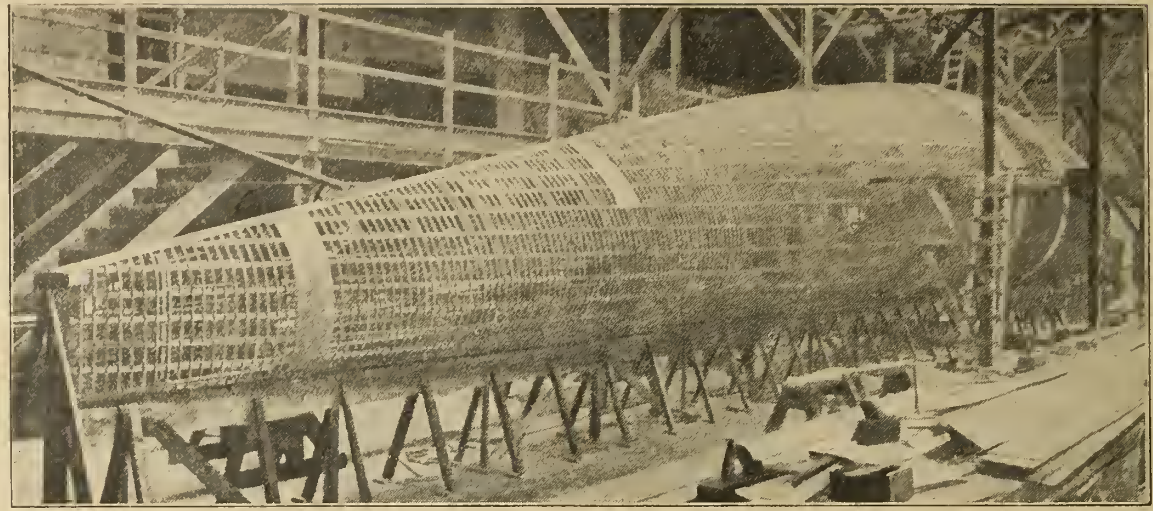


Fig. 14.—Type N 4. Hull in frame.

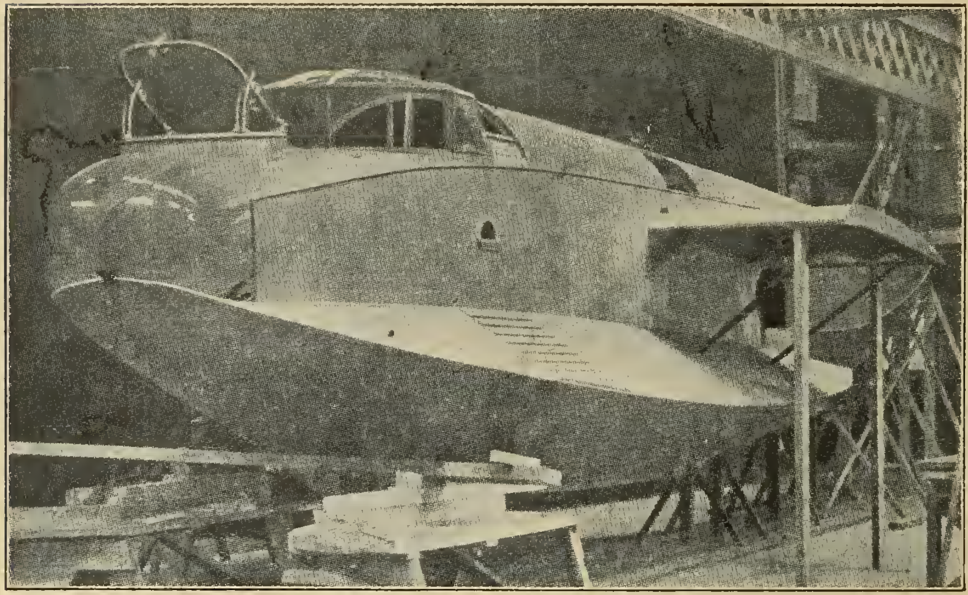


Fig. 15.—Type F 3. Hull nearing completion.

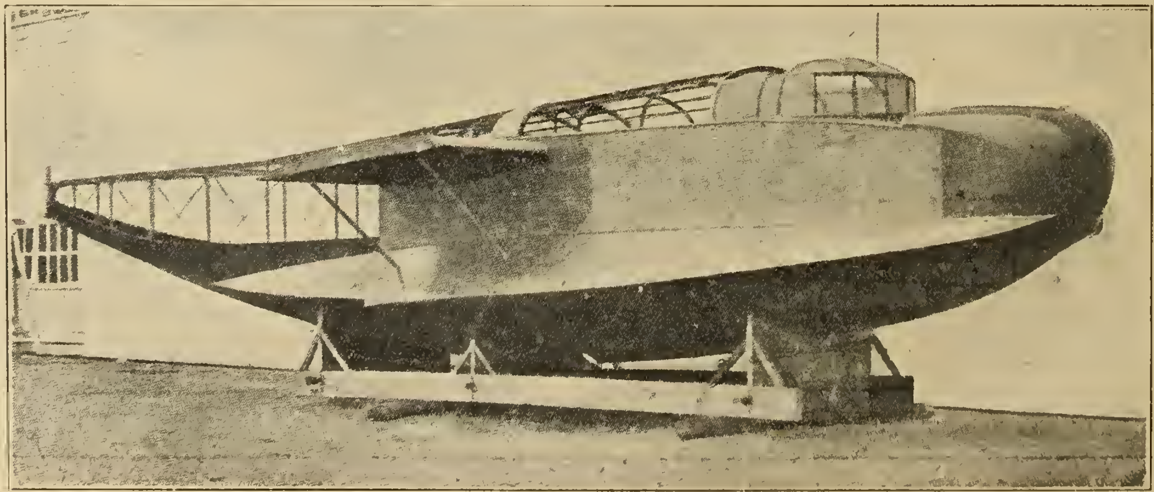


Fig. 16.—Type F. Hull ready for mounting wings and engines.

falls or rapids, for such boats can alight on any moderately sheltered water, and require no special aerodrome.

Following are a few comparative weights relating to the F., P. and N. types already described.

Since the F.5 and P.5 boats are of similar dimensions, and designed to lift the same weight, 12,000 lbs., the lightest hull adds greatly to the operational value of the boat.

The total weight of each of two F.5 boats built by different firms, from official plans, only differed by 4 lbs., the average weight being 2,174 lbs., including wing roots, cloche, seats, and tank seats; deducting 333 lbs. for cloche, seats, etc., leaves a weight for bare hull of 1,841 lbs. The P.5 hull only weighs 1,321 lbs. with the same fittings, therefore the F.5 is nearly 40 per cent. heavier than the P.5.

The rate of production of the various types of boats built in one shipyard show the following figures :—

Ten men built an N.4 hull in from 12 to 13 weeks, three of these being experienced boat-builders, five joiners, and two apprentices. The construction of an F. boat required two skilled boat-builders, and the rest as in the previous case—seven men in all—and they took from 11 to 11½ weeks.

As the N.4 has 1,320 sq. ft. of planking on the main hull, compared with 560 sq. ft. in P.5, which is the same size as F.3, the saving on man-power hours is very much in favour of the larger boat and its particular construction. The increase in area between 1,320 sq. ft. and 560 sq. ft. is roughly 236 per cent. ; while the increase of highly-skilled labour is 50 per cent., and 40 per cent. semi-skilled, with an increase of time of under 10 per cent. Boats of the F. type took 4,830 man-hours for 560 sq. ft. ; while on the N.4 there were 7,500 man-hours for 1,320 sq. ft., equal to 8.6 man-hours per square foot on the F. and 5.6 for the N.4. The N.4 shows a saving in man-hours per square foot of surface of over 34 per cent. when compared with the F. type.

The F. boats are propelled by two Eagle Rolls-Royce engines, each developing 345 h.p., giving a speed of 100 m.p.h. The wings have no appreciable dihedral angle or stagger, and are almost square at the wing tips. The span of the top wing is 102 ft. Small wing floats are fitted underneath, and almost at the extremities of the lower planes. The rudder is car-shaped, the bottom of which is in line with the bottom of the boat.

The N. boat has an overall length of 70 ft., carries a crew of nine, and a thousand gallons of fuel. Her wings are of the variable camber device, and the span is 142 ft. She is fitted with four Rolls-Condor engines, each giving 640 h.p. under dual control, and has a sea-level speed of 110 m.p.h., while her ceiling will be from 17,000 to 18,000 ft.

Fig. 13 illustrates in outline the profile and sections of various types of flying boats.

Figs. 14, 15, and 16 show photographic views of a hull in frame, a hull nearing completion, and a hull ready for mounting the wings and engines respectively.

The following tables show the relationship between the performances of some of the boats :—

P.5.

Two Eagle VIII Rolls 352 h.p., 1,800 revs.			lbs.
Weight empty			7,347
Petrol, 100 galls.			
Oil, 20 galls.			915
Miscellaneous			138
Crew			720
Total weight..			9,210
Weight per sq. ft. of surface ..			7.12
Weight per horse power ..			13.10
Climb to	Mins.	Secs.	
2,000 ft. ..	2	40	
5,000 ft. ..	7	55	
Speed at	Knots.		
2,000 ft.. ..	91		
5,000 ft. ..	89		

F.3.

Two Eagle VIII Rolls 345 h.p., 1,800 revs.			lbs.
Weight empty			7,958
Petrol, 100 galls.			
Oil, 10 galls.			836
Miscellaneous			238
Crew			720
Total weight ..			9,752
Weight per sq. ft. of surface			6.82
Weight per horse power ..			14.13
Climb to	Mins.	Secs.	
2,000 ft. ..	3	12	
5,000 ft. ..	9	3	
Speed at	Knots.		
2,000 ft. ..	81		
5,000 ft. ..	80		

F.5.

Two Eagle VIII Rolls 345 h.p., 1,800 revs.			lbs.
Weight empty			8,023
Petrol, 80 galls.			
Oil, 10 galls.			688
Miscellaneous			199
Crew			720
Total weight ..			9,630
Weight per sq. ft. of surface			6.83
Weight per horse power ..			13.95
Climb to	Mins.	Secs.	
2,000 ft. ..	2	45	
5,000 ft. ..	7	30	
Speed at	Knots.		
2,000 ft. ..	88		
5,000 ft. ..	87		

◆ ◆ ◆ ◆

No Service Aircraft for Peace Flights

THE Air Ministry announces, in order to prevent useless applications and to avoid disappointment, that it will not be possible to permit Service aircraft to be lent for the purpose of giving exhibition flights during the Peace and other celebrations.

R.A.F. Dental Surgeons

THE Air Council invites applications from duly qualified men for appointment as commissioned dental officers at a salary of £1 per diem, together with a War bonus of 28*s*. per week, and certain allowances where quarters are not available. Successful applicants will be required to engage under contract for twelve months, or until their services can be dispensed with, whichever will happen first, and will be granted an outfit allowance of £30. Applications should be made to the Secretary, Medical Department, Air Ministry, London.

Mr. W. M. Hughes on Imperialism

AT the farewell dinner given last week in London to the Australian Prime Minister, before his departure for Australia, Mr. Hughes said we must hope that somehow means would be found whereby the great confederation of free nations calling itself the British Empire would work, live and develop together in the highest interests of civilisation and the welfare of mankind.

Apart from spiritual ties of tradition, race, and common ideals, he added to the two great links—defence and trade—the means of communication. Every step that we took that brought the widely scattered portions of the Empire closer together was a safeguard against disintegration and a greater assurance of unity. The present means of transport and communication, good as they were, fell far short of that which was imperatively necessary. With marine engineering, even as it stood to-day, there was no reason why we should not travel from Fremantle to London by steamship in from 18 to 20 days, by aeroplane or airship in much less. An Imperial fleet of swift steamships, ploughing and encircling the oceans of the earth, aeroplanes and airships still more swiftly piercing the upper air, were imperatively necessary—and, not less so, a chain of powerful wireless stations supplementing cables and enabling every part of the Empire to be more fully conversant with each other's thoughts and actions.

In the not-distant future Sydney and Montreal would speak to London and hear its voice over the great wastes of water. Thus drawn together by an effective Imperial Defence and trade policy, and by improved means of communication, bonds of Empire would be so firmly cemented that neither corroding time nor the rude buffets of adversity would shatter them.

Air Services in the Orient

ACCORDING to a message from Paris, the French Chamber will vote additional credits for the establishment of an Aviation Mission in Turkey, entrusted with the organisation of the following postal lines : Constantinople, Smyrna, Grecian Archipelago ; Constantinople, Palestine, Messa, Egypt ; Constantinople, Armenia, Caucasus, Persia ; Constantinople, Bucharest, South Russia ; Constantinople, Salonika, the Balkans. It is stated that these lines will be carried on by the military until French air navigation companies have been floated.

Propellers as Souvenirs

THE Government are offering for sale singly a number of aeroplane propellers at York House, Kingsway. These propellers are made up of the finest walnut and mahogany, and can be used for a variety of purposes, such as hat stands, with a clock or barometer inserted in the boss, and can also be made into picture frames, jewel and clock cases. The four-bladed ones are being sold at 30*s*. and the two-bladed at 25*s*. Arrangements for delivery can be made. These propellers are all quite new, the engines for which they were made having become obsolete.

CIVILIAN FLYING

HENDON

BAD weather, and what might have been an extremely bad accident, somewhat marred the proceedings of the Hendon Peace Meeting last Saturday afternoon, when the first racing round the pylons since the War took place. As regards the accident, this, it appears, was very similar to that which occurred to Lieut. De Ville when he flew into a wireless mast. Capt. Chamberlayne had just finished first in the final of the race, and re-ascended in the G.-W. Bantam to do some stunting. For some reason, at present unknown, when flying round No. 3 pylon he appeared to lose control of the machine, which flew straight into one of the iron supports of a hangar.

Fortunately, the machine remained "stuck" where it hit, and the pilot managed to extricate himself almost unhurt, though soaked with petrol. It was undoubtedly a miraculous escape, and Capt. Chamberlayne is to be congratulated on being still alive.

There were seven entries for the race, which was flown in two heats of four circuits each, and a finish of six laps. There were four pilots in the first heat, which was won by Capt. Gathergood, winner of the Aerial Derby, on an Airco VI., with a 90 h.p. R.A.F. engine, who received 19 sec. start from Capt. Chamberlayne, flying a Grahame-White Bantam, with an 80 h.p. Le Rhone engine, who started from scratch and finished second. Heat 2 was won by Maj. R. H. Carr, whose machine was an Avro, with a 110 h.p. Le Rhone engine, with Capt. G. R. Hicks second on the same type of machine. Both started from scratch, and easily outdistanced the third competitor in the heat, Lieut.-Col. G. H. P. Henderson, who received 19 sec. The final being over a longer course necessitated an alteration in the handicap. Capt. Gathergood received 28 sec., Maj. Carr 19 sec., Capt. Hicks 19 sec., and Capt. Chamberlayne scratch. On the completion of the first lap Capt. Gathergood retired, and the final result was: Capt. Chamberlayne, 1; Capt. Hicks, 2; Maj. Carr, 3.

During the afternoon the usual exhibition and passenger flights were made.

Passenger work was again continued throughout the whole of Sunday afternoon.

"Flight" Copyright.

RACING AT THE LONDON AERODROME, HENDON: Line-up of the machines before Saturday's race of the day

"Flight" Copyright.

RACING AT THE LONDON AERODROME, HENDON: Start on Saturday of the first heat. Capt. Gathergood first away on an Airco, followed by Lieut. Park on an Avro, Capt. Robertson (Avro) and the winner of the final, Capt. Chamberlayne, on a G.W. Bantam.

"Flight" Copyright.

RACING AT THE LONDON AERODROME, HENDON: First heat on Saturday as seen from No. 1 Pylon. High up in the air, Capt. Chamberlayne (final winner), below Capt. Gathergood (21), first in the heat, followed by Lieut. Park (4)

Next Saturday's Cross-Country Race

A 20-mile cross-country handicap for the Hendon Trophy and £30, will be held at the London Aerodrome, Hendon, at the Summer Meeting, on Saturday afternoon next, at 4 p.m.

The course, of which five laps must be flown, is round the aerodrome pylons and a point about two miles out, *i.e.*, Bittacy Hill—a distance of approximately four miles.

It is expected that the pilots will include Prodger, Draper, and Turner on B.A.T. machines; Chamberlayne, Carr, Hicks and Robertson on Grahame-White biplanes; Park and Hammersley on Avro biplanes, the latter flying the Avro "Baby"; Gathergood and Manton on Airco biplanes; and Smith on a Bristol monoplane.

Entries close at 12 noon to-day (Thursday), the 10th inst.

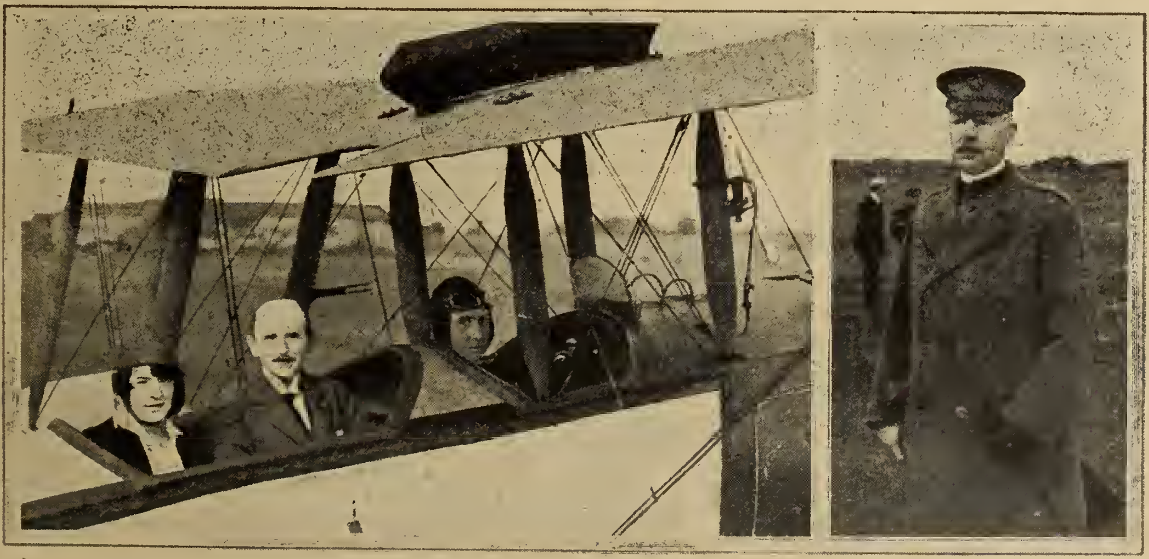
At intervals during the day, special flying displays and passenger flights will be carried out, and these will be repeated on the following day.

Additional enclosure accommodation has now been provided, and admission to the aerodrome is now from 9*d*. plus tax, children being half price.

Special flying displays will be given on the following afternoon, Sunday.

STAG LANE AERODROME

BY arrangement with the *Daily Sketch*, *Evening Standard* and *Sunday Herald* the London and Provincial Aviation Co. spent the whole of Sunday afternoon and evening in taking up readers of the above journals for free flights. Early in the



AT HENDON AERODROME: On the right Gen. Fitzpatrick, Chief of Army Aviation in U.S.A. On left, Einer Petersen of the "Politiken," Denmark, has a joy-flight with Pilot Hicks

afternoon hundreds of visitors turned up, all with great expectations. A ballot for 100 free seats was held, and the lucky ones were given 15 minute flips without delay. Needless to say, there was considerable disappointment amongst the unlucky ones—tears were no uncommon sight! It was then that Mr. W. T. Warren showed his good nature and sportsmanship, for he decided to ballot for another 10. Then, there still being some tears left, another 10. And then another! In fact, the end of it was that 75 additional free flips were given—and they all lived happily ever after! In the meantime the usual Jazz band, dances, and teas were going "all out."

THE R.A.F. AID COMMITTEE AND R.A.F. PRISONERS FUND

With the signing of Peace the labours of the above Committee draw to a close, and some extracts should prove interesting from the work done during the last four and a half years, which has been sent to all who have contributed in one way or another to the fund and enabled it to provide efficiently for the comfort of the R.A.F. on all the battle fronts.

The work was begun on October 9, 1914, by Lady Henderson and a small Committee at 3, Queen Anne's Gate, lent by the courtesy of the National Relief Fund. The R.F.C. at this time consisted only of 149 officers and 997 men. An appeal was sent out which brought in over £9,000, and work was immediately started. Separate parcels (containing a pair of socks, handkerchief, cigarettes, chocolate, bachelor's buttons, writing paper and pencil, etc., were baled and conveyed to France to each squadron, thereby providing each man with all small necessaries. Cardigans, mufflers and shirts were also sent to every man. The small parcels were discontinued later on when the articles which they contained could be bought in the canteens in the field; comforts were substituted in bulk as requisitioned by the C.O.'s of the squadrons. Hundreds of flying suits and goloshes were sent out during the first winter. Both officers and men were supplied with Christmas fare in 1914 as there had been no time for official arrangements to be made.

To Mesopotamia, East Africa, Egypt and India mosquito nets and quinine and the usual extra clothing were sent, also the small individual parcels of comforts. Books in large quantities were asked for in 1914 by the men in France, and ever since then they have been sent, and have by this means started many a library.

The airmen in the Army of Occupation, also those in North Russia, received up till the closing of the fund anything that the O.C.'s requisitioned—indoor games, gramophones, books, boxing gloves and footballs being their chief request.

The following are some statistics of the various articles sent to France, Mesopotamia, Italy, Salonika, Egypt, India and East Africa:—

5,700 cardigans, 70,000 socks, 9,500 mittens and gloves, 11,800 mufflers, 6,800 helmets, 26,250 handkerchiefs, 6,550 oilskins, 5,160 gum boots, 850 shirts and vests, 615 footballs, 160 gramophones, 1,000 records, 5,000 games, 4,000 books, 15,000 sundry articles, also 202,335 small parcels, the contents of which have been noted above.

As the Flying Corps increased and the work with it, the premises at 3, Queen Anne's Gate became too small; consequently a move was made in March, 1915, to the first floor and other rooms of Surrey House, Marble Arch, Lady Battersea very kindly having permitted their use, the only expenses being electric light, fuel and caretaker.

Gradually the "Prisoner of War" question developed, and early in 1915 a "first capture" food parcel was sent to each man—pilot, observer or N.C.O. We also opened a clothes department for the officers, and undertook to repack all parcels sent to us, taking out prohibited articles.

Lady Leighton and Miss Copland were responsible for the splendid work accomplished in this department.

When the Central Prisoners of War Committee was started in 1916 the fund came under its management, the organisation being of the greatest assistance. But all the money expended on our account had been raised by the Committee alone and independently of the Red Cross.

In October, 1914, a fund was inaugurated by Mrs. Sueter for supplying comforts for the men of the R.N.A.S., and for three and a half years the ratings at all the R.N.A.S. Stations both at home and abroad were provided with warm garments, books, games, gramophones, cigarettes, etc., about 200,000 articles being distributed. On the amalgamation of the two Flying Services, it was thought advisable that there should be only one joint fund for dispensing comforts; so in June, 1918, the R.N.A.S. Comforts Fund combined with the R.A.F. Aid Committee, the balance of their cash and stock being handed over to the amalgamated fund.

It will be of interest to the subscribers to know that over £7,000 was raised by the units of the R.N.A.S., the R.F.C., and R.A.F., and contributed to the fund for the benefit of their comrades.

Amongst the voluntary workers, the Committee especially mention Mrs. Pryor, M.B.E., Hon. Secretary for Prisoners of War, and Lady Barnes, M.B.E., Food Department, both of whom worked untiringly during the years the fund was in existence; also Miss Dudley, who was Secretary from its inauguration.

Other helpers, in kind, who are gratefully thanked by the Committee are Lady Battersea, for so generously lending her house for so long a period; to Mr. Neale, of Messrs. Phillips, Neale and Co., who provided office furniture, tables, screens, etc., free of charge; to Mr. Letts (Manager of Messrs. Crossley's, Ltd.) who, with others, helped us financially by raising large sums from aircraft factories; to Mr. Leigh Pemberton, who gratuitously advised on all legal matters; and Messrs. Smith and Earle, Chartered Accountants, for auditing the accounts free of charge.

Finally, a word of very special thanks is given to the Canadian Aviation Aid Club, which was affiliated with the R.A.F. Aid Committee early in 1918, and was always most generous in sending monthly supplies of comforts as well as donations in money.

We are glad to note that Lady Henderson has been given a D.B.E. and Lady Barnes and Mrs. Pryor a M.B.E. in recognition of their work with the fund.

Utilisation of Surplus War Material. Aero Engines for Commercial Purposes

Considerable attention is now being directed to the subject of working up much of the surplus war material, at present being disposed of by the Ministry of Munitions, into commercial propositions. It is interesting to note in this connection that a very successful test has just been carried out as to the utility of aeroplane engines for commercial purposes. A 200 h.p. 8 cylinder aero engine was installed in a London factory as a stand by power unit, and the space occupied was approximately 8 feet long by 5 feet wide by 5 feet high, the total weight not exceeding 800 lbs., exclusive of radiators.

The water cooling was effected by running the water through the ordinary cast-iron radiator as used in factories for warming the air in the shops. Coal gas was used, and the general running was found to be quite satisfactory, the noise being almost negligible compared with that of the other machines in the shop.

It is estimated that the total output of this engine at a speed which may be reasonably supposed to give the engine a life of satisfactory duration should be about 75 h.p.

The Management of the factory concerned expressed themselves satisfied with the running of the engine, and it would undoubtedly appear that such units constitute easily adaptable and convenient stand-bys for such purposes.

Bang Go Another 12 Million Yards

Following Mr. Martin's deal of 40 million yards of aeroplane linen, the conclusion of another little transaction for 12 millions of balloon cloth now transpires. A Manchester man is this time the "acquiree" for, it is stated round about a million sterling, and in the view of those who ought to know this sale by the Cotton Textile Department of the M.O.M. is an advantageous one. Of quite a different character is this balloon fabric to the aeroplane cloth. It is much more saleable as, being of finer texture, it is well suited for the manufacture of men's shirts, ladies' underwear, etc.

Amsterdam Air Exhibition

It is announced that up to date six British firms will take part in and send machines to the First Dutch Aviation Exhibition, to be held next month at Amsterdam—viz., the Aircraft Manufacturing Company, the British Aerial Transport Company, the Blackburn Company, the Gosport Flying Boats Company, the Handley Page Company, and Messrs. Vickers.

AIRISMS FROM THE FOUR WINDS

There is at least one thing in which it can honestly be said the French excel. They have imagination. A good many years ago—as time in aviation progress counts—M. Henri Deutsch de la Meurthe, President of the Aero Club of France, was continuously and persistently generous in providing funds for the encouragement of aeronautics. His *forte* lay in the fact that he usually placed his money on some really useful object, likely to lead to results for the general good. Not, perhaps, unnaturally, he would hope his prizes would be secured by his fellow-citizens. But nearly always the reward was open to the world for securing. And so the great art and science has been helped forward again and again by this wealthy sportsman.

– – –

Now he is to the fore again, immediately upon the heels of the signing of Peace, with a gift of a couple of million francs—£80,000—to help the Aero Club de France to organise air meetings. It is a princely donation, and gives an idea of how the imagination of the French has been fired, to be first in the art if it be at all within the realms of the possible.

– – –

In so many directions is there scope for recognition by the Italian powers of the helpful work in Italy during the War by our R.A.F., that it is good hearing to learn that, at the suggestion of the Italian Minister of Marine, silver and bronze medals have been conferred on a number of R.A.F. officers.

– – –

Ventnor is the last popular resort to come into line with seaplane trips for visitors.

– – –

Considerable difference of opinion appears to exist as to either the advisability or the seemliness of perpetuating, by means of memorials, the exact spots where the Huns deposited their more venomous "eggs" during their Zeppelin and aeroplane raids to London. In the case of the Westminster City Council it has been decided to erect tablets at places which were struck by bombs in air raids during the War. There are 19 such places in the Westminster area, and according to a police return 78 people were killed and 167 injured in this district during hostile air raids. The tablets will be fixed subject to the consent of the owners and occupiers of the properties affected. The cost of the tablets will be £266. Chelsea is the only other borough council affected which is in sympathy with the proposal, as Hammersmith, whilst in favour, had the agreeable fact to record that no bombs fell within the borough area. Nine other borough councils are not in favour of the proposal—Bermondsey, Camberwell, Deptford, Lambeth, St. Pancras, Shoreditch, Southwark, Wandsworth and Woolwich. From the other 17 borough councils and the Corporation of London no replies have been received. One of the members of the council, whose house was among those struck, said he was opposed to the proposal, which he regarded as a waste of public money. The members in favour of the proposal numbered 18, and 11 voted against.

– – –

Wonder if it was an oversight, or under some ancient form necessary, to omit in the Proclamation of Peace with Germany, signed by the King and read at various historical points in London on July 2, all mention of the Air. So that the omission—if it be an oversight—may be noted, we reprint the document, and then perhaps in the next peace proclamation, following the next war, we may hope to see the Air embodied. Nothing like being well in time for a job like this. The following is the text, and it will be noticed that apparently there is no *special* call to observe the terms of the peace document, when in the air. This loophole *might* be useful on emergency :—

"Whereas a definite Treaty of Peace between us and the Associated Governments and the German Government was concluded at Versailles on June 28 last: In conformity thereunto we have thought fit hereby to command that the same be published in due course throughout all our Dominions: And we do declare to all our loving subjects our will and pleasure that upon the exchange of the ratifications thereof the said Treaty of Peace be observed inviolably as well by sea as by land and in all places whatsoever: strictly charging and commanding all our loving subjects to take notice hereof and to conform themselves thereunto accordingly."

– – –

Mr. G. Grenville Grey, late Commander R.N.V.R., has expressed himself strongly as being at a loss to understand why the R.N. Anti-Aircraft Corps should have received such scanty official recognition for the work it did during the War. The occasion was at a meeting of the R.N. A.A.C. Association's first smoking concert the other day at Cannon Street Hotel, when Mr. Grey reminded the company that when the corps was formed in 1914 all agreed to become sailors, and to be trained for anti-aircraft work at a time when there were neither guns nor men for the defence of London against aerial attack. About 3,000 men passed through the corps. The Special Constabulary, he said, had received medals, and rightly so, but the corps had been overlooked, though it was the first in the field for the defence of London, and worked strenuously for four years and a half.

– – –

Yet another uniform for the R.A.F. is on the stocks. This time it is a new "full-dress" outfit, it being stated that the

The "Dashing Rumpity," which is bringing in £3 and £5 per five and ten minutes' "flip" in Victoria, Australia, as referred to by "Kahminyah"

new cloth is to be somewhat lighter in shade than the present uniform. An early issue is to be made to non-commissioned and other ranks, who have so far only had the regulation khaki "field service" pattern jacket and breeches to play with.

- - -

FROM "Kahminyah," dating from Brighton, Victoria, Australia, an interesting letter is to hand. He writes:—

"The Commonwealth Government of Australia have devised a scheme for the organisation of an Australian Air Force, by which the aerial activities of the land and sea forces will be controlled. The main idea of the scheme is to give a beginning in Australia to every phase of aerial work. Two stations are to be maintained, one in Victoria, and one in New South Wales. The establishments of these stations will provide two squadrons of aeroplanes, one of seaplanes, an airship section and a balloon section. The strength proposed is to be 1,400 officers and men. The initial cost is estimated to be from about £500,000 with an annual expenditure of from £400,000 to £500,000 as maximum. Flying officers will be engaged for five years and then three years in the reserve. Technical officers will be selected, as far as possible, from the ranks of suitable N.C.Os. and men."

- - -

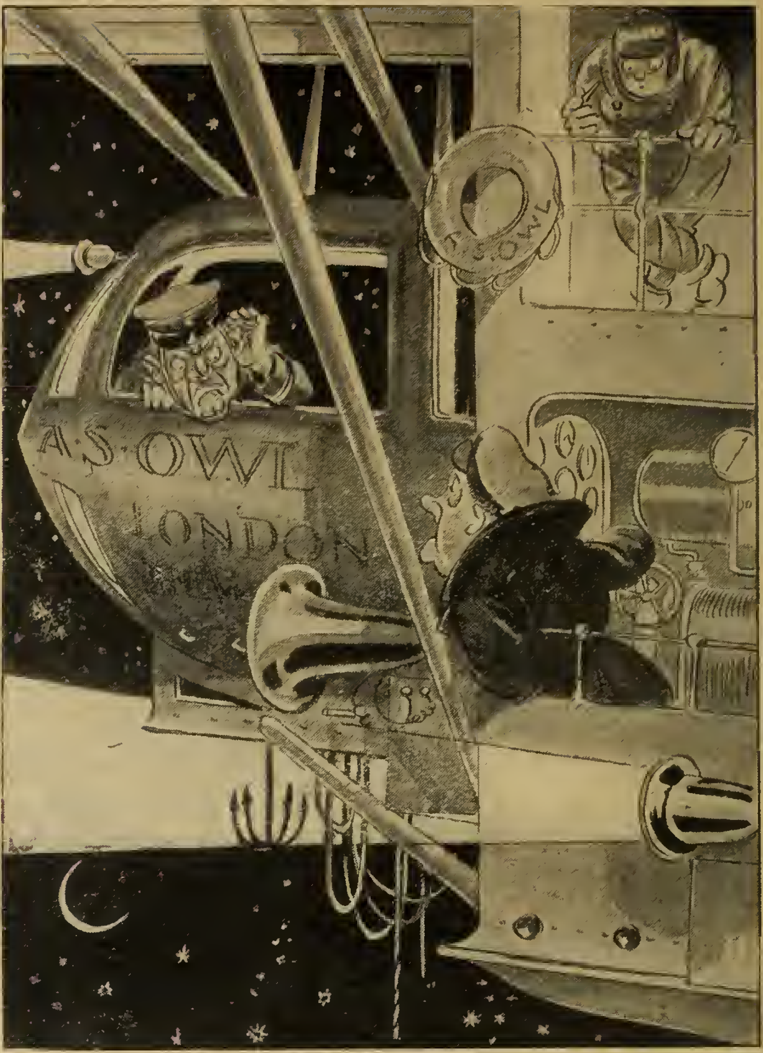
"KAHMINYAH" also encloses a photograph, which we reproduce. "It shows," he says, "one of the first machines to be used there seriously for the business of making passenger flights. As you see it is an old 'Rumpity,' and is one of six acquired from the Defence Department recently. The prices for the flights of five and ten minutes are £3 and £5 respectively! And apparently there are plenty of people willing to pay that price for a flip in such a 'dashing' machine."

- - -

IT is to be hoped after that, *all* our aerodrome proprietors this side of the world will not emigrate to this better land on profiteering intent.

- - -

AN *Evening News* correspondent scores with the following: An aeroplane has been flying over Kent dropping leaflets bearing the words—"*Wake up and buy Victory Bonds!*" One of the leaflets fell in a village churchyard.



Captain of Atlantic Airship (*to Chief Engineer*): **"What are we stopping for, Mr. Rivetts?" Chief Engineer: "Well, Sir, we're passing through the Milky Way, and the propeller's full of butter!"**

- - -

THERE appears to be no end to the wild-game stunting possibilities of aeroplanes. The latest little scheme is up against "rogue" elephants in the Bush. These are to be, according to the *African World*, tackled by means of bombing planes, until they are no more. Next, please.

Free flights at Stag Lane Aerodrome: Last week end, Mr. Warren, of the London and Provincial Aerodrome, gave over 170 free flights in connection with offers made by different newspapers. Only 100 flights had been advertised and offered, but not wishing to disappoint a number of the crowd who had foregathered, Mr. Warren continued to distribute orders for flips until dusk stopped his generosity. Our photo. shows Mr. Warren passing the ballot for the last flight.

PERSONALS

Casualties

Lieut. Donald Alexander Fowler, R.A.F., who was accidentally killed on June 26 at the age of 24, while flying at Winchester, was the son of the late Lieut.-Col. B. W. Fowler, R.A.M.C., and of Mrs. Fowler, 15, St. Minver Road, Bedford.

Capt. Richard Litton Lyster-Smythe, R.A.F., Flt.-Comdr. Damascus, formerly lieut. 3rd Gordon Highlanders, who was drowned on June 19, at the age of 22, while bathing at Jaffa, was the youngest son of Col. and Mrs. Lyster-Smythe, of Barbavilla, Westmeath.

Married

Lieut.-Col. Wilmot Boys Adams, late R.A.F., was married on July 2 at St. Paul's, Knightsbridge, to Enid, second daughter of J. Carnegy Arbuthnot, of Balnamoon, Brechin, and 34, Roland Gardens, S.W.

Reginald Arthur Cartledge (late H.A.C. and R.A.F.), elder son of Arthur Cartledge, 9, Chislehurst Road, Richmond, Surrey, was married on July 2 at Barnes Parish Church, to Laura Winifred May, eldest daughter of the late Thomas Pritchard, C.E., and Mrs. Pritchard, of 56, Treen Avenue, Barnes.

Capt. Arnold John Dick, late R.A.F., eldest son of the late Mr. Walter David Dick and Mrs. Dick, of Hillhead, Glasgow, was married on July 1, at St. Mary Abbott's, Kensington, to Miss Margery Elizabeth Wiseman, third daughter of Elizabeth, Lady Wiseman and the late Capt. Sir William Wiseman, R.N.

Capt. Graham Donald, D.F.C. (late Flt.-Comdr., R.N.), elder son of the late Capt. D. P. Donald, of Johnstone, Renfrewshire, Scotland, was married ón June 30 at St. Bartholomew's the Great, E.C., to Claira Sylvia, third daughter of Lieut.-Col. J. H. Stacy, T.D., R.A.M.C.T., of Great Yarmouth (late of Norwich).

Lieut. James T. Paine, R.A.F., was married on June 3 at St. Alban's, Westcliffe-on-Sea, to Mabel E. Norton, youngest daughter of Mrs. Norton and the late Fredk. Norton, of 20, Gordon Road, Lowestoft.

To be Married

Sir Arthur Whitten Brown, the Atlantic aviator, is to be married to Miss Kennedy on July 30.

The engagement is announced between Capt. Roland Northover, of the 4th Lancs. Fusiliers, late R.A.F., and Dorothy, only daughter of Mr. and Mrs. Charles Parsons, of 110, Park Street, Grosvenor Square, W.

Items

The Crown Prince of Roumania, who was accompanied by Sir Henry and Lady Mainwaring, visited the Handley Page aeroplane works at Cricklewood on July 1, and was shown over the establishment by Mr. Handley Page. The Crown Prince and Lady Mainwaring afterwards had a trip in a two-engine Handley Page Rolls-Royce aeroplane, this being the first time the Crown Prince had been in the air. The pilot, Lieut.-Col. Douglas, M.C., D.F.C., took the machine to a great height, and gave his passengers a very fine view ot London.

▣ ▣ ▣ ▣

AVIATION IN PARLIAMENT

British Cellulose Company (Committee's Report)

Mr. Raper, on July 1, asked the Prime Minister if he will state when the Report of Lord Sumner's Committee regarding the British Cellulose and Chemical Manufacturing Co. will be forthcoming?

Mr. Bonar Law: It is hoped that the Report will be ready before the end of the month.

R.A.F. Scapa Seaplane Station

Capt. Brown, on July 1, asked the Under-Secretary of State to the Air Ministry whether it is necessary to maintain the Scapa seaplane station, where tour men are retained without anything to do?

Maj.-Genl. Seely: Scapa seaplane base is being retained temporarily until Smoogroo is ready, and will be given up shortly. The station is in charge of a care and maintenance party who are responsible for equipment and stores.

Hours (Numbering)

Col. Wedgwood asked the Under-Secretary of State to the Air Ministry whether the system of numbering the hours continuously up to 24, which was adopted in the Army last year, has also been adopted in the Royal Air Force; and, if so, from what date and under what Regulation?

Maj.-Genl. Seely: The system in question was adopted throughout the Royal Air Force from midnight October 19-20, 1918, under Air Ministry Weekly Order No. 1,232, dated October 10, 1918.

Flying Exhibitions

Mr. Joynson-Hicks asked the Under-Secretary of State to the Air Ministry whether any, and, if so, what arrangements are being made for flying exhibitions by members of the Royal Air Force in connection with Peace or other celebrations?

Maj.-Genl. Seely: No special exhibitions by Royal Air Force machines are being arranged for. All available machines are already demonstrating on behalf of the "Victory Loan." I think that this is the most useful way of celebrating Peace at the present time.

Week-end Leave

Mr. Campbell asked the Under-Secretary of State to the Air Ministry whether the officer commanding No. 10 Group, Royal Air Force, has issued an order suspending week-end leave, contrary to the practice hitherto; and if the Air Ministry intend the Order to stand?

Maj.-Genl. Seely: Week-end leave has not been stopped. The pre-war practice of granting week-end leave from Saturday midday to Sunday night has been reintroduced. At the same time it has been found possible to restore the practice prevailing before the war of observing general holidays and the giving of extended leave so far as the exigencies of the service permit.

Lady Shorthand writers (Ripon)

Mr. Rendall asked the Under-Secretary of State to the Air Ministry if he is aware that two lady shorthand writers were engaged at the Royal Air Force, Ripon depot, in January last, and that, after training in exceedingly technical work, they were informed, about five or six weeks after being engaged, that unless they joined the Women's Royal Air Force they would be discharged; whether, after consideration, they informed their officer, Sec. Lieut. Barton, that they would join the Women's Royal Air Force, but heard nothing more until the last Friday or Saturday in March, when, without any previous warning, they received a week's notice to go; whether thereupon two other ladies were engaged, one of whom had no previous knowledge of office work and both of them required considerable training to make them efficient; what reasons caused this change; and will he insist on an impartial inquiry into the chief section leader's conduct, he being responsible indirectly for the dismissals?

Maj.-Genl. Seely: I have not yet been able to trace the incident referred to, but further inquiries are being made both by the Air Ministry and the War Office, as the depot at Ripon is administered by that Department. The result of the inquiries will be communicated to my hon. friend as soon as possible.

Air Navigation Regulations

Mr. Joynson-Hicks asked the Under-Secretary of State to the Air Ministry whether any number of hours' solo flying is necessary before civilian pilots are licensed; and whether inquiries are being made regarding all crashes which occur in civilian flying?

Maj.-Genl. Seely: (1) Tests required for civilian pilots are specified in the directions issued under Air Navigation Regulations, 1919. All pilots who have been licensed have had a large number of solo flying hours to their credit. (2) All possible inquiries are made. The question is being considered by a Committee dealing with points arising on the subject of the Air Navigation Regulations.

R 34 Airship

Lieut.-Comdr. Kenworthy, on July 2, asked the First Lord of the Admiralty if he will state the cost for construction of the R 34 type of airship, the cost of the housing-shed and extensions, the personnel required at the shed for handling, berthing, cleaning the airship, etc., the estimated total monthly cost of the airship when in commission, including pay of persons employed in ship and shed; how many of these airships are under construction; and whether work is being continued on them?

Dr. Macnamara: The cost of constructing an airship of R 34 type is approximately £350,000. The cost of the housing-shed at East Fortune, together with extensions and wind screens, is approximately £166,000. Fourteen officers and 400 men are required at the station for handling, berthing, cleaning airships, etc. The estimated total monthly cost of the airship when in commission depends on the distance flown. Taking as basis 8,000 nautical miles per month at a speed of 40 knots, it amounts to about £2,600 at current rates for cost of petrol, oil and gas. This figure includes the wages of crew and also one-fourth the total pay of the personnel required for handling, etc., as this latter is adequate for maintaining four airships in commission. No further airships of this class are under construction, but six of improved types have been ordered and are in varying stages of construction. Work upon them is being continued.

Lieut.-Comdr. Kenworthy: Will Peace make any difference to the programme?

Dr. Macnamara: Speaking off-hand, I should say no.

Aeroplanes (Automatic Control)

Capt. Wedgwood Benn asked the Under-Secretary of State to the Air Ministry whether he can amplify the statement recently made by Mr. Baker, the United States of America Secretary for War, on the question of automatic control of aeroplanes ?

Maj.-Genl. Seely : I regret that I am not in a position to do so at the moment. I will have further investigation made and communicate with my hon. and gallant friend.

Married Quarters

Maj. LLOYD-GREAME asked the Under-Secretary of State to the Air Ministry whether he is aware of the expense to which married officers and other ranks in the Royal Air Force stationed at many aerodromes are put to find housing accommodation ; and if any steps are being taken to provide married quarters at permanent stations ?

Maj.-Genl. Seely : I realise that married officers and other ranks of the Royal Air Force are probably finding difficulty in obtaining suitable accommodation near aerodromes. Married quarters will eventually be provided at permanent stations, and in the meantime the possibility of making temporary use of suitable hutting accommodation where available is being investigated.

Women's Corps (Railway Warrants)

Mr. F. C. THOMPSON asked the Under-Secretary of State to the Air Ministry why members of the Women's Royal Air Force are not given free railway warrants when proceeding home on leave ; and if he will take steps to remedy this ?

Maj.-Genl. Seely : The general rule is that expenses in connection with leave are not a public charge. Certain concessions were made to the Army and Royal Air Force as a war measure, but these were not extended to the women's corps attached to the Army and Royal Air Force, because of the difference in their conditions of service. The question of making similar concessions to the women's corps is now under consideration.

Flying-Boat Contracts

Mr. MACQUISTEN, on July 3, asked the Secretary to the Admiralty whether, at the outbreak of war, the Admiralty purchased a flying boat of new and successful design, by Mr. Norman Thompson, built by Messrs. White and Thompson (subsequently renamed the Norman Thompson Flight Co. in 1915), a pioneer firm, established in 1909 ; whether in 1915 the Admiralty placed an order with the Norman Thompson Flight Co. for ten flying-boats of such size that the firm were compelled to lay out considerable money in additional buildings to their existing works ; whether for twelve months after these extensions were completed in May, 1916, the Government were aware that the firm were only able to work at about one-third full output owing to constant changes in design ordered by the Admiralty and shortage of orders ; and, if so, whether he will explain why in the autumn of 1916 the Admiralty refused to allow the War Office to place orders with the firm ?

Dr. Macnamara : With my hon. friend's permission I will circulate the answer in the Official Report.

The following is the reply referred to :

In August, 1914, the Admiralty requisitioned a seaplane from Messrs. White and Thompson. The seaplane was an improved form of the " Curtiss " single-engined flying-boat, of which Messrs. White and Thompson were sole concessionaries.

Trials of this machine were successful, and as a result of the trials the machine was purchased and six further machines were ordered. A further order for ten " America," type seaplanes, to be fitted with engines to be supplied by the Admiralty, was placed with the firm in July, 1915, tender price being finally accepted December 28, 1915. An advance of 25 per cent. of the contract price was made with the acceptance of tender at firm's request, the firm stating that the greater part of the profits they might derive from the contract would be spent on new factory extensions and land which they were making arrangements to purchase. The firm did not state that such extensions were necessary on account of the size of the flying-boats.

Shortly after the order was placed it was decided to fit 140 horse-power instead of 100 horse-power engines in order to improve the performances of the machines. At this time the firm had in hand 18 S. 38 type school aeroplanes ; delivery of the last of these was made on June 7, 1916. In July, 1916, an order for 20 F.B.A. flying boats was placed with the firm. Various orders for spare parts were also in hand. In August, 1916, the War Office asked the Admiralty whether there was any objection to firm's resources being utilised for supply of spare parts.

The ten " America " and 20 B.F.A. flying-boats were then under construction, and it was under consideration to place an order for small flying-boats of the firm's own design, in which circumstances the War Office was informed that the Admiralty orders would absorb the firm's whole output for some time.

Mr. Macquisten asked the Parliamentary Secretary to the Ministry of Munitions whether a design of flying-boat by the Norman Thompson Flight Co., known as type N.T. 2 B, and officially adopted by the Air Ministry in April, 1918, as a standard naval construction machine, was ordered in repetition from them and from other firms ; whether, in June, 1917, the Air Board required the firm to increase their works for the production of one of their designs of flying-boats, type N.T. 4 A, and subsequently agreed to advance £20,000 for new buildings ; whether, after placing considerable orders in the autumn of 1917 for N.T. 4 A flying-boats, the Air Board cancelled those orders in January, 1918, and gave no new orders until May, 1918, after the appointment of a receiver for the debenture holders ; whether the Aircraft Finance Department of the Ministry of Munitions in October, 1918, refused the recommendation of the Lubbock Committee of the Treasury to pay off the debentures issued to Messrs. Cox and Co. as security for advances and revest the control of the company in the directors ; and, if so, whether he proposes to take any action in the matter ?

The financial Secretary to the Ministry of Munitions (Mr. James Hope) : The answer to the first three parts of this question is in the affirmative. No such recommendation was ever made by the Lubbock Committee as is suggested in the fourth part of the question, and the fifth part does not accordingly arise.

Mr. Macquisten : Will the hon. gentleman make an investigation into the whole transaction of the Admiralty with this particular company, and allow Mr. Thompson to appear before him ?

Mr. Hope : Not on the information I have at present. If my hon. and learned friend will give me any more information, I shall be delighted to act upon it, but at present his premises, I think, are wrong.

Mr. Macquisten : As the hon. gentleman's information is so meagre, wil he take the steps I suggest, so as to get the necessary information ?

Mr. Hope : I take it that it is for my hon. and learned friend to supply me with premises on which I can reasonably act.

R.A.F. Technical Officers

Sir F. HALL asked the Under-Secretary of State to the Air Ministry if he can state what amount of technical pay, if any, it has been decided to award to technical officers in Class A of the Royal Air Force ; whether the same is to be retrospective from September 1, 1918, and will include technical officers demobilised before the decision has been arrived at ; and, if so. whether an officer who would thus be entitled to additional pay can claim the same together with gratuity based on the larger amount of pay ?

The Under-Secretary of State for Air (Maj.-Genl. Seely) : The whole question of pay is now under consideration, and I hope to be able to give further information in a short time. Perhaps the hon. and gallant gentleman will put down a question next week.

Atlantic Flight (Airship R 34)

Capt. W. BENN asked the Under-Secretary of State to the Air Ministry whether he can make a statement about the Atlantic trip of the airship R. 34. ?

Maj.-Genl. Seely : His Majesty's Airship R. 34 left East Fortune, near Edinburgh, at 2.48 yesterday morning on an experimental cruise across the Atlantic. She is equipped with every known form of scientific instrument which it was considered would be of value for the trip. We are sure that much valuable information will be obtained as to the possibilities of air traffic across the Atlantic. All being well she will drop messages at Newfoundland and Halifax, and proceed to New York. I should like to acknowledge the great assistance given by the Admiralty in every respect to the Air Ministry who are responsible for the flight. His Majesty's ships, *Tiger* and *Renown*, are in the Atlantic sending and receiving wireless messages. At 6 o'clock this morning the airship was reported to be about 1,030 miles on her course, and 885 miles from St. Johns. The weather reports are very favourable, and it is hoped that she will soon get a following wind.

I may add that what weighed with us most in deciding to attempt this flight was the hope of thereby making still closer the ties between this country and America.

R.A.F. Badges

Lieut.-Col. ARCHER-SHEE asked the Secretary of State for War whether officers who have qualified as pilots or observers during the War, and have served in that capacity at the front, are entitled to wear wings on their uniform if since transferred to a line regiment ?

Mr. Churchill : Badges of the Royal Air Force may not be worn by Army officers after return to Army duty with their units. A notification to this effect was issued in Army Council Instruction 1110, of 1918.

Cellulose Acetate

Lieut.-Col. THORNE asked (1) the Secretary of State for War the names of the firms referred to on page 5 of the Fifth Report of the Select Committee on National Expenditure, who were invited to tender in July, 1915, for supplies of cellulose acetate and what was the reason for refusing to send a tender form to the Cellon Co. of London, and who was the person responsible, and his name, who thus refused permission to an English company and invited tenders from a firm of neutrals adjacent to enemy territory, the Cellonit Gesellschaft Dreyfus, of Basle, who were advertising their wares in the enemy Press ; and was the Department aware of this firm's advertisements in the *Chemiker Zeitung* when they invited them to tender ; and (2) the Parliamentary Secretary to the Ministry of Munitions the reason why in March, 1918, his Department made an Order forbidding the importation of cellulose acetate as indicated in the Fifth Report of the Select Committee on National Expenditure, in view of the fact that all that which was being produced in this country was pronounced to be defective ; will he state the names of the contractors who carried out the erection and extension of the British Cellulose Co.'s work at Spondon, Derby ; and whether this was a contract between the Ministry of Munitions and the builders or the British Cellulose Co. and the builders ?

Mr. Kellaway : I will reply to these questions at the same time. A Committee appointed by the Government is examining this question, and, as was stated by the Leader of the House on July 1, it is hoped that their report will be ready by the end of the month. In these circumstances, I do not think it would be desirable to make any statement at present.

* * *

" Civiatory Eftramb, London "

FROM the Air Ministry comes the notification that " Civiatory Eftramb, London," has been registered as the telegraphic address of the Civil Aviation Department, Air Ministry, India House, Kingsway.

Enterprise in Ceylon

A NEW Aviation Company with headquarters in Ceylon is working with the object of establishing and maintaining regular air services of all kinds.

Seaplanes Scoring Against Bolshies

FROM Keur it is reported on June 30 that our seaplanes have successfully bombed the enemy's positions, greatly damaging buildings, and have destroyed a train with a direct hit. Two seaplanes were shot down by machine guns, and one of them wrecked, but the aviators succeeded in returning to our lines. There were no casualties in these raids.

Afghans' Methods

RUMOURS recently gained currency that the Ameer's Army had obtained delivery of four aeroplanes for attacking our troops. The cat is now out of the bag in the fact having transpired that these aircraft delivered at Kabul are " dummies " which were secretly constructed under the Ameer's orders, in order to reassure the scared population, that they were also able to carry on War in the air as readily as the British. For the moment the dummies are reported to have had the desired effect, and, following Hun methods, most wonderful tales of imaginary exploits of Afghan airmen are being circulated for the benefit of the Ameer's subjects.

A Baby Aeroplane from Sweden

A TRIAL flight is reported from Malmoe, Sweden, of a new small type of aeroplane made at the Paalson aeroplane factory there. The machine is said to weigh only 700 lb., and it is capable of carrying another 440 lb. The body is described as cigar shaped, and constructed so as to reduce the air resistance to a minimum. It has a Thulin 50 h.p. Gnome engine of special construction, capable of giving a speed of about 80 miles an hour.

THE ROYAL AIR FORCE

London Gazette, June 27.

Administrative Branch

The following relinquish their commns. on ceasing to be employed :—Sec. Lieut. M. Landless (Sec. Lieut., Gloster R.) ; April 20, 1918. Lieut. (Hon. Capt.) P. W. McLean (Capt., Sea. Highrs.) ; March 14. Capt. G. A. Revington (Lieut., R.N.) ; June 25. Capt. G. R. Turner (Capt., E. Kent R.) ; June 27.

(Then follow the names of 22 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. G. P. Forbes relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; May 18.

Sec. Lieut. E. R. Tremlett to take rank and precedence as though his appoint. as Sec. Lieut. bore date March 26.

The initial of C. Howard (Capt. and Qtr., Gen. List) is as now described, and not " G.," as stated in the *Gazette* of Feb. 14.

The surname of Sec. Lieut. H. J. Cutler is as now described, and not " Cutter," as stated in the *Gazette* of April 29.

The surname of Capt. S. Walters is as now described, and not " Watters," as stated in the *Gazette* of May 2. The notifications in the *Gazette* of Aug. 16 and Nov. 29, 1918, concerning Lieut. H. Tilley (D.L.I.) are cancelled. The notification in the *Gazette* of Jan. 31 concerning Lieut. J. N. Mackay is cancelled. The notification in the *Gazette* of May 13 concerning Capt. (actg. Maj.) L. C. Coates is cancelled. The notification in the *Gazette* of May 27 concerning Sec. Lieut. C. B. Dick-Clealand is cancelled. The notification in the *Gazette* of June 13 concerning Sec. Lieut. J. Dale is substituted for the notification which appeared in the *Gazette* dated May 27.

Technical Branch

Capt. A. Belton is to be graded for purposes of pay and allowances of Maj. whilst employed as Maj. (Grade A) ; May 1.

Capt. E. Holloway, O.B.E., to be Capt., Grade (A) from Grade (B) ; May 22.

Lieut. S. W. Davies to be actg. Capt. whilst employed as Capt., Grade (A), from Feb. 1 to April 30.

Sec. Lieut. (Hon. Lieut.) F. W. Day to be actg. Capt. whilst employed as Capt., Grade (B), from July 24, 1918, to April 30.

Lieuts. to be Lieuts., Grade (A) from (Ad.) :—Lieut. A. L. C. Hartland-Rowe ; Sept. 3, 1918 (substituted for the notification in the *Gazette* of April 18. Lieut. D. A. Parker ; June 23. Lieut. R. Macfarlane to be Lieut., Grade (B), from (Ad) ; May 13 (substituted for the notification in the *Gazette* of June 17).

Sec. Lieut. F. J. F. English to be Lieut. ; Dec. 30, 1918 (substituted for the notification in the *Gazette* of Jan. 3).

Sec. Lieut. (actg. Lieut.) A. J. Macnab, M.C., to be Lieut., Grade (A) ; June 26, 1918.

Sec. Lieuts. to be Sec. Lieuts., Grade (A) from (Ad.) :—R. Lyne ; Jan. 1. MacD. Goodall ; June 13.

(Then follow the names of 29 officers who are transfd. to the Unemployed List under various dates.)

Lieut. C. S. Willmott relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; June 10.

Lieut. G. H. C. Crooke-Rogers (Lieut., Worc. R.) resigns his commn., and is permitted to retain his rank ; June 28.

Lieut. (actg. Capt.) R. Stephenson, D.F.C. (Temp. Sec. Lieut., Ches. R.), resigns his commn., and is permitted to retain the rank of Capt. ; June 28.

Sec. Lieut. H. J. C. White (Sec. Lieut. in Army) resigns his commn., and is permitted to retain his rank ; June 28.

The rank of Lieut.-Col. A. S. Hellawell, O.B.E., is as now shown, and not Maj., as stated in the *Gazette* of April 4.

The Christian name of Lieut. Henry Smith is as now described, and not as stated in the *Gazette* of March 4. The surname of E. G. Davison is as now described, and not E. G. Davidson, as stated in the *Gazette* of Oct. 22, 1918. The notification in the *Gazette* of March 5 concerning Lieut. C. A. Elliott is cancelled.

The notification in the *Gazette* of March 11 concerning Sec. Lieut. H. A. Creswell is cancelled.

The notification in the *Gazette* of May 23 concerning Lieut. H. H. Ballard is cancelled.

Chaplains' Branch

The Rev. A. J. N. Saunders is transfd. to the Unemployed List ; May 28.

Memoranda

Capt. E. J. Sayer, M.C., is granted the hon. rank of Maj. ; June 3.

Sec. Lieut. C. F. Kearns (A. and S.) is granted the hon. rank of Lieut. ; April 1.

The following Overseas Cdts. are granted temp. commns. as Sec. Lieuts. :—60527 G. F. Evans, 171428 F. C. Miller ; Feb. 15.

Temp. Hon. Lieut. S. H. Troughton relinquishes his hon. commn. on ceasing to be employed ; June 16.

(Then follow the names of four officers who are transfd. to the Unemployed List under various dates.)

Lieut. J. E. B. Thornely, O.B.E., relinquishes his commn. on account of ill-health contracted on active service, and is granted the rank of Maj. ; June 20.

The notification in the *Gazette* May 9 concerning Sec. Lieut. F. T. L. Avis is cancelled.

Air Ministry, July 1.

The following temporary appointments are made :—

Staff Officer, 2nd Class (P.).—Paymr., Lieut.-Comdr. H. L. Jackson (R.N.) ; Feb. 13, and is granted a temp. commn. as Maj. (T.).—Lieut. J. G. N. Clift ; April 1, 1918, to Sept. 1, 1918, and to be actg. Maj. whilst so employed.

Staff Officer, 3rd Class (T.).—Lieut. (actg. Maj.) J. G. N. Clift ; Sept. 2, 1918, from S.O., 2nd Class, relinquishing the actg. rank of Maj., and to be actg. Capt. till April 30.

The following temporary appointment is made :—

Staff Officer, 3rd Class (P.).—Capt. R. R. L. Thom ; June 1.

Flying Branch

Maj. R. B. Ward to be actg. Lieut.-Col. whilst employed as Lieut.-Col. (A. and S.) ; June 16.

Capt. L. P. Paine, D.S.C., to be graded for purposes of pay and allowances of Capt. (S.), and to be actg. Maj., without the pay and allowances of that rank ; March 25.

Capts. to be graded for purposes of pay and allowances of Capts. whilst employed as Capts. :—L. C. W. Trend (A. and S.) ; Feb. 3. Lieut. G. Le B. Croke (O.) ; May 1. Lieut. R. P. M. Whitham to be actg. Capt. whilst employed as Capt. (A.), from April 30, 1918, to April 30.

Lieut. T. A. Warne-Brown, D.S.C., to be graded for purposes of pay and allowances of Capt. whilst employed as Capt. (A.) ; May 1.

Lieut. S. W. Symons to be Lieut. (A.), from (T.) ; Dec. 31, 1918.

Sec. Lieuts. to be Lieuts. :—(Hon. Capt.) A. A. J. Poole ; May 31, 1918. (Hon. Capt.) F. R. Ashmead ; Aug. 23, 1918 (substituted for notification in *Gazette* March 7). F. Coxen ; Nov. 2, 1918. A. E. N. Ashford ; April 25.

R. E. Shears (Temp. Lieut., Glouc. R.) is granted a temp. commn. as Sec. Lieut. (O.) ; Oct. 27, 1918, and to be Hon. Lieut. (substituted for notification in *Gazette* Dec. 10, 1918).

The following relinquish their commns. on ceasing to be employed :—Lieut. (Hon. Capt.) J. Hirschberg (Capt., N.Z. A.S.C.) ; Dec. 28, 1918. Sec. Lieut. S. Hodgson (Sec. Lieut., Suff. R.) ; April 2. Capt. I. C. Barclay (Capt., Sea. Highrs.) ; April 16. Lieut. E. F. J. Bull (Lieut., Worc. R.) ; June 12. Sec. Lieut. (Hon. Capt.) H. R. Dennison (Capt., Brit. Col. R.), Lieut. C. R. Hall (Lieut., Quebec R.) ; June 18. Sec. Lieut. (Hon. Lieut.) J. W. Grant (Lieut., E. Ont. R.), Lieut. E. T. Lough (Lieut., actg. Capt., Manitoba R.) ; June 19.

(Then follow the names of 200 officers who are transfd. to the Unemployed List under various dates. We regret that owing to great pressure on our space it is impossible to reprint this portion of the List.—ED.)

Lieut. W. H. Gibson relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; June 18.

Lieut. D. J. Allen (Manitoba R.) relinquishes his commn. on account of ill-health contracted on active service ; May 3.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—W. S. Winter, contracted on active service (substituted for the notification in the *Gazette* of Feb. 7). M. S. Dickinson (substituted for the notification in the *Gazette* of March 18. S. J. Bolitho ; June 12 (substituted for the notification in the *Gazette* of March 14) ; May 20. H. T. Watts ; June 19.

The rank of Lieut. T. M. Cornish is as now described, and not as stated in the *Gazette* of May 9.

The initials of Sec. Lieut. C. D. Neill are as now described, and not " C. W.," as stated in the *Gazette* of May 2.

The initials of Sec. Lieut. I. L. Wood are as now described, and not " T. L.," as stated in the *Gazette* of May 9.

The initials of Sec. Lieut. A. Sykes are as now described, and not " Arthur A.," as stated in the *Gazette* of May 23.

The surname of Lieut. E. R. Trendell is as now described, and not " Tundell, as stated in the *Gazette* of May 13.

The surname of Capt. C. Gordon-Davis is as now described, and not " C. G. Davis," as stated in the *Gazette* of May 20.

The surname of Lieut. B. F. Smith-Clebourne is as now described, and not " B. F. S. Clebourne," as stated in the *Gazette* of May 20.

The name of Lieut. E. F. Van der Riet, D.F.C., is as now described, and not as stated in the *Gazette* of May 23.

The notification in the *Gazette* of Sept. 6, 1918, concerning Sec. Lieut. W. E. Baxter is cancelled.

The notification in the *Gazette* of Jan. 24 concerning Sec. Lieut. G. J. C. Tigar is cancelled.

The notification in the *Gazette* of March 21, concerning Sec. Lieut. E. J. Norris is cancelled.

The notification in the *Gazette* of April 1 concerning Lieut. E. N. MacDonald is cancelled.

The notification in the *Gazette* of April 29 concerning Sec. Lieut. (Hon. Lieut.) A. E. Overton is cancelled.

The notification in the *Gazette* of May 13 concerning Sec. Lieut. A. G. Middleton is cancelled.

The notification in the *Gazette* of May 16 concerning Lieut. R. J. Marshall is cancelled.

The notification in the *Gazette* of June 10 concerning Lieut. R. B. Wainwright is cancelled.

The notifications in the *Gazette* of June 20 concerning the following officers are cancelled :—Sec. Lieut. J. Martin, M.M., Sec. Lieut. T. E. Winckworth.

The notification in the *Gazette* of June 24 concerning Sec. Lieut. L. C. Phippen is cancelled.

Administrative Branch

Maj. K. L. Buist to he Maj., from (S.O.) ; June 2.

Capt. A. M. Wilson to be actg. Maj. whilst employed as Maj. ; May 1.

G. N. F. Powell (Maj., London R.) is granted a temp. commn. as Capt., and to be Hon. Maj. ; April 1, 1918.

Sec. Lieut. F. T. L. Avis to be actg. Capt. whilst employed as Capt. ; May 1.

Lieut. H. W. Sidley to be Lieut., from (S.O.) ; May 23.

Lieuts. (A.) to be Lieuts. :—D. H. Bell, M.C., C. A. Umbers ; June 11. G. D. Daly ; June 12.

The following are granted temp. commns. as Sec. Lieuts. :—G. A. Maddams, H. E. Phillip ; June 28.

The following relinquish their commns. on ceasing to be employed :—Lieut. Lord H. Cecil ; Jan. 18 (substituted for notification in the *Gazette* of April 18, 1918. Lieut. (Hon. Capt.) W. C. Sharpe (Capt., R. W. Surrey R.) ; April 15. Capt. (actg. Maj.) D. G. F. Darley (Capt., Dragoon Guards) ; April 24. Capt. J. T. Waller, M.C. (Capt., Leic. R.) ; June 4. Lieut. N. A. Arthur (N.Z., Wellington R.) ; June 11.

(Then follow the names of 33 officers who are transfd. to the Unemployed List under various dates.)

Lieut. J. W. Holdsworth is granted the hon. rank of Capt ; Aug. 9, 1918.

Lieut. (Hon. Capt) J. W. Holdsworth relinquishes his commn. on account ill-health, and is permitted to retain the rank of Capt. ; May 14.

Capt. H. T. Holdstock, M.C., relinquishes his commn. on account of ill-health and is permitted to retain his rank ; June 19.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—J D. Dalzell ; June 19. I. C. Bannister ; June 27 (substituted for notification in *Gazette* March 11) C. M. de L. Norman July 2.

The rank of Lieut. F. D. Owen is as now described, and not Sec. Lieut as stated in *Gazette* June 20.

The notifications in *Gazettes* May 23 and June 6 concerning Lieut. J. W. Houldsworth are cancelled.

The notification in *Gazette* March 14 concerning Lieut. H. Townsend is cancelled.

The notification in *Gazette* May 13 concerning T. W. B. Hill is cancelled.

The notification in the *Gazette* of May 16 concerning Lieut. M. R. Helliwell is cancelled.

Technical Branch

Capt. W. C. Broadhead to be Capt., Grade (A), from Grade (B), from Aug. 12, 1918, to April 1.

Capt. R. N. Spence to be Capt., Grade (B), from (Ad.) ; April 1, 1918.

Lieuts. to be Lieuts., Grade (A.) :—L. J. Anstey, from (O.) ; April 1, 1918 substituted for notification in the Gazette of Oct. 4, 1918. E. G. Taylor, from (Ad.); Feb. 26.

Sec. Lieut. (actg. Lieut.) F. S. Stokes to be Lieut.; March 8 (substituted for notification in the *Gazette* of April 11).

Sec. Lieuts. to be Lieuts., without pay and allowances of that rank:— T. H. Evans; April 2, 1918. S. Empsall; Dec. 16, 1918. L. G. Sewell; May 7.

Sec. Lieut. (Hon. Lieut.) B. T. Hood to be actg. Lieut. whilst employed as Lieut., Grade (B), from Oct. 17, 1918, to April 30.

The following relinquish their commns. on ceasing to be employed:— Capt. E. Graham (Lieut.-Col., R.E.); May 9. Lieut. H. Marsden (Lieut., Manchester R.); June 6. Maj. H. C. Tweedie (Maj., N. Staffs. R.); June 20.

(Then follow the names of 39 officers who are transfd. to the Unemployed List under various dates.)

The notification in the *Gazette* of March 18 concerning Lieut. T. W. Cave, M.C., is cancelled.

Motor-Boat Branch

Capt. H. Howard is transfd. to Unemployed List; March 28.

Medical Branch

Lieut. G. A. S. Madgwick is transfd. to Unemployed List; June 17.

The initials of Lieut. G. O. Roper are as now described and not G. A., as stated in the *Gazette* of April 1.

Dental Branch

Lieut. H. H. Chapman is transfd. to Unemployed List; June 11.

Chaplains' Branch

The Rev. P. C. Barber is transfd. to Unemployed List; June 13.

Memoranda

(Then follow the names of 233 Overseas Cadets granted temporary commns. as Sec. Lieuts. and 19 Cadets granted Hon. commns. as Sec. Lieuts.)

Lieut.-Col. H. C. H. Hudson, M.V.O. (Capt. (Bt. Maj., Hussars), relinquishes his commn. on ceasing to be employed; June 17.

Temp. Hon. Lieut. C. G. Whinfrey relinquishes his commn. on ceasing to be employed; June 30.

Transferred to Unemployed List:—Maj. C. L. Baillieu, from (S.O.); March 27. Lieut. C. W. Hogg, from (S.O.); April 23. Capt. M. J. Golding, from (S.O.); May 20. Capt. J. M. Mitchell, M.B.E., from (S.O.); June 11. Capt. F. T. Bridger, from (S.O.); June 15.

London Gazette, July 4

The following temporary appointments are made:—

Staff Officers, 1st Class (Air).—Lieut.-Col. A. C. Winter, O.B.E.; July 1, vice Maj. H. A. Moore, C.B.E., M.C.

Staff Officers, 2nd Class (Air).—Maj. E. J. Hodsoll; July 1, vice Maj. W. J. C. Kennedy-Cockran-Patrick, D.S.O., M.C. (Q.).—Lieut. (Hon. Capt.) H. W. Clarke; July 1, vice Capt. Lord St. Oswald.

Staff Officers, 3rd Class.—(Q.) Lieut. F. J. Cooke; July 1, vice Lieut (Hon. Capt.) H. W. Clarke.

Staff Officers, 4th Class (T.).—Sec. Lieut. L. B. Hobgen; Nov. 6, 1918, and to be actg. Lieut. till April 30.

Area Commander.—Col. (actg. Brig.-Gen.) C. A. H. Longscroft, C.M.G., D.S.O., A.F.C.; March 8, to retain actg. rank of Brig.-Genl., and to be graded for purposes of pay and allowances of Maj.-Genl. while so employed, vice Col. (actg. Brig.-Genl.) P. W. Game, C.B., D.S.O.

Group Commander (graded for pay and allowances as Col., Staff).—Lieut.-Col. G. W. P. Dawes, D.S.O.; June 25.

Flying Branch

Lieut.-Col. (actg. Col.) R. H. Clark-Hall, D.S.O., to retain actg. rank of Col. while employed as Col. (A. and S.); June 5.

Lieut.-Col. C. Bovill to be Lieut.-Col. (A.), from (S.O.); May 23.

Capt. G. H. Bowman, D.S.O., M.C., to be actg. Maj. while meployed as Maj. (A.); June 7.

Capt. T. E. Salt, A.F.C., to be graded for purposes of pay and allowances of Maj. while employed as Maj. (A.); May 1.

Capt. (actg. Lieut.-Col.) C. E. Wardle to be Capt. (A.), from (S.O.), and to relinquish actg. rank of Lieut.-Col.; March 24.

Lieut. H. O. Long to be Lieut. (O.), from (Ad.); June 10.

Sec. Lieut. H. J. Ashley to be Lieut.; April 21.

The following relinquish their commns. on ceasing to be employed:— Lieut. T. W. Morse (Capt., Cent. Ont. R.); Oct. 24, 1918. Lieut. H. Johnson (Capt., Can. Fld. Art.); Dec. 14, 1918. Sec. Lieut. (Hon. Lieut.) R. K. Armstrong (Lieut., Can. Art.), Lieut. (Hon. Capt.) R. A. Boger (Maj., R.E.); April 14. Lieut. H. C. Scotheran (Capt., West Ont. R.); April 23. Lieut. F. L. Baker (Lieut., West Ont. R.); April 25. Maj. P. C. Sheeren (Maj., New Brunswick R.); May 2. Capt. P. B. Tabernacle (Capt., E. Ont. R.); May 7. Lieut. J. W. Langmuir (Capt., Can. Local Forces); May 30. Lieut. D. A. Gordon (Lieut., Brit. Col. R.); June 3. Sec. Lieut. E. A. H. Goodwin (Sec. Lieut., R. Suss. R.); June 4. Lieut. C. A. S. Bean (Lieut., Brit. Col. R.), Sec. Lieut. (Hon. Lieut.) H. S. Stidston (Lieut., Sask. R.); June 5. Sec. Lieut. (Hon. Lieut.) F. G. Black (Lieut., Cent. Ont. R.); June 23. Lieut. J. A. Parker (Lieut., R. Scots Fus.; July 5 (substituted for notification in *Gazette*, June 13).

(Then follow the names of 123 officers who are transfd. to the Unemployed List under various dates. We regret that owing to great pressure on our space it is impossible to reprint this portion of the List.—Ed.)

Capt. A. E. Godfrey, M.C., A.F.C., relinquishes his commn. on account of ill-health, and is granted the rank of Maj.; June 25.

Capt. T. G. M. Stephens reilnquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; June 26.

Sec. Lieut. E. H. Fry relinquishes his commn. on account of ill-health, and is permitted to retain his rank; June 24.

Sec. Lieut. W. C. Treen, M.C., D.F.C., D.C.M. (R.A.F.), relinquishes his commn. on account of ill-health, caused by wounds; June 20.

◆ ◆ ◆ ◆

The Prix de la Ligue

From July 15 next the half-yearly French Aerial League Prize may be competed for. The prize will go to the French aviator who makes the longest flight from Paris to one of the French colonies.

British Flyers in Sweden

Two British officers, Major Rally-Johnston and Capt. Saunders, in company with a Swedish flying expert, have arrived at Stockholm, reports the *Morning Post* correspondent there. They intend to give passenger trips in double-seated war machines.

Paris–Melbourne

We understand that in a few weeks' time Poulet, on a Caudron, may have a try for the Paris–Melbourne flight which the late Jules Vedrines had intended to attempt.

The Paris–Dakar Flight

It is reported from Casablanca, on June 29, that the French aviator Lieut. Lemaitre, who left Mogador (Morocco) on June, 28 has crashed at Pont-Etienne, 1,400 kiloms. from Mogador and 700 kiloms. from Dakar. Lieut. Lemaitre and his passenger escaped, but the machine is smashed. The Paris–Dakar flight appears to be ill fated, but by his fine flight of 1,400 kiloms. over desert country Lieut. Lemaitre has proceeded farther towards Dakar (Cape Verde) than any previous attempts.

Yet Another Attempt.

It is rumoured that Lieut. Roget may attempt the Paris–Dakar flight.

Cost of Aerodrome Land

The claim of Mr. N. Hague, of New House Ford, Arundel, Sussex, was heard before the Defence of the Realm War Losses Commission on June 26, Sir Matthew Wallace presiding, in respect of losses incurred through the occupation of land by the R.A.F.

It was stated that 95½ acres had been taken over for the purposes of the aerodrome, and the claim was for 60s. per acre with rent and tenant right losses, amounting altogether to £1,474.

Other claims of the same nature were made by Mr. C. W. Atkey and Mr. E. Ewens, of Chichester for £576 and £116, and Mr. A. Rushbrook and Messrs. E. and C. Philpott, of farms near Ramsgate for £601 and £522, the last two being in respect of aerodromes under the Admiralty.

The Atlantic Vickers-Rolls Machine

It is possible that the Vickers Vimy-Rolls aeroplane upon which Sir J. Alcock flew the Atlantic may become the property of the nation. Messrs. Vickers, Ltd., are considering the matter. In the meantime, the machine is under repair at the Weybridge works. The souvenir hunters who annexed some parts of the machine when she got "bogged" in Ireland might have the decency under the circumstances to return their captures—even if it be anonymously, and no questions asked.

Aerial Mails in America

It is stated that the air mail service in America will be extended from Chicago to Omaha and St. Louis next autumn, shortening the time for correspondence between the Atlantic and Pacific coasts by from 12 to 24 hours.

French Aero Club and Lady Aviators

Considerable annoyance has been caused in French aviation circles owing to the decision of the French Aero Club not to recognise feminine aviation records as such, but only in cases where they exceed those of male flyers. The general feeling in France appears to be that if a French *aviatrice* puts up a better performance than, for instance, an American one, the fact should be recognised. It is pointed out that at a time when our interests are turning towards commercial aviation, everything possible ought to be done to encourage those who are doing their best to create enthusiasm and promote the interests of the movement. And quite right too. We understand, however, that at the next aeronautical congress the question will be discussed, when it is to be hoped that recognition will be given to those of the gentle sex who, by the very fact that they pilot aeroplanes, are doing good work in demonstrating the possibilities of flying.

A New Magnesium Alloy

A metal lighter than any yet known, and as strong as or stronger than steel, has for years been the dream of many, and every now and then rumours are circulated to the effect that at last it has been discovered. The advantages which such a metal would have, especially for aircraft, are obvious, but unfortunately it is generally found on investigation that there is a "snag" somewhere. The latest report to be circulated relates to a new magnesium alloy, said to have been discovered by the Shawinigan Electro-Metals Co., of Montreal. The new alloy, it is stated, is only two-thirds the weight of aluminium and is "as strong as steel." It is said to be especially suitable for pistons and connecting-rods of aero and motor car engines. It is to be hoped that some of the qualities attributed to the new alloy may, on closer examination, be found to be correct. Further particulars will be awaited with interest.

SIDE-WINDS

The name of Major H. Waymouth Prance, M.I.A.E., A.F.R.Ae.S., A.I.E.E., will be familiar to the majority of our pre-War readers as a partner in the well-known firm of Markham and Prance, consulting engineers (motor, marine and aeronautical), of Dudley House, Southampton Street, Strand, and High Street, Southampton. Like many other businesses of this nature, this firm shut down upon the outbreak of war, the partners and staff betaking themselves to the business of assisting in defeating the Hun and his allies.

– – –

Major Prance's duties carried him to the land of the Turk, where he took part in the Gallipoli campaign as second in command of the 2/3rd Battalion London Regiment (Royal Fusiliers). Subsequently, after a somewhat protracted retirement to hospital, Major Prance, being no longer fit for active service, returned to his old sphere, that of petrol engines and aeroplanes, and for the past three years he has been serving in the technical department of the R.F.C. and R.A.F.

– – –

Here his duties were of a varied nature. In the early days he supervised tests and prepared reports upon the experimental engines which were submitted to the department. He next took charge of the Technical Information Section, which was subsequently developed into the Technical Publications Section. This section was responsible for the compilation of engine, aeroplane and seaplane handbooks, data charts and diagrams, for the supply of technical information to the Allies and Colonial Governments, the supply of technical information to engine and aeroplane contractors, and the preparation of reports on German engines and aeroplanes.

– – –

His activities in this direction having ceased, we have pleasure in welcoming Major Prance back to civil life. His future plans are as yet unsettled, but with his very thorough knowledge of internal-combustion engines and up-to-date aeronautical practice, his services should be of great use in civil aviation.

– – –

Major Prance is one of the "old hands" in aeronautical circles, whose experience dates back to the days of many years before the War, and this early knowledge combined with his War-time experience of aeronautics should prove a very useful combination. We may add that we should be very pleased to put any firm in touch with Major Prance should they wish to correspond with him.

– – –

A little publication which is of very great use to all who have to do with publicity is the official handbook of the British Society of Trade and Technical Journals. This gives practical information regarding the leading technical journals of this country, together with their advertisement tariffs, etc., and a copy should be in the hands of all who have to do with the placing of announcements in such papers. Enquiries should be addressed to the Secretary of the Association, at Sicilian House, Southampton Row, W.C. 2. The book is published at 1s.

– – –

The "Skootamota"—the A.B.C. motor scooter—is rapidly winning its way in popular favour, and Messrs. Gilbert Campling, Ltd., 1, Albemarle Street, W. 1, have been almost swamped with enquiries and orders. They have got out a smart little folder which tells you all you want to know about this handy and speedy little mount, and they will be pleased to send a copy to any Flight readers. It may be recalled that this scooter—which is priced at present at £40—weighs only 65 lbs., is provided with a seat and has a speed range up to 20 m.p.h.

– – –

Those who have read the story of the Transatlantic flight of Capt. Sir J. Alcock and Lieut. Sir A. W. Brown, will have realised the important part their clothing played in enabling them to keep up their strength, and it is interesting to learn that Burberry protection, which enabled the first man to reach the South Pole, was relied upon to carry them through. Both Capt. Alcock and Lieut. Brown were clothed in Burberry flying suits, which required no electrical heating, and which these gallant gentlemen credit with giving them the greatest comfort possible under the trying circumstances of the flight. Practically all those who have entered for the contest have shown the acumen to choose Burberry material and design, as their protective covering against the rigours of the long overseas flight.

– – –

A charming brochure is to hand containing letters from Messrs. Sir W. G. Armstrong-Whitworth and Co., Ltd., and the Siddeley-Deasy Motor Car Co., Ltd., regarding their alliance, and the announcement of the new Armstrong-Siddeley six-cylindered car. The booklet also gives some details with regard to the future policy and developments of the company, and doubtless any of our readers who are interested in a high-class car such as the Armstrong-Siddeley will be glad to have these particulars. A copy can be obtained on application to the Siddeley-Deasy Motor Car Co., Ltd., Coventry.

– – –

Messrs. S. Smith and Sons (M.A.), Ltd., of 179-185, Great Portland Street, have acquired the sole selling rights for the whole world for the famous "K.L.G." plug.

– – –

With characteristic enterprise Messrs. C. C. Wakefield and Co., Ltd., announced in Saturday's morning papers, side by side with the news that the "R. 34" had crossed the Atlantic, the fact that her Sunbeam motors were being lubricated with Castrol R. Nothing like being up to date! Mr. Thorburn says he would like to see their address changed to Wide-Awakefield House.

– – –

Mr. F. G. Diffin, President of United Aircraft Engineering Corporation, 52, Vanderbilt Avenue, New York, arrived this week on the *Baltic* in London, and his address during his stay will be the Savoy Hotel. Mr. Diffin is over here for the purpose of establishing a London Branch of his Corporation, besides taking up various matters pertaining to commercial aviation with London manufacturers.

– – –

Southend was the venue selected by the Alex. Mosses Radiator Co., Ltd., of Long Acre, for the Victory Dinner and outing to their employés on Friday last. The party, numbering some 50 strong, journeyed down in motor char-à-bancs and cars, arriving about midday in time to do justice to an excellent repast at the Royal Hotel. Mr. Alex. Mosses himself presided, and was supported by Mr. H. L. Sceales, the works manager. At the special invitation of all Mr. W. D. Rae, of the Sheet-Metal Workers Society, accompanied the party.

The speeches were short, as everybody was bent upon enjoying the glorious day to its utmost in out-door amusement. The outing was the first of its kind since the formation of the company, some two years since, as they have been far too busy upon production of radiators for various types of aircraft, thereby keeping up the excellent standard of being third or fourth regularly on the production (output) chart. This outing was therefore a well-deserved relief after such a continued and concentrated War effort.

"Sausage balloons"—old and new—can still make good in Peace time, as the above demonstration of utility emphasises. This shows one of these "observers" being used by the North British Rubber Co., the makers of every description of rubber goods, including these tameable balloons, for advertising "Clincher Cross" golf balls at the Braid Hills, Edinburgh, on the occasion of a golfing tournament.

RESETTLEMENT

There are many officers and men of the R.A.F. who are demobilised or are about to be demobilised.

In order to assist those who are undecided or are seeking advice as to their prospects in civil life, the Editor has arranged for an expert, with wide experience of service, industrial and educational conditions, to give advice to those who may solicit it through the medium of this Journal.

Applications, which must be in writing, should be marked *Resettlement*, and addressed to the Editor, FLIGHT, 36, Great Queen Street, Kingsway, W.C. 2. They will be dealt with in these columns, as far as possible, in rotation.

K.G.V., Lieut. R.A.F.—The R.Ae.C. certificate was usually obtained during the period when graduating for "wings." If you have not yet obtained this certificate, you should communicate with the Secretary, Royal Aero Club, 3, Clifford Street, London, W. As you are an R.A.F. pilot, and have been passed by the Medical Board "fit to fly passenger and goods aircraft," you can obtain a licence to fly civilian aircraft (see Air Navigation Regulations).

P.H.G., Ex-R.N.A.S.—In view of the large number of experienced pilots at present available for civilian aviation, and having regard to the few that will be required in the immediate future, we fear that you will experience great difficulty in obtaining employment as a civilian pilot. We can only suggest that you resume the occupation for which you have been trained or make application for a course of aeronautical engineering at a recognised college or university.

J.B., Ex-R.A.F.—For financial aid to enable one to resume studies which have been interrupted by War service, application should be made to the Appointments Department, Ministry of Labour.

T.H.P.—If you are already demobilised you should address your query with regard to the honorary commission to the Secretary, Air Ministry, Strand. Give full particulars, with dates, of your service, when appointed a cadet and what training you received. Messrs. Cox and Co., Charing Cross, can furnish you with full particulars in connection with any kit allowance to which you may be entitled. If you are not demobilised, your demobilising officer should be able to give you the information you seek.

IMPORTS AND EXPORTS, 1918–1919.

Aeroplanes, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "Flight" for January 25, 1912; for 1912 and 1913, see "Flight" for January 17, 1914; for 1914, see "Flight" for January 15, 1915; for 1915, see "Flight" for January 13, 1916; for 1916, see "Flight" for January 11, 1917; for 1917, see "Flight" for January 24, 1918; and for 1918, see "Flight" for January 16, 1919.

	Imports.		Exports.		Re-exportation.	
	1918.	1919.	1918.	1919.	1918.	1919.
	£	£	£	£	£	£
January ...	49,402	555,989	24,765	57,571	—	—
February	51,941	453,822	13,545	57,972	—	—
March ...	47,930	704,424	11,451	72,716	1,000	400
April ...	33,342	97,662	10,815	25,433	—	—
May ...	942,866	136,631	67,224	38,428	—	—
June ...	864,296	1,410	35,658	41,526	—	—
	1,989,777	1,949,938	163,458	293,646	1,000	400

NEW COMPANIES REGISTERED

AIRCRAFT IMPROVEMENTS CO., LTD., 10, Coleman Street, E.C.—Capital £1,000, in £1 shares (50 founders). Directors: E. Neal, J. S. Cotman, F. M. T. Lange and D. Gordan.

TOURS AND TRANSPORT, LTD., 66, Lichfield Street, Wolverhampton.—Capital £6,000, in £1 shares. Transport of passengers and goods by land, air or water, etc. First directors: E. Genna, S. S. Guy, F. F. Sharpe.

PUBLICATIONS RECEIVED

Training the Airmen. By Cecil Roberts. London: John Murray. Price 3*s*. 6*d*. net.

The Rights of Russia to Lithuania and White-Ruthenia. By Stanislaw Kutzreba. Paris: M. Flinikowski, 216, Boul. Raspail.

Bolshevism and Poland. By W. Lutoslawski. Paris: M. Flinikowski, 216, Boul. Raspail.

Our Part in the Great War. Ruston and Hornsby, Ltd., engineers, Lincoln.

On Paintings of Aircraft. The Brook Street Art Gallery, Ltd., 14, Brook Street, New Bond Street, W. 1.

The Year-Book of Wireless Telegraphy and Telephony, 1919. London: The Wireless Press, Ltd., Marconi House, Strand, W.C. 2.

Aeronautical Specifications Published

Abbreviations:—cyl.=cylinder; I.C.=internal combustion; m.=moto- .

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 3, 1919

6,153. F. W. Lanchester. Mechanism for receiving and launching aeroplanes at sea. (127,620.)

6,227. Lang Propeller, Ltd., and G. Mills. Aerial propellers. (127,627)

6,266. Wolseley Motors, Ltd., and A. A. Remington. I.C. aircraft engines. (127,628.)

6,427 and 6,472. Aeronautical Instrument Co. and G. Brewer. Ripping panels for balloons, etc. (127,633 and 127,637.)

6,677. Sir A. T. Dawson and Sir G. T. Buckham. Aircraft gun mountings. (127,648.)

7,124. W. G. Tarrant. Girders, beams, struts, etc., for aircraft. (127,665.)

7,216. Soc. dite "Spad" and Soc. Anon. pour l'Aviation et ses Derives. Control of aerial machines. (127,667.)

7,268. L. Blêriot. Joints for aerial machines. (127,671.)

7,367. Sopwith Aviation Co. and H. E. Cato. Tool for extracting fixing bolts of propellers. (127,673.)

Published July 10, 1919

7,597. C. J. Robinson. Propeller shaping machines. (127,841.)

7,630. R. E. L. Lott. Fuel tank mountings. (127,842.)

7,643. W. G. Tarrant. Joints of girders, struts, etc. (127,844.)

7,677. Sopwith Aviation Co. and H. G. Hawker. Engine cowls. (127,847.)

7,952. G. H. Thomas and G. de Havilland. Aeroplane radiator. (127,857.)

7,982. Sopwith Aviation Co. and F. Sigrist. Struts, spars, etc. (127,858.)

8,055. S. A. Flower. Airships. (127,862.)

8,114. F. Sage and Co. and W. R. Turnbull. Hydro-aeroplane floats. (127,866.)

8,199 and 8,200. P. Brotherhood, Ltd., C. W. Bryant and G. F. Jones. Aero engines. (127,867 and 127,868.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 3, 1919

3,677. N. Woyevodsky. Aircraft. (127,684.)

7,493. Patent Corporation and W. P. Thompson. Flying-machines. (127,695.)

8,973. T. H. Robins and G. H. Thompson. Device for indicating angular position of aircraft with respect to horizontal. (127,703.)

9,033. D. J. Mooney. Method of building aeroplane wings. (127,710.)

9,034. D. J. Mooney, E. E. Brown and A. C. Wescombe. Aeroplane wings having metal frames. (127,711.)

10,017. Rudge-Whitworth, Ltd., J. V. Pugh, V. A. Holroyd and W. H. Nelson. Aircraft fairings or stream linings. (127,743.)

10,226. E. Hobbs. Sights for bomb-dropping. (127,748.).

13,604. D. E. W. Jones. Apparatus for cleaning weather screens, planes or wings of aircraft, etc. (127,768.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages liii, liv, lv and lvi)

NOTICE TO ADVERTISERS.

In order that "Flight" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates:*—

United Kingdom.	s.	d.	Abroad.	s.	d.
3 Months, Post Free	7	1	3 Months, Post Free	8	3
6 ,, ,,	14	1	6 ,, ,,	16	6
12 ,, ,,	28	2	12 ,, ,,	33	0

These rates are subject to any alteration found necessary under war conditions.

Should any difficulty be experienced in procuring "Flight" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

Cheques and Post Office Orders should be made payable to the Proprietors of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World.
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 551 (No. 29, Vol. XI.) JULY 17, 1919 **Weekly, Price 6d. Post Free, 7d.**

Flight
The Aircraft Engineer and Airships
Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2
Telegrams: Truditur, Westcent, London. Telephone: Gerard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.*
These rates are subject to any alteration found necessary under war conditions

CONTENTS

Editorial Comment: PAGE
The Voyage of R 34 .. 931
Speeding the Commercial Side .. 932
Peace Joy-Flights .. 932
Coal and Industry .. 932
Flight—and the Men: Mr. Short .. 933
The Vickers-Vimy Commercial Biplane .. 936
The Royal Aero Club: Official Notices .. 942
The Transatlantic Voyage of R 34 .. 944
Airisms from the Four Winds .. 953
Some Developments in Aircraft Design .. 955
The Royal Air Force .. 961
Side-Winds .. 963

EDITORIAL COMMENT

The Voyage of R 34

BY her successful double journey across the Atlantic the airship R 34 has erected another milestone, additional to the one we recorded last week, on the long road of aerial navigation. It may be true that she has done no more than was expected of her by those who knew the capabilities of the rigid airship, but it is just as true that her voyage will be of inestimable value from the point of view of propaganda. She has demonstrated for the education of the layman that long-distance aerial service for the carriage of passengers and mails is not only a possibility of to-morrow, but the accomplished fact of to-day. She has further demonstrated that it is possible for the airship to voyage to a time-table, and that stress of weather can be combatted successfully with almost as great certainty as by the ocean liner. Lest this should seem to be too great a claim to make, we would remind the reader that on her outward voyage R 34 encountered at one time a head wind of some fifty knots velocity, and that nothing but the possible exhaustion of her fuel supplies caused a moment's anxiety to her commander and crew. The obvious lesson to be drawn from this is that the air liner of the future must be of greater size and possessed of ample fuel reserves to allow for such circumstances of weather as R 34 actually encountered.

We notice that some of the newspapers in their comments on the flight make rather a point of the hurried departure of the ship from America on account of the warning of the U.S. Weather Bureau that a depression was advancing from the Great Lakes. This is used to point the moral that there is a long way to go yet before regular airship services will be possible over such routes as the Atlantic. We agree that we have by no means reached the ultimate development of the airship, and that ships of the future will be much more advanced in design and construction than we are able to appreciate to-day. As R 34 is to the original Zeppelin, so will the airship, possibly even of 1921, be to existing types. But we do not think it is altogether fair to the airship to make capital for counter-argument out of the hurried departure from America. This was principally due to the fact that R 34 was moored out, owing to there being no sheds capable of accommodating a craft of her size, and that to have remained was to have courted disaster. The giant airship without a shed is as much at the mercy of the elements as a ship without a harbour. No seaman would remain at anchor in an open roadstead with fires drawn if he had received warning of a gale expected from seaward. Nor, if he took the wiser counsel and proceeded to sea to avoid the risk of being driven on to a lee shore, would anyone argue that the steamship is insufficiently developed to be a reliable means of transport. It seems to us that the real lesson to be drawn from the incident is that before airship services can be properly developed, sheds, which are to the airship what harbours are to ships, must be provided. That is fully appreciated by those who stand behind the airship and its development for commercial purposes, and it is, to say the least, a little unfair that the want of proper accommodation should be used as an argument against the craft itself.

There remains now nothing to be done but to congratulate Major Scott and his officers and crew on the successful consummation of their object. They have credited Britain with yet another record in aerial travel which will stand for all time, and will mark the first really successful attempt to demonstrate that the airship is, so far as human vision can foresee, the real aerial vehicle for sustained flight. They have shown us that the modern rigid airship is capable of keeping the air for at least 100 hours, and of being navigated with the precision and certainty of a steamship. Last, but by no means least, they have confirmed in the eyes of the whole world the commanding lead this country has achieved in aerial navigation. All honour to them.

◆ ◆ ◆

Speeding the Commercial Side

Whatever may be thought of the parsimonious attitude of the Treasury towards commercial aviation—and it cannot be argued that the grant of a mere half-million of money is generosity—it cannot be denied that the Air Ministry is doing its level best to encourage development and further the interests of the British industry in foreign countries. There was the recent flight to Spain of several machines of diverse types, which has done a great deal to interest the Spaniards in aerial navigation, and particularly in the reliability of the British machine. Then came the Atlantic voyage of R 34, which, as we have said elsewhere, has accomplished an enormous amount of good which must have a very favourable reflex on the industry. Now the Air Ministry has again risen to the occasion by sending two flying boats of the F 5 type for a nine-days' trip to Norway, Sweden and Denmark. The route to be followed is from Felixtowe to Dundee, Christiansand, Christiania, Copenhagen, Stockholm, Goteborg and Esbjerg, and so back to Felixstowe direct. The total distance to be covered is about 2,380 miles.

It is a very wise move to have sent these craft across to visit the Scandinavian ports. There should be business to be done in these countries, which, by reason of their extended coast-line, offer peculiar facilities for services conducted by flying boats. Even where routes lie overland, there are large areas of water—as for instance between Goteborg, over the chain of lakes in North Denmark to Esbjerg—which render Scandinavia eminently the territory for the exploitation of this type of aircraft. Apart from these points, which are important enough to have justified the enterprise, it is just as well that we should be early in the field. The Germans, who are going to be dangerous competitors in the commercial field, have been trying to get a footing in the Scandinavian countries. Indeed, it is understood that they have already succeeded in obtaining a certain number of orders for aircraft from Sweden. We are, fortunately, a long way ahead of Germany in the design and construction of aircraft of every kind, and particularly so in that of the seaplane and the flying boat. It is now for the industry to follow up the missionary work of the the Air Ministry, and see that the development of aerial services in Scandinavia falls to us, and not to our late enemies.

◆ ◆ ◆

Peace Joy-Flights

The Air Ministry has announced that, pending a definite agreement in accordance with the Air Convention, and in order to enable French and British aircraft firms to send machines to London and Paris, should they so desire during the Peace celebrations, arrangements have been made with the French Government for the opening of civil communication by air between the two capitals from July 13 to 20, inclusive. British machines visiting Paris will land at Le Bourget only, and French machines visiting London at Hounslow, except in emergency. All machines will cross the French coast between Calais and Boulogne, and the English coast between Folkestone and Dungeness. All machines must be provided with and carry certificates of airworthiness issued by their respective Governments, while passports must be carried by all civilian passengers.

The concessions thus made for the current week are graceful in their conception, but we are not inclined to think they are being taken advantage of to any great extent. The notice, for one thing, has been too short to permit of arrangements being made, while the idea of the casual British civilian deciding to fly to Paris in peace week, and succeeding in securing a passport in time to take the journey is humorous, when we remember the vagaries and delays of the Passport Office. Perhaps, however, the authorities of this department made up their mind to celebrate peace week by abandoning for a season the policy of delay and circumlocution which, as a rule, is attendant upon the issue of passports, even when these are required for urgent purposes of business.

◆ ◆ ◆

Coal and Industry

No more disquieting announcement has been made since the end of the War than that conveying the intimation that, as from Wednesday—since temporarily postponed until Monday next—the price of coal is to be advanced by no less than six shillings per ton. Whether it is viewed from the point of view of the domestic consumer, or of industries—in which aviation now plays a conspicuous part—which depend for the ability to compete in the markets of the world on a plentiful supply of cheap fuel, the outlook is black and discouraging in the extreme. And the worst of it is that the increase is, in the main, the result of the prevailing policy of organised Labour to get all it can for as little as it can give. If it were the result of what might be called temporary and accidental causes it would be bad enough at the moment, but there would still be hope for the future. As it is, we can only say that if this policy of grab and disregard of the interests of the community is persisted in, then good-bye to all hope of re-establishing industry, and to every chance of placing this country once more on a sound and solvent commercial basis.

So far as the aircraft industry is concerned, this wicked addition to the cost of coal must result in greatly increased costs of working. For example, it will add at least £1 per ton to the cost of steel, which is even now at a figure which is disquietingly high. Indeed, not to labour the point unduly, it may be said that, even if no other results were to follow, the net consequence would be that the prices of all materials must rise by at least from 10 to 12 per cent. But it is certain that other results must follow hard on the heels of this increase which has been necessitated by the overbearing demands of the miners. All these things follow in a vicious circle. There is not an industry or a commodity in general use which will not be affected. Prices will rise, and it will inevitably result in demands for more and more wages to meet the extra cost of living, until a point is reached at which it will be utterly impossible

Flight—And the Men

"Flight" Copyright.

Mr. H. OSWALD SHORT, Managing Director of Messrs. Short Brothers.

for us to maintain our overseas trade, upon which we rely for our very existence as a commercial power. That is the present outlook, unless organised Labour can be got to see sense, and be content to give a real day's work for a day's wages. One of the fundamental facts which Labour seems quite unable to grasp is that Capital, as represented by the employer, has no objection in the world to paying high wages. We have yet to meet the employer of up-to-date ideals who cares whether his men earn five pounds a week or fifty, *so long as they earn it.* They have the prevision to see that we must strive, under the new conditions resulting from the War, for output and yet more output, and that to attain the objective every producer must give of his best. Nothing less will do, if we are not to sink to the commercial level of Spain.

Labour's idea of the Millennium, however, seems to be a state in which men may draw a full week's wages for two days' work, and make merry for the other five. That is obvious from the state of things obtaining in the mining industry, in which absenteeism rises in direct ratio to increase of wages. It is all very well for the leaders to assert that output is handicapped by the want of facilities for clearing the coal after it has been won, and by the absence of proper machinery. There may be trouble in both these directions, and it may be that the whole industry wants reorganisation from top to bottom. But that does not dispose of the figures relating to absenteeism which show that after every rise in wages the inclination is to work shorter hours and do less work, when actually at the coal face. Nor is the complaint peculiar to the mining industry. Right through the ranks of Labour the same disposition is to be observed. There is no recognition of the task that lies before us; no thought for the community as a whole; and no symptom of sane foresight. The general movement is for less work and more money for doing it.

Bridging the Gap.

We have no complaint against Labour for demanding its fair share of the wealth it assists to create. Far from that, we most willingly concede that in the past, in some directions, Labour has not shared as it should have done, and it is quite right to insist that this shall be altered. But there are limits to the share that either Capital or Labour can safely demand for its work, and if they are exceeded, then there is nothing but disaster ahead. We have spoken of the price of steel, which is a fair example of the effect that outrageous demands by Labour is having on our industries. Contracts for very large quantities of steel work have gone to America because our manufacturers cannnot quote a price within £5 per ton of the American producer, and the extra cost of coal will bring the adverse margin up to £6 per ton, because it requires some three tons of coal to produce a ton of steel. How can we hope to remain solvent and get back to our commercial status when things are like they are? It is very much to be hoped that the shock the community has received will do good by causing Labour to reflect that by demanding more than industry can stand it is killing the goose which lays the golden eggs.

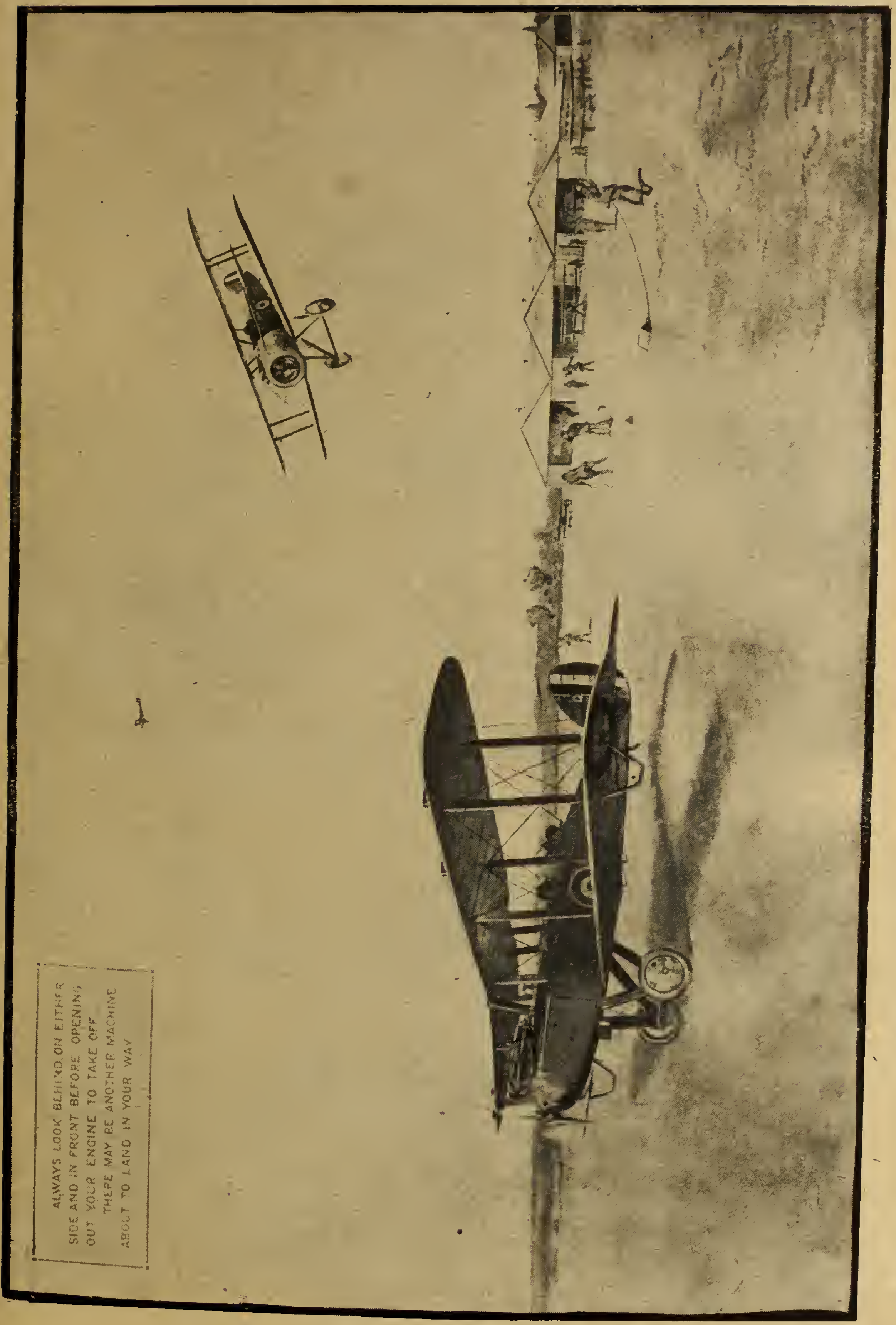
◆ ◆ ◆ ◆

The Rhine Area Control

IN the agreement between the United States, Belgium, the British Empire, and France, and Germany with regard to the military occupation of the territories of the Rhine (issued as a White Paper Cd. 222) Article, 8 mentions that the German Government undertakes to place at the disposal of the Allied and Associated troops and to maintain in good state of repair all the military establishments required, including aviation grounds.

Flying-Boats to Tour Scandinavia

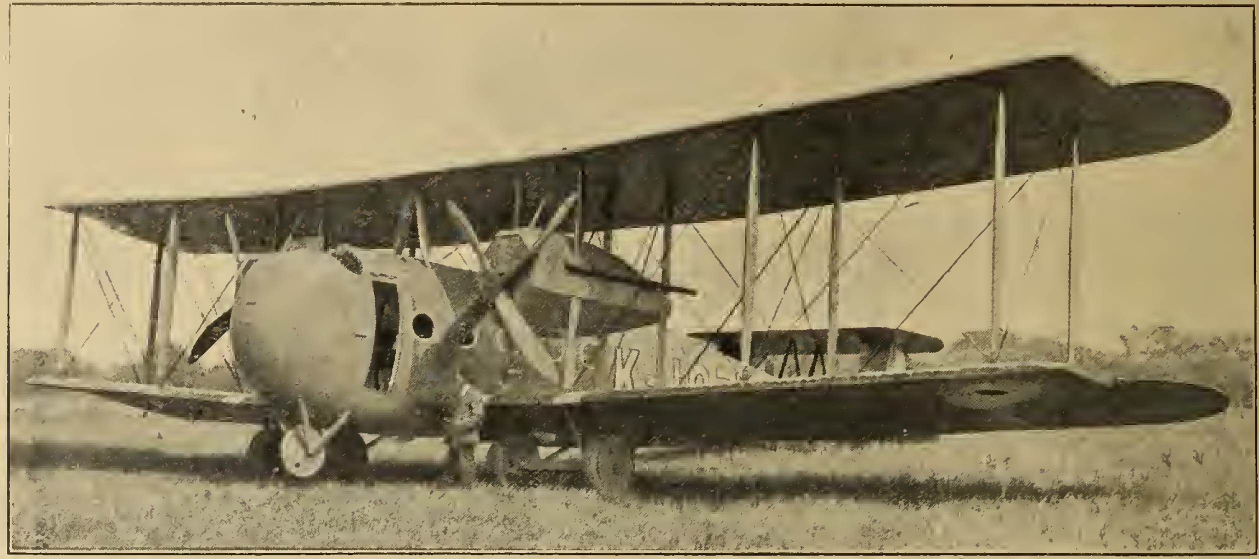
Two British flying-boats—4041 and 4044—of the F 5 type fitted with two 350 h.p. Eagle VII Rolls-Royce engines, left Felixstowe at 9.15 a.m. on July 11 on the first stage of a trip to Norway, Sweden and Denmark. One of the machines reached Dundee at 3.20 p.m., but the other had to come down at Orford Bay (Suffolk) soon after 11 a.m. owing to fog. The latter continued her journey on the following day and in very stormy weather flew to Dundee in six hours.


ALWAYS LOOK BEHIND ON EITHER SIDE AND IN FRONT BEFORE OPENING OUT YOUR ENGINE TO TAKE OFF
THERE MAY BE ANOTHER MACHINE ABOUT TO LAND IN YOUR WAY

Landing Across Wind. (*Drawing published by the Air Technical Services for use at the R.A.F. Schools.*)

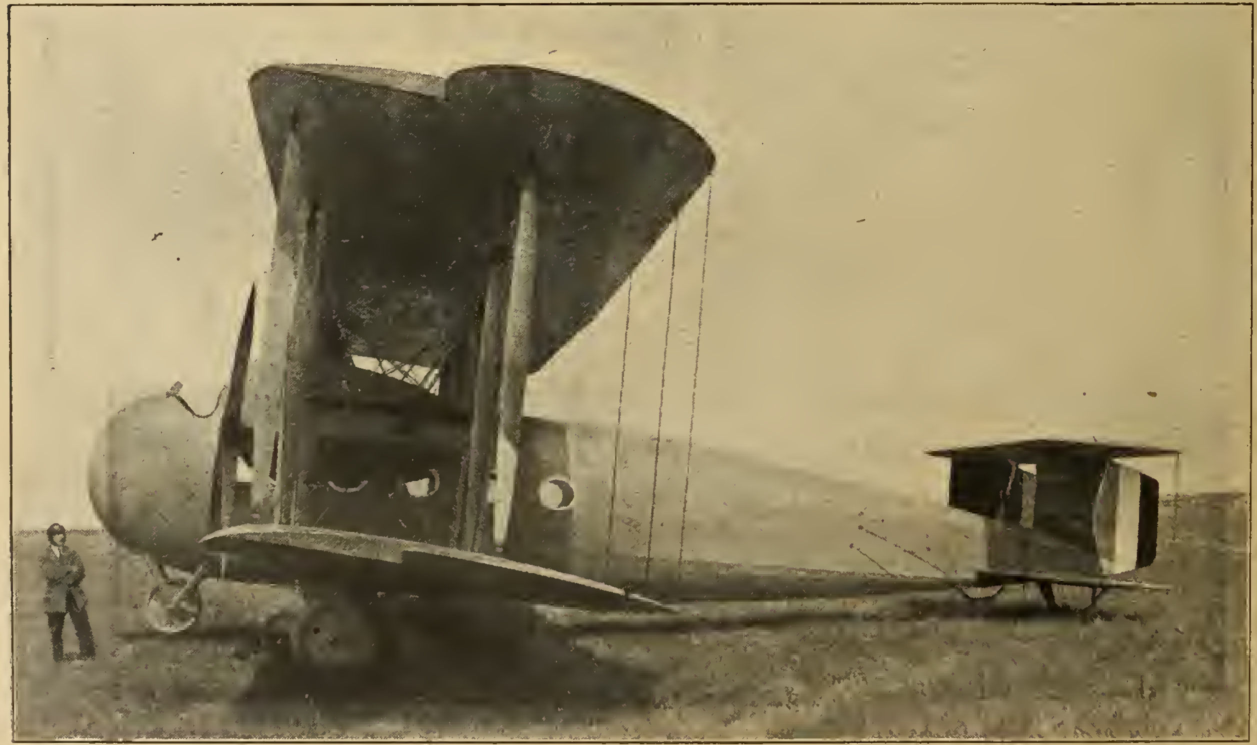
THE VICKERS "VIMY-COMMERCIAL" BIPLANE

When you take one of the ten comfortable seats in the Vickers "Vimy-Commercial" biplane and look around the handsomely-furnished, spacious cabin, and out of one of the small circular windows at your side, nothing strikes you as being at all out of the ordinary; you accept it as a matter of daily fact. It is only when the machine is up in the air with its load of passengers that you realise the true significance of things, and what an enormous stride has been made towards practical commercial aviation, when such machines as this can be designed and made successfully to fulfil all that is required of them.

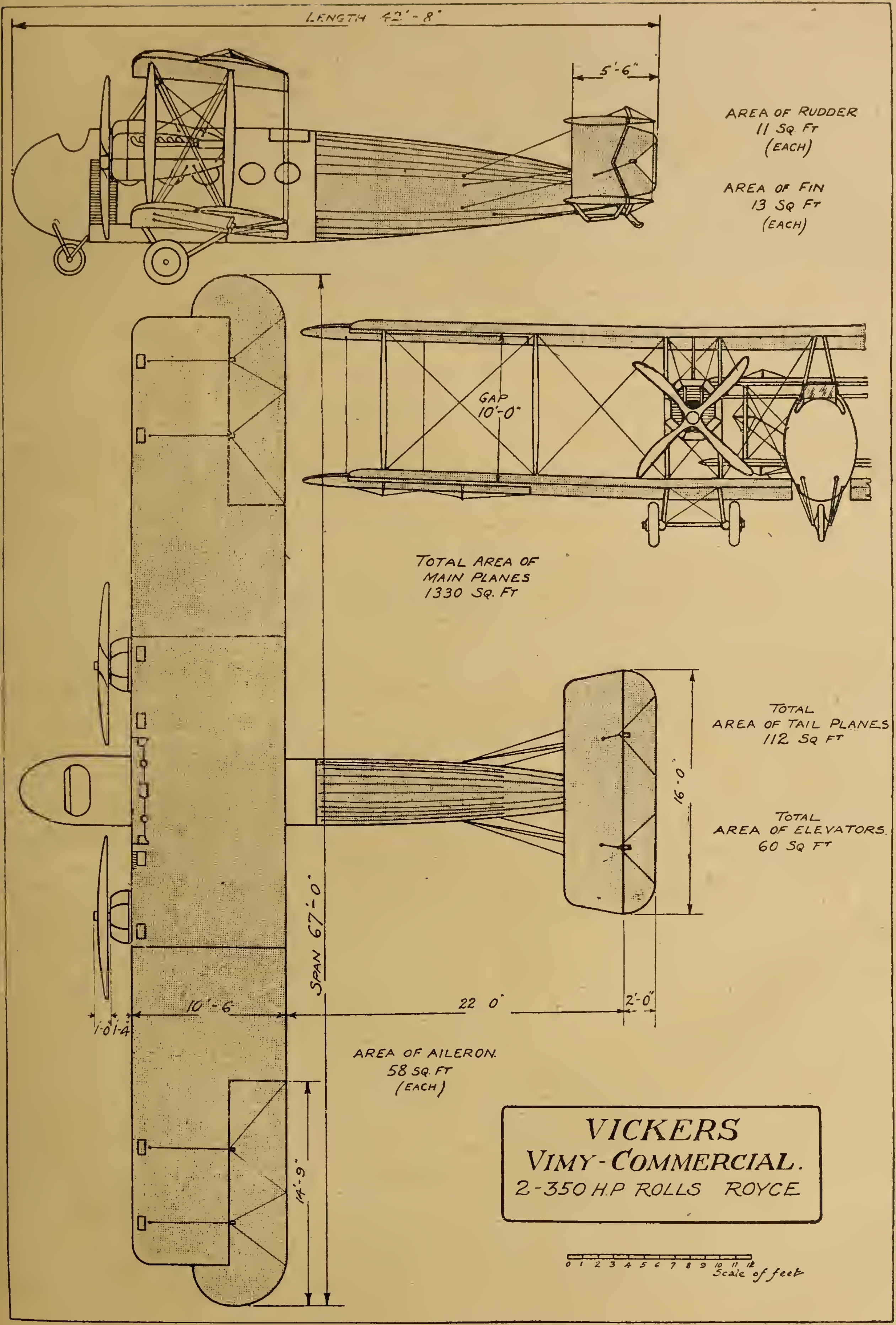


Three-quarter front view of the Vickers "Vimy-Commercial" biplane

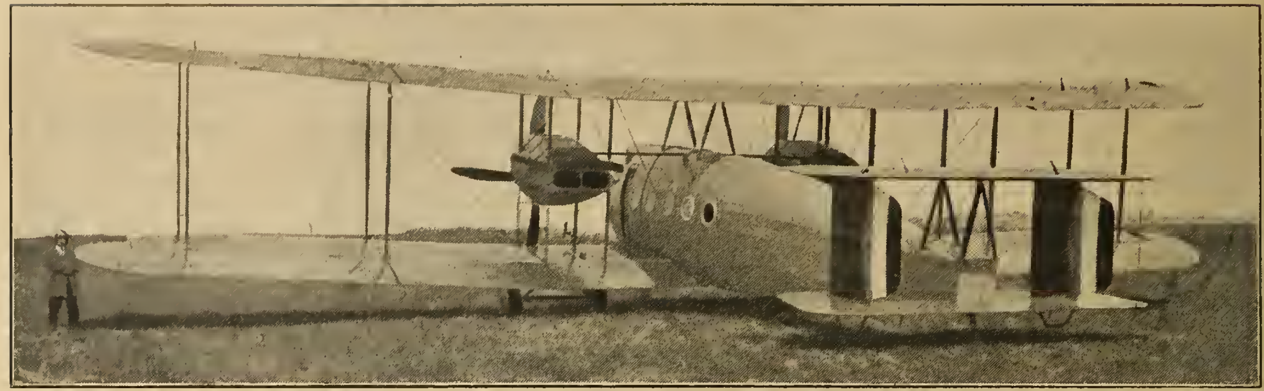
In the case of the Vickers "Vimy-Commercial," the achievement to this end is all the more remarkable when it is remembered that this machine is a standard War model, modified only to meet its new and more peaceful requirements. In fact, except for the *fuselage*, this machine is identical to the "Vimy" Bomber; merely changing from one *fuselage* to the other—which can be done quite easily—transforms



Side view of the Vickers "Vimy-Commercial" biplane



THE VICKERS "VIMY-COMMERCIAL" BIPLANE: Plan, side and front elevations to scale

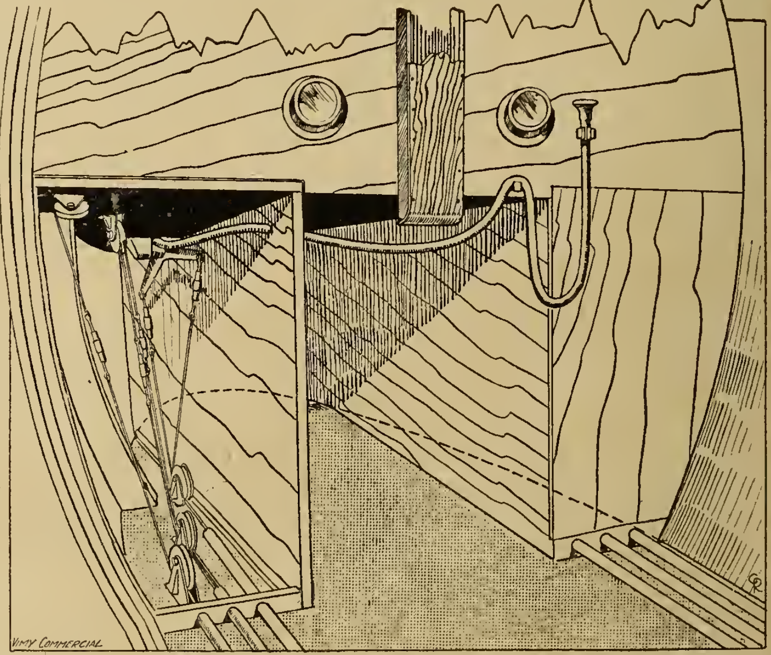


Three-quarter rear view of the Vickers "Vimy-Commercial" biplane

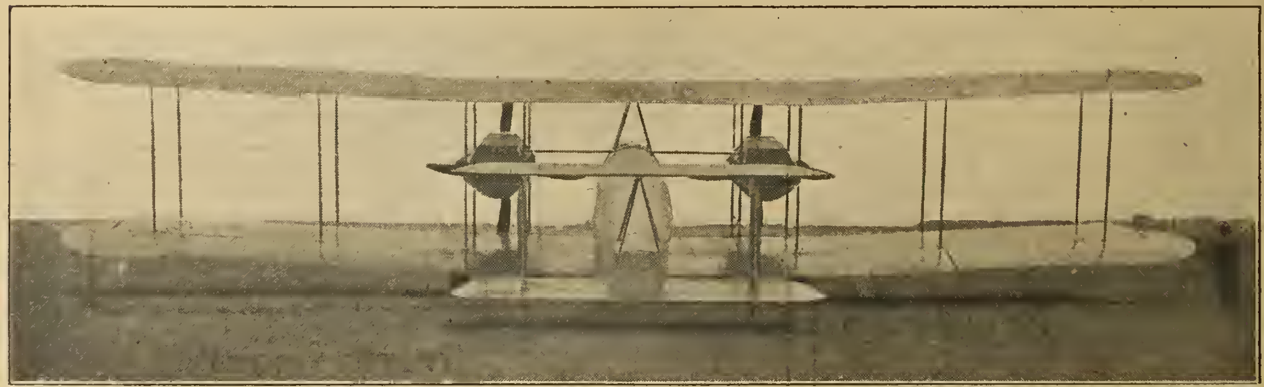
it from a peaceful general utility vehicle to a deadly weapon of war. This is a feature not to be ignored, in spite of the prevalent talk of "no more wars." The Millennium has not yet arrived.

In describing the "Vimy-Commercial," therefore, we will confine most of our remarks to the *fuselage*, having given the general characteristics of the Vimy Bomber in "Milestones" for FLIGHT of June 12 last. The *fuselage* is built up in two portions, the front half comprising the pilot's cockpit, passengers' and luggage cabin, tanks, etc., and the rear half carrying the tail. The forward or cabin portion is of *monocoque* construction, elliptical in cross-section; the shell, or outer covering, is not of the usual three-ply as generally employed in *monocoque* construction, but consists of a modification of the same known as "Consuta"—a system evolved by Messrs. S. E. Saunders, Ltd., of Cowes, who are now allied with the Vickers Company. In the "Consuta" construction, layers of selected spruce are placed with the grain located diagonally, glued and sewn together, each row of stitching being spaced about 1½ ins. apart. By this means considerable strength is obtained, which greatly increases the factor of safety of the whole construction of the *fuselage*.

The shell is attached to box-section formers built up of three-ply, as shown in one of the accompanying illustrations. On each side of the cabin are circular



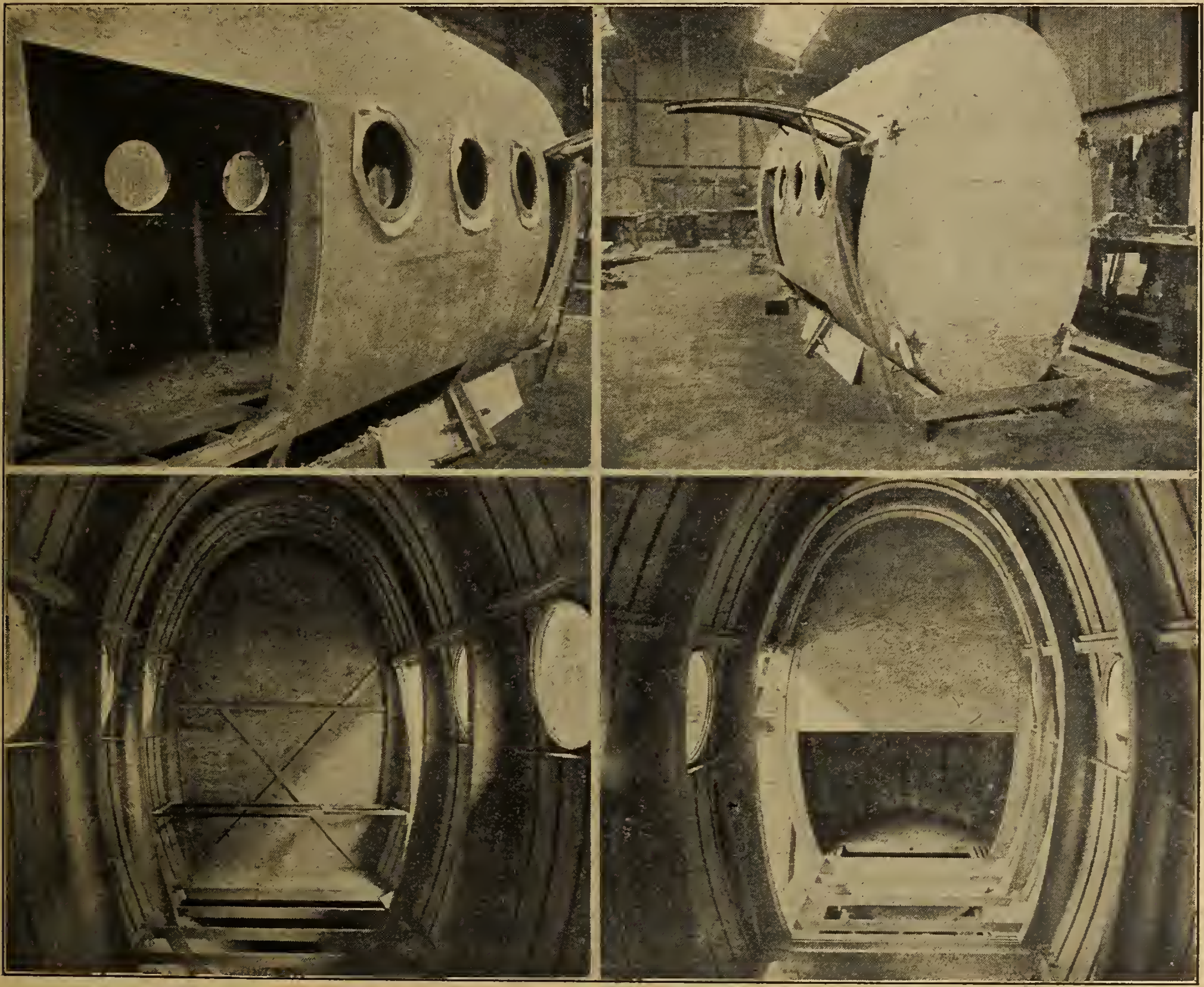
Sketch showing the recesses, in the fore part of the cabin, giving access to the control cables. The conduit conveying the engine controls will be seen in the centre.



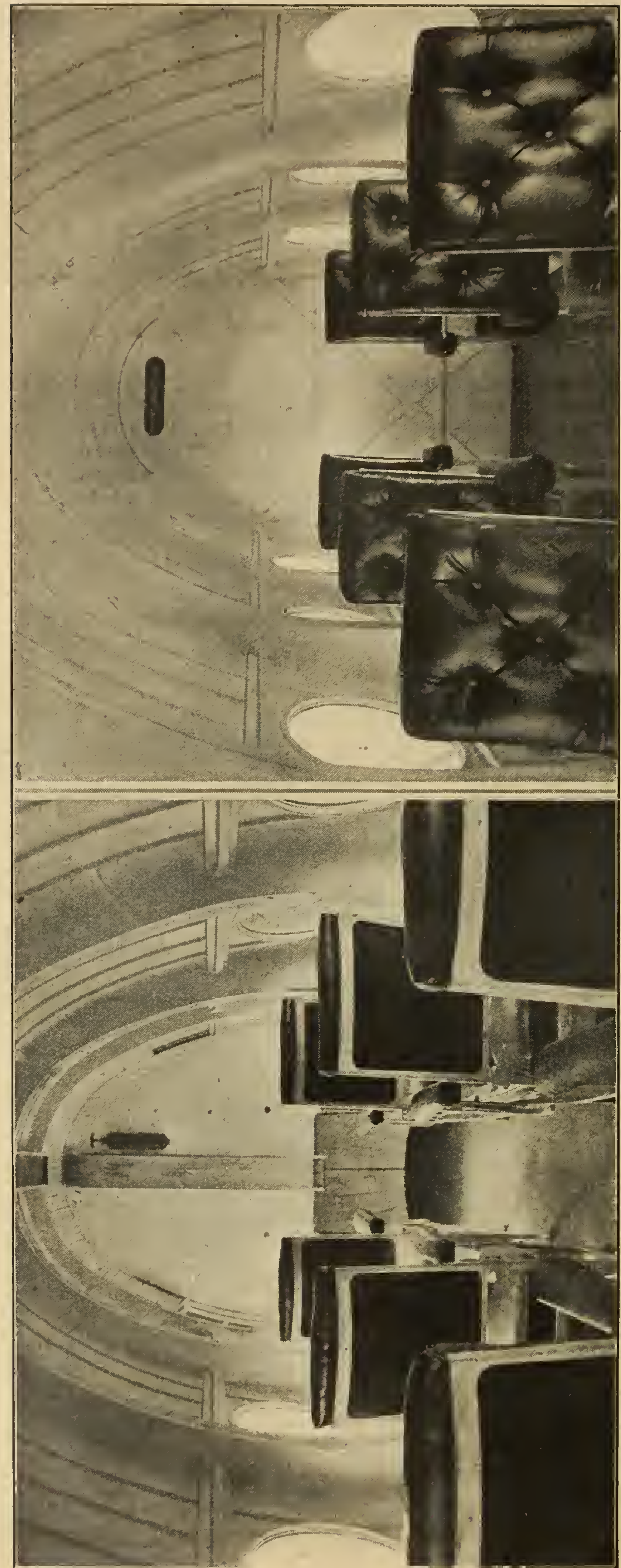
Rear view of the Vickers "Vimy-Commercial" biplane

One of the box-formers for the *fuselage* of the Vickers "Vimy-Commercial" biplane

portholes glazed with Triplex, and at the forward end of the cabin, on the port side, is a door of the roller-shutter type. It is of interest to note that the whole of this fore part of the *fuselage*, including the door and windows, is watertight, enabling the machine, should occasion arise, to float in a normal position with safety on the water. The cabin, which is thus totally enclosed, has a seating capacity for ten passengers, each one of which has a separate and very comfortable armchair, with a window at the side; a gangway runs down the centre of the cabin, and there is ample space between the chairs. Both altitude and speed indicators are mounted on the front wall of the cabin for the benefit of these passengers anxious to be kept informed of the machine's progress. Telephonic conversation can also be carried on between the passengers and the pilot. Cupboards are provided at the end of the cabin for the storage of light luggage.



THE VICKERS "VIMY-COMMERCIAL" BIPLANE: Four views showing the cabin under construction



THE VICKERS "VIMY-COMMERCIAL" BIPLANE: Two views of the interior of the "luxurious" cabin. On the left, looking forward, and on the right, looking aft. It should be noted that it is not quite finished, and several fittings have to be added.

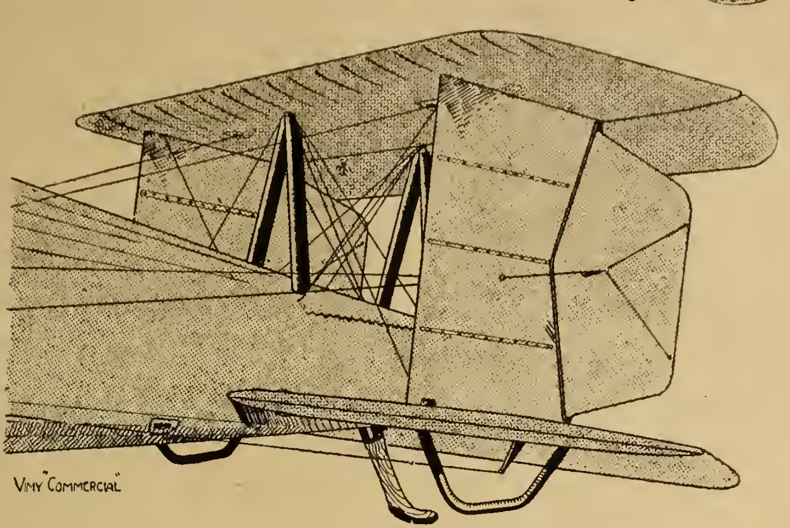
In the roof of the cabin are adjustable ventilators and a trap-door, the latter at the rear of the cabin. Noise and vibration have been reduced to a minimum, in fact, the safety and comfort of the passengers has been considered in every way possible.

High up in the nose of the *fuselage* is the pilots' cockpit, where accommodation is provided for two pilots seated side by side, with, of course, dual control. In this position a very wide range of vision is obtained. The lay-out of the various controls is extremely neat; the *aileron*, elevator and rudder control wires are led from the pilots' cockpit to port and starboard recesses in front wall of the cabin, where access is given for adjustment, etc. This is illustrated by one of the accompanying sketches. From these recesses the cables are led through aluminium tubes along the floor of the cabin. The engine controls (throttle, ignition, radiator shutters, etc.) are taken from the bottom of the pilots' cockpit through a conduit running up the front wall of the cabin, along the roof, and thence out to the engines through metal streamlined casings. The conduits have polished mahogany covers, which enhance the general appearance of the interior of the cabin. The control is fitted with a compensating device so that the machine can be flown "hands off" at any speed, whether level, climbing, or gliding.

Very little alteration is necessary in converting the machine for mails and freight carrying. The seats in the cabin can be detached in a few minutes, giving a floor area of 53 sq. ft., and a volumetric capacity of 300 cubic ft. for freight, which can be kept at an even temperature and dry. The maximum weight which can be carried is 2,500 lbs., just over one ton.

When Mail carrying, sorting boxes are fitted, and the process of Sorting can be carried out on similar lines to the arrangements now in operation on the mail trains. Mail bags can be released attached to parachutes, and dropped where necessary between terminal stations, thus reducing the time and cost of a journey.

The rear portion of the *fuselage* is of the standard Vickers construction of wood and swaged tie rod, and Vickers-Ryan patent *longerons*. The fuel tanks are located beneath the floor of the cabin, and follow the streamline contour of the *fuselage*. A constant petrol supply is maintained by a windmill pump under each engine, which draws petrol from



The biplane tail of the Vickers "Vimy-Commercial."

the main tanks and delivers it to a service tank in the leading edge of the top plane centre section; an overflow returns any surplus petrol to the main tank.

As previously stated, the remainder of the machine is of standard Vimy construction. The main planes are in seven sections, three in the top plane, comprising a straight centre section to which are attached the outer sections at a dihedral angle of 3½ degs., and four for the lower plane, the centre section of which, whilst having the same overall span as the top one, is divided into two sections, one on each side of the *fuselage*. The lower outer sections also have a dihedral of 3½ degs. The main spars are of box section spruce and three-ply wood bound with fabric, and the interplane struts are of hollow spruce, except in the engine bay where the struts are of round steel tube, reinforced where necessary and with wooden fairings; the ribs are of spruce. The engine mounts are carried on four struts each side, and the chassis is attached below the engine mountings, thus minimising the load in the antilift wires. Throughout the machine, streamline steel tie rods are used in external bracing, and round steel rods in all internal bracing; looped wires and ferrules are not used in any important part. In no part has solidity and strength of construction been sacrificed to lightness, a factor of safety of 4½ being provided throughout the machine.

The following are some further particulars of the "Vimy-Commercial":—

Overall length	42 ft. 8 ins.	Area of main planes ..	1,330 sq. ft.
Overall height	15 ft. 3 ins.	Weight per sq. foot	8·4 lbs.
Span	67 ft. 0 ins.	Weight per h.p.	16·4 lbs.
Gap	10 ft. 0 ins.		
Chord	10 ft. 6 ins.		

Engines

Two Rolls-Royce "Eagle" 8 engines or two "Liberty" engines are fitted. The machine will fly with one engine out of action.

Weights and Load, with Rolls-Royce "Eagle" 8 engines or "Liberty" engine:—

	lbs.		lbs.
Weight empty with water	7,292	Oil for 5 hours ..	190
Reserve water (4 gallons)	40	Useful load, either passengers, mails, or goods, including pilot)	2,308
Petrol for 5 hours ..	1,290	Total	11,120

Speed with Full Load

Near ground ..	109 m.p.h.	Landing	45 m.p.h.
At 6,000 ft. ..	103 „	One engine ..	70 „
At 10,000 ft. ..	99 „		

Climb with Full Load

To 6,000 ft. ..	17 mins.	To 10,000 ft. ..	48 mins.

Endurance with Full Load

Fuel for five hours at 90 m.p.h. is carried, which means that the machine will cover a distance of 450 miles without landing. If necessary the endurance can be increased by lessening the amount of the useful load, *e.g.*, if a non-stop journey of 900 miles is required, the useful load will amount to 1,000 lbs., or five passengers and baggage.

Useful Load

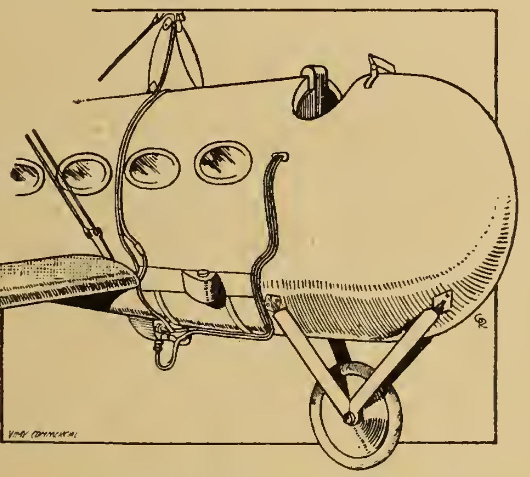
The load that the machine will take is just over one ton; and arrangements are made whereby (*a*) eleven passengers and one pilot or (*b*) one ton dead weight of mails or goods, or (*c*) any combination of (*a*) and (*b*) can be carried. The internal capacity of the machine behind the pilot's seat is 300 cub. ft., which is equivalent in displacement to a load of 7½ cubic tons.

Fuel Used

When slightly throttled so that the speed of the machine is 90 m.p.h., the engines consume the following quantities of petrol and oil:—

Petrol.—An average of 17½ galls. per engine per hour.

Oil.—An average of 1 gall. per engine per hour.



Sketch showing the mounting of the main petrol tanks under the cabin of the Vickers "Vimy-Commercial"

✱ ✱ ✱ ✱

Sir John Hunter Resigns from Air Ministry

The Secretary to the Air Ministry announces that Sir John Hunter, K.B.E., Administrator of Works and Buildings in the Air Ministry, has tendered his resignation to the Secretary of State for Air, and that this resignation has been accepted in view of the progress made in clearing up the War work of the Ministry and the desire of Sir John Hunter to return to his private business as soon as possible. An intimation of the cordial thanks of the Air Council has been conveyed to Sir John Hunter for the eminent services rendered by him from December, 1917, to the present date, in dealing with the very heavy programme of works necessitated by the rapid expansion of the Royal Air Force.

R.A.F. in Victory March

In connection with the Victory March through London on Saturday, the R.A.F. will contribute a contingent of 55 officers and 605 men, and the W.R.A.F. 4 officers and 120 ranks. Nineteen squadrons from the Army of Occupation will be represented, together with personnel from the four Areas and from the 29th and 11th Groups. These numbers will be exclusive of the G.O.C. and Staff. Maj.-Gen. Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O., commanding the R.A.F. in the field, will be in command of the contingent, with Brig.-Gen. G. L. Lambe, C.M.G. D.S.O., as his Chief Staff officer. There will also be a strong representation from the Anti-Aircraft Stations.

THE ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS

SPECIAL COMMITTEE MEETING

A Special Meeting of The Committee was held on Tuesday last, July 15, 1919, when there were present :—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Maj.-Gen. Sir Sefton Brancker, K.C.B., Mr. Ernest C. Bucknall, Lieut.-Col. Spenser D. A. Grey, D.S.O., R.A.F., Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., Lieut.-Col. F. K. McClean, Lieut.-Col. Alec Ogilvie, Col. C. R. Samson, D.S.O., R.A.F., Mr. A. Mortimer Singer, Mr. T. O. M. Sopwith and Mr. Harold E. Perrin, Secretary.

Election of Members.—The following New Members were elected :—

Maj. Thomas Morgan Barlow, R.A.F.
Capt. John Claude Beddard, R.A.F.
Lieut. Edgar Hastings Cambridge.
Lieut.-Com. Kenneth Mackenzie Grieve, R.N.
Lieut. Albert Charles Guyer, R.A.F.
Lieut. Harold William Hern, R.A.F.
Nicolas Herzmark.
James Inglis Ker, J.P.
Francis Martin Luther.
Lieut. John Marsden, R.A.F.
Emil Adam Merckel.
Lieut. William Thomas Simpson.
Capt. Maurice Hugh Stephens, R.A.F.
Lieut. Bernard Noel Wills, R.A.F.

Royal Aero Club and Society of British Aircraft Constructors.—An Agreement has been entered into between the Royal Aero Club and the Society of British Aircraft Constructors defining the activities of the respective bodies.

A joint Committee has been appointed to act as the channel of communication by which the two bodies are kept in touch and to advise generally upon matters affecting their common interests.

The following are the representatives of the Club on the Joint Committee :—

Lieut.-Col. F. K. McClean.
Lieut.-Col. J. T. C. Moore-Brabazon, M.P.
Mr. J. H. Nicholson.
Lieut.-Col. Alec Ogilvie.

N.C. 4.—The following letter was read from Lieut.-Com. H. C. Read, U.S.N., Commanding N.C. 4 :—

"U.S.S. *Zeppelin*,
"At sea *en route* New York,
"June 18, 1919.

"Royal Aero Club,
"3, Clifford Street, W.,
"London, England.

"Gentlemen,—I am taking this opportunity, the first peaceful moment since first arriving at Plymouth, to thank you on behalf of myself and the crew of N.C. 4 most heartily for your welcome to us during our stay in London.

"As a consequence of the care with which the members of the Club looked after our welfare, the visit to London will always remain the brightest spot of the entire trip.

"Hoping some day to be able to repay you, at least, in part, I remain,

"Very sincerely yours,
"(Signed) H. C. Read,
"Lieut.-Commander, U.S.N.,
"Commanding N.C. 4."

R 34.—The following cablegram was sent to Brig.-Gen. E. M. Maitland, C.M.G., D.S.O.:—

"Royal Aero Club sends heartiest congratulations to Major Scott and Crew of R 34.

"Atholl,
"Chairman."

The following reply was received from Gen. Maitland :—

"President Royal Aero Club, London.

"Scott and Crew R 34 much appreciate kind messages congratulation. "General Maitland."

Committee Meetings.—It was decided that meetings of the Committee should be held in future on alternate Wednesdays, instead of Tuesdays.

Club Banquet to Brig.-Gen. E. M. Maitland, C.M.G., D.S.O., Major G. H. Scott, and the Crew of H.M.A. R 34.

The Club will entertain the Officers and Crew of H.M.A. R 34 at a Banquet at Prince's, Piccadilly, W., on Wednesday, July 23, 1919.

Particulars are being forwarded to members by post.

Jacques Schneider International Race.

The Race for the Jacques Schneider International Trophy will be held on Wednesday, September 10, 1919, at Bournemouth. The course will be over a circuit of about 30 miles, starting from Bournemouth, and taking in Swanage and Christchurch.

Messrs. S. E. Saunders, Ltd., the well-known yacht and aircraft builders, of Cowes, Isle of Wight, have kindly placed their new erecting shops and slipways at the disposal of the Club for the accommodation of the competing machines.

Machines representing the British Empire must be ready not later than September 1, 1919.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and reserves to itself the right to hold eliminating trials.

Entries are to be made to the Royal Aero Club, 3, Clifford Street, London, W. 1, not later than July 31, 1919. Each entry must be accompanied by the Entry Fee of £20.

Royal Aero Club Peace Celebrations.

In order that the House Staff may have a holiday, the House Committee has decided that no meals shall be served in the Club on Saturday, July 19, 1919.

By Order,
July 15, 1919. House Committee.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

THE PEACE TERMS

The following clauses affecting aeronautics appear in the Peace Treaty now ratified by Germany :—

Part V.—Military, Naval, and Aerial Clauses

In order to render possible the initiation of a general limitation of the armaments of all nations, Germany undertakes strictly to observe the military, naval, and air clauses which follow.

Section III.—Air Clauses

Article 198

The armed forces of Germany must not include any military or naval air forces.

Germany may, during a period not extending beyond October 1, 1919, maintain a maximum number of 100 seaplanes or flying boats, which shall be exclusively employed in searching for submarine mines, shall be furnished with the necessary equipment for this purpose, and shall in no case carry arms, munitions, or bombs of any nature whatever.

In addition to the engines installed in the seaplanes or flying boats above mentioned, one spare engine may be provided for each engine of each of these craft.

No dirigible shall be kept.

Article 199

Within two months from the coming into force of the present Treaty the personnel of the air forces on the rolls of the German land and sea forces shall be demobilised. Up to October 1, 1919, however, Germany may keep and maintain a total number of 1,000 men, including officers, for the whole of the cadres and personnel, flying and non-flying, of all formations and establishments.

Article 200

Until the complete evacuation of German territory by the Allied and Associated troops, the aircraft of the Allied and Associated Powers shall enjoy in Germany freedom of passage through the air, freedom of transit and of landing.

Article 201

During the six months following the coming into force of the present Treaty, the manufacture and importation of aircraft, parts of aircraft, engines for aircraft, and parts of engines for aircraft, shall be forbidden in all German territory.

Article 202

On the coming into force of the present Treaty, all military and naval aeronautical material, except the machines mentioned in the second and third paragraphs of Article 198, must be delivered to the Governments of the Principal Allied and Associated Powers.

Delivery must be effected at such places as the said Governments may select, and must be completed within three months.

In particular, this material will include all items under the following heads which are or have been in use or were designed for warlike purposes :—

Complete aeroplanes and seaplanes, as well as those being manufactured, repaired or assembled.

Dirigibles able to take the air, being manufactured, repaired or assembled.

Plant for the manufacture of hydrogen.

Dirigible sheds and shelters of every kind for aircraft.

Pending their delivery, dirigibles will, at the expense of Germany, be maintained inflated with hydrogen; the plant for the manufacture of hydrogen, as well as the sheds for dirigibles, may, at the discretion of the said Powers, be left to Germany until the time when the dirigibles are handed over.

Engines for aircraft.

Nacelles and *fuselages*.

Armament (guns, machine guns, light machine guns, bomb-dropping apparatus, torpedo-dropping apparatus, synchronisation apparatus, aiming apparatus).

Munitions (cartridges, shells, bombs loaded or unloaded, stocks of explosives or of material for their manufacture).

Instruments for use on aircraft.

Wireless apparatus and photographic or cinematograph apparatus for use on aircraft.

Component parts of any of the items under the preceding heads.

The material referred to above shall not be removed without special permission from the said Government.

Section IV.—Inter-Allied Commissions of Control

Article 203

All the military, naval and air clauses contained in the present Treaty, for the execution of which a time-limit is prescribed, shall be executed by Germany under the control of Inter-Allied Commissions specially appointed for this purpose by the Principal Allied and Associated Powers.

Article 210

The Aeronautical Inter-Allied Commission of Control will represent the Governments of the Principal Allied and Associated Powers in dealing with the German Government in all matters concerning the execution of the air clauses.

In particular it will be its duty to make an inventory of the aeronautical material existing in German territory, to inspect aeroplane, balloon and motor manufactories, and factories producing arms, munitions and explosives capable of being used by aircraft, to visit all aerodromes, sheds, landing grounds, parks and depots, to authorise, where necessary, a removal of material and to take delivery of such material.

The German Government must furnish to the Aeronautical Inter-Allied Commission of Control all such information and legislative, administrative or other documents which the Commission may consider necessary to ensure the complete execution of the air clauses, and in particular a list of the personnel belonging to all the German Air Services, and of the existing material, as well as of that in process of manufacture or on order, and a list of all establishments working for aviation, of their positions, and of all sheds and landing grounds.

Part VIII.—Reparation. Annex 1

Compensation may be claimed from Germany under Article 232 above in respect of the total damage under the following categories:—

Damage to injured persons and to surviving dependents by personal injury to or death of civilians caused by acts of war, including bombardments or other attacks on land, on sea, or from the air, and all the direct consequences thereof, and of all operations of war by the two groups of belligerents wherever arising.

Damage in respect of all property wherever situated belonging to any of the Allied or Associated States or their nationals, with the exception of naval and military works or materials, which has been carried off, seized, injured or destroyed by the acts of Germany or her allies on land, on sea or from the air, or damage directly in consequence of hostilities or of any operations of war.

Part XI.—Aerial Navigation

Article 313

The [aircraft of the Allied and Associated Powers shall have full liberty of passage and landing over and in the territory and territorial waters of Germany, and shall enjoy the same privileges as German aircraft, particularly in case of distress by land or sea.

Article 314

The aircraft of the Allied and Associated Powers shall, while in transit to any foreign country whatever, enjoy the right of flying over the territory and territorial waters of Germany without landing, subject always to any regulations which may be made by Germany, and which shall be applicable equally to the aircraft of Germany and to those of the Allied and Associated countries.

Article 315

All aerodromes in Germany open to national public traffic shall be open for the aircraft of the Allied and Associated Powers, and in any such aerodrome such aircraft shall be treated on a footing of equality with German aircraft as regards charges of every description, including charges for landing and accommodation.

Article 316

Subject to the present provisions, the rights of passage, transit and landing, provided for in Articles 313, 314, and 315, are subject to the observance of such regulations as Germany may consider it necessary to enact, but such regulations shall be applied without distinction to German aircraft and to those of the Allied and Associated countries.

Article 317

Certificates of nationality, airworthiness, or competency and licences, issued or recognised as valid by any of the Allied or Associated Powers, shall be recognised in Germany as valid and as equivalent to the certificates and licences issued by Germany.

Article 318

As regards internal commercial air traffic, the aircraft of the Allied and Associated Powers shall enjoy in Germany most favoured nation treatment.

Article 319

Germany undertakes to enforce the necessary measures to ensure that all German aircraft flying over her territory shall comply with the Rules as to lights and signals, Rules of the Air and Rules for Air Traffic on and in the neighbourhood of aerodromes, which have been laid down in the Convention relative to Aerial Navigation concluded between the Allied and Associated Powers.

Article 320

The obligations imposed by the preceding provisions shall remain in force until January 1, 1923, unless before that date Germany shall have been admitted into the League of Nations or shall have been authorised, by consent of the Allied and Associated Powers, to adhere to the Convention relative to Aerial Navigation concluded between those Powers.

"WAR SEAL" MODEL COMPETITION

On Thursday afternoon last the "Knights of the Air," Capt. Sir John Alcock, and Lieut. Sir Arthur Whitten Brown, visited the exhibition of War Models which has been organised by Messrs. Thomas Parsons and Sons at their showrooms, 315-317, Oxford Street, London, in aid of the War Seal Foundation.

Nearly a quarter of a million people have visited this exhibition, and up to the end of June last over £11,000 has been collected and handed over to the War Seal Foundation. This latter, as no doubt some of our readers know, is an institution for providing comfortable residential flats for totally disabled Service men and their families, founded by Sir Oswald Stoll. Already 72 residential flats, together with buildings and equipment for giving massage, electrical treatment, etc., have been erected at Fulham, but there is still plenty to be done, so those of our readers who are interested may care to obtain further particulars from the Secretary at 10, Charing Cross Road, W.C. 2.

The primary object of the above visit was to present the prizes won in the model-making competition inaugurated by the above firm. There were two sections in this competition, a senior and a junior, Sir John Alcock presenting the prizes in the former, and Sir Arthur Whitten Brown the latter. The prizes were as follows:—

Senior Section

1st.—Model—H.M.S. *Princess Royal*. Mr. L. F. Rudd, £60.

2nd.—Horizontal engine. Mr. H. C. Duffield, £30.

3rd.—Renault air-cooled engine. Mr. F. Williams, £15.

Junior Section

1st.—Model—Handley-Page aeroplane. Mr. J. R. Baker, £25.

2nd.—Hospital ship. Mr. E. J. Thring, £15.

3rd.—Fokker aeroplane. Mr. G. H. S. MacCallum, £10.

There were also five consolation prizes of £3 each in the junior section. It was a very happy thought on the part of one of the consolation winners to present Sir Arthur Brown with a beautifully-made model of the "Vimy"—an act that was much appreciated.

AIRSHIPS

THE RETURN VOYAGE OF R 34

The R 34 now has the double journey across the Atlantic to her credit. She made a somewhat hurried start, as it was reported that a storm was approaching from the Great Lakes; she arrived safely at Pulham, the airship station in Norfolk, early on Sunday morning after a voyage which had taken 75 hours and three minutes.

The Air Ministry state that the airship was first sighted on the north side of Pulham at 5,56 G.M.T., her position being about 15 miles away, and her course almost due east. Turning south towards the Airship Station she circled over Pulham about 6.22, flying at 800 ft., landing safely at 6.56 G.M.T., exactly an hour after she was first sighted.

The landing at Pulham was thus described by *The Times* correspondent :—

"The British airship R 34 landed at Pulham aerodrome, 14 miles from Norwich, this morning a few minutes after 8 o'clock. She had accomplished the flight from Long Island in 75 hours three minutes.

Maj. G. H. Scott, R.A.F., commander of R 34.

"We began to watch for the airship at 6 o'clock. Reports through the night indicated that that was the earliest moment at which she could arrive. Towards 4.30 the R 34 had been reported over Derby, and it was nearly 7 o'clock when we saw her at last coming out of the mist.

"She might have been a cloud herself in shape and hue and seemingly slow movement. She was creeping out of the north-west, flying at 1,500 ft., and not until she was almost overhead could a sound be heard from her. At a quarter to 6 parties of men had brought out the guide ropes and placed them in readiness on the ground. As the airship began to circle the aerodrome the crews were mustered and took up their positions on the ropes, forming a lane. The airship dipped and headed for it, but rose again suddenly and swept overhead as if unwilling at last to come to earth.

"There was a rapid exchange of signals by flashlight between Maj. Scott and a signal party on the ground respecting barometric pressure and then the R 34 swung round again, dived rapidly towards the ground, and flattened out. A rope was flung out from her; a score of orders were shouted through a megaphone; cable ends were joined; and in five minutes the landing party had the airship under control and were hauling her nearer and nearer to the ground.

"The sudden ejection of her water ballast and the emptying of her water storage tanks occurred at the moment when the R.A.F. band, much depleted by week-end leave, struck up "See the Conquering Hero comes.' A moment later the airship was being walked by the guide rope crews, still directed through Capt. R. A. Cochrane's megaphone, to her shed, and Gen. Maitland leant from the forward gondola and handed me a letter addressed to the Editor of *The Times*, the first to be delivered on English soil from an airship. Upon the envelope was written, 'By kindness of the officers of R 34.'

"Not for a second did the airship get out of control. Steadily and without a hitch she was moved across the wide meadow, always entirely in hand. Then her bow was turned and stern first she was brought into the shed and moored.

"Gen. Maitland, who was wearing the blue uniform of the R.A.F., was the first to disembark. He was followed by Maj. Scott. They were met by Lieut.-Col. Boothby, commanding the air station, and the officers and crew were taken to the camp for breakfast. Pulham aerodrome is vast and flat.

"The R 34 came home to-day on four of her five engines, and finished the flight with 1,000 gallons of petrol to spare. Half-way across the Atlantic the engine in her stern gondola went wholly out of commission, the connecting-rod breaking and going clean through the crank-case. Otherwise she shows little sign of the severity of the test she has just undergone. The repairs to her envelope can be detected, but the damage itself was trifling."

The story of the progress across the Atlantic is thus told in Gen. Maitland's log, which was issued by the Air Ministry an hour after the airship landed :—

The Log of the R 34

It is a dark night, and a gusty wind is blowing from the S.W., strength about 30 m.p.h. We steer straight for New York, and stop, as promised, to fly over the city before heading out into the Atlantic. It was an extremely good "get-away," considering the gusty wind and difficult conditions generally. We find we have 4,600 gallons of petrol for the return journey.

New York at midnight looks wonderful from above. Miles and miles of tiny bright twinkly lights—a veritable fairyland. The searchlights at first make a very unsuccessful search for us, but finally get us fair and square. We are over Fifth Avenue. The Times Square and Broadway present a remarkable sight. We distinctly see thousands of upturned faces in spite of the early hour, 1 o'clock in the morning, and the whole scene is lit by the gigantic electrical signs which seem to concentrate about this point. One in particular, the Overland Tower, illustrates the enormous

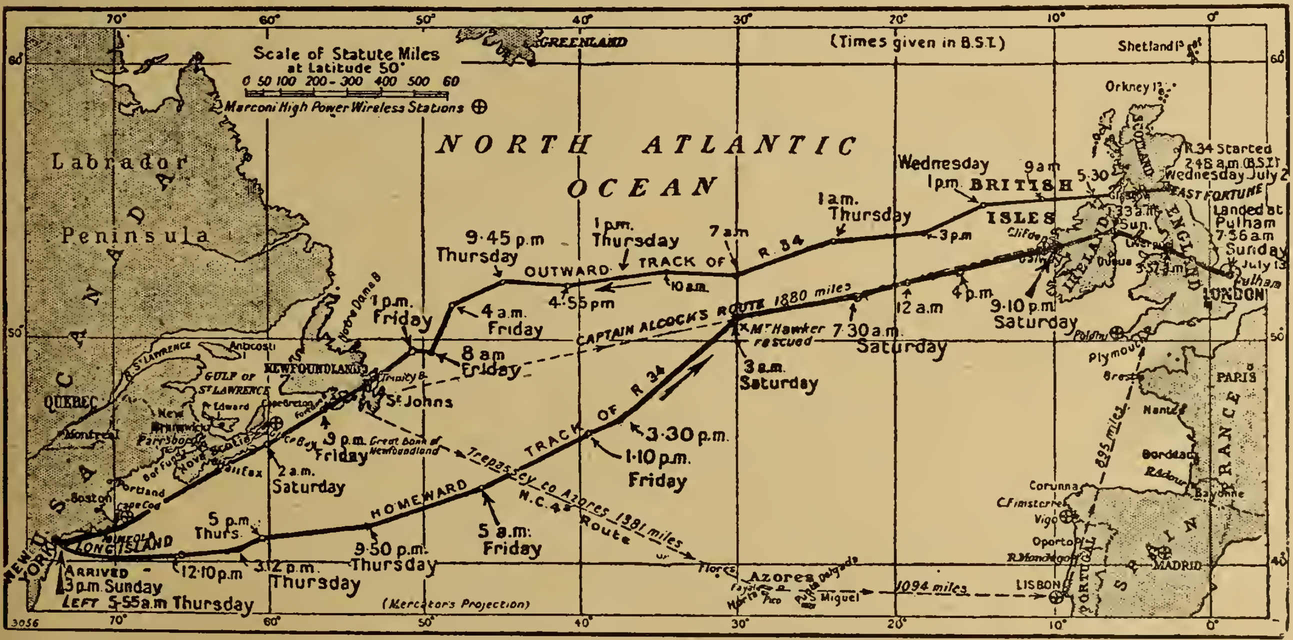
OFFICERS ON BOARD R 34 UPON THE OUTWARD JOURNEY: A photograph taken at Roosevelt Field, Mineola, just after they had landed on American soil. From left to right: Lieut.-Comdr. Zachary Lansdowne, U.S.N., Lieut. R. F. Durrant, Lieut. Guy Harris, Maj. J. E. M. Pritchard, Brig.-Gen. E. M. Maitland, C.M.G., D.S.O., Lieut. H. Luck and Lieut. J. D. Shotter.

importance of aerial advertisement. From 2,000 ft. above we see its wheel revolving and the mist rising in a cloud behind it, presumably an illustration of its speed.

The air over New York feels very disturbed, partly owing to the approaching cyclone from the Great Lakes, of which we have already had warning, and partly also to the heat rising upwards from the city itself. The airship, however, rides out very steadily under the circumstances.

July 10, Thursday, 1.10 a.m.—We head for home with 3,000 miles of sea between us and our Scottish base. The wind is now well behind, and our speed makes good; it is estimated at 65 knots, or nearly 74 m.p.h. Our weather at time of starting is decidedly favourable for a flight from America to England. There is a depression west of Newfoundland, and then a large one centred to the north of Iceland; also an anti-cyclone over the East Atlantic and Great Britain. The inference from the above is that a strong south-west or west wind will prevail over the greater part of the Atlantic. We have got away on the outskirts of the depression which is central west of Newfoundland, and are getting the full benefit of the 35-knot south-west wind on its southerly side.

At this speed we are travelling considerably faster than the depression, which is probably moving eastward at about 35 m.p.h., and it may well be that we shall run right out of it by the time we reach mid-Atlantic. We then expect



R 34'S RETURN FROM AMERICA: Map from *The Times* showing the route taken on the homeward journey. The outward and homeward courses of the R 34 are shown above, the times indicated on the chart being British summer time throughout. It will be noted that until 1.30 a.m. on Sunday morning the R 34 was heading for East Fortune, whither the crew were anxious to return.

(it may be only a pious hope) to get into touch with the still bigger depression centred to the north of Iceland and benefit by the south-west wind which we ought to find on its southerly side.

2.17 a.m.—We are crossing the American coast with four out of our five engines running, the fifth engine resting. Some hot coffee from the Thermos flask presented us by our kind American friends is very nice and warming.

9.15 a.m.—We have already covered 430 miles from New York and are going strong. Our mails are now sorted and this takes some time. We find we have quite a large collection of parcels and letters of all descriptions, including some for H.M. the King, the Foreign Office, Admiralty, Postmaster-General, and a large number of copies of the *Public Ledger* for the Editor of *The Times*. This journey, we hope, will prove the fastest newspaper delivery between New York and London yet accomplished, and will be the forerunner of regular interchanges of mails between East and West—the Old World and the New.

10.45 a.m. G.M.T.—We are now making good 72 knots, or 83 m.p.h., on four engines. The forward engine stopped. If all goes well Maj. Scott will go straight for London, and we will see how long it takes us to cross the Atlantic from Broadway, New York, to Piccadilly Circus, London—from the heart of one capital to the heart of the other.

10.45 a.m.—Cooke asleep under the dining-room table. (Note.—This may take our thoughts back to the days of our ancestors, but the cause of this slip and the position selected are from quite a different reason.)

12 noon.—Lunch: Cold Bologna sausage and pickles and stewed pineapple, and a ration of rum. This latter was much appreciated as the weather had turned much colder. The conversation turned on the subject of obtaining secondary meteorological information in the Atlantic. Scott, Greenland, Luck and Harris all agree that one good method of getting information at small cost would be to equip all cable repair ships with a meteorological observer and a suitable outfit of kites and instruments. These cable repair ships work in all parts of the world, and are often at sea for days at a time. Moreover, the cable routes are ready in every case on the shortest and most direct route between the countries they link up.

1.5 p.m.—We have averaged 56.3 knots ever since leaving Broadway. Weather fine, visibility 15.20 miles. Wind 40 knots S.S.W., sea very rough. It is difficult from above to measure the height of the waves, but it is easy to see that in a very heavy sea like this one surface ships would be having an extremely bad time. Up here we are as steady as a rock, and unless one looks out of the windows one would hardly realise we were travelling at all.

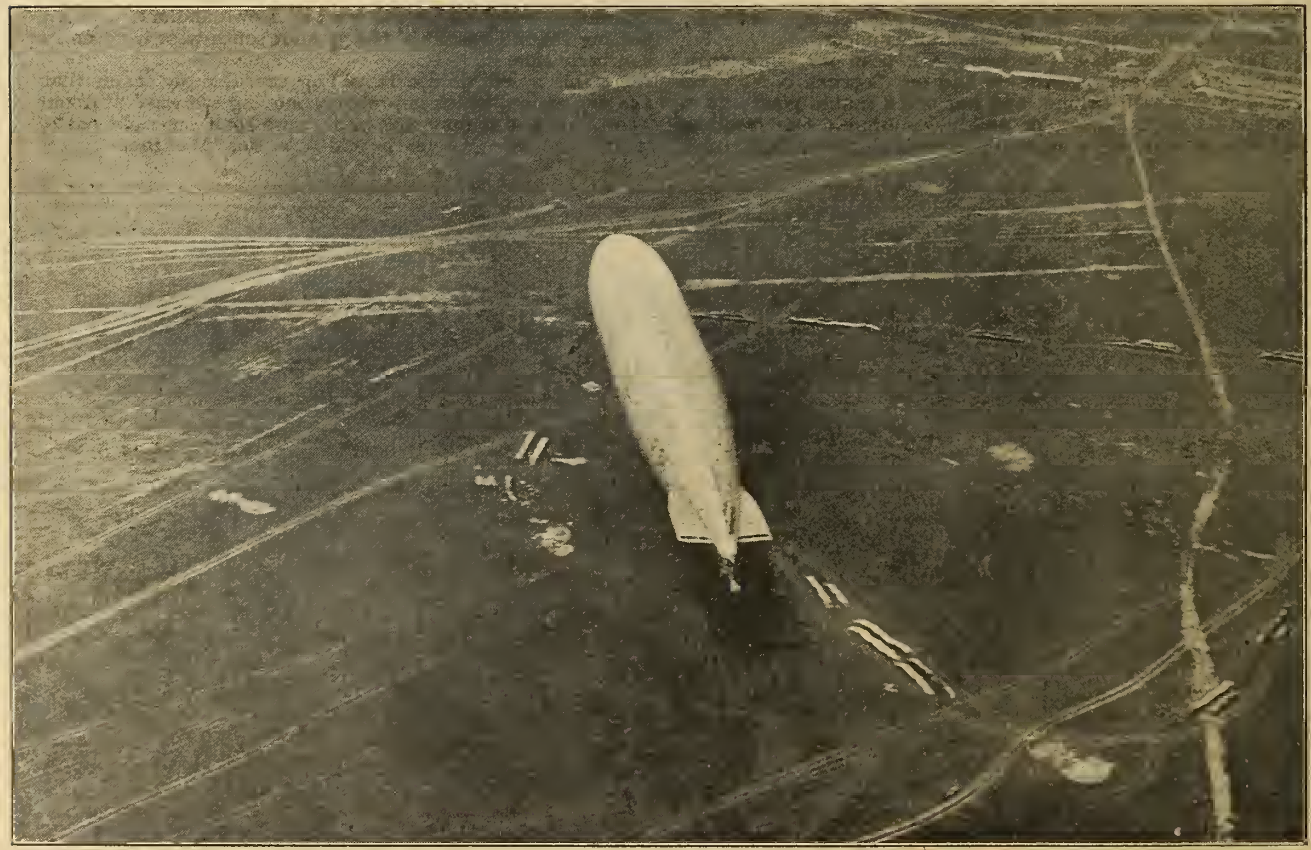
Lieut.-Col. Hemsley, U.S. Army Aviation Department, is steering, and is taking opposite watch with Pritchard, while Luck has relieved Greenland in the fore car, Corpl. Burgess being on the elevators. We are in very good wireless communication with Sable Island, and many messages wishing us success are received from America and Canada. We send our grateful thanks to the U.S. naval and military authorities for their very efficient and kind assistance in looking after the airship at Mineola during four days of difficult and unpleasant weather conditions.

4.50 p.m.—Position 42.15 N., 54.05 W.; course 140 deg. steered, 110 deg. made good, 86 deg. true, 48 knots. We have covered 900 miles from New York, 16 hours, and are 1,850 miles from south coast of Ireland, exactly one-third of the distance between the two countries.

Our petrol consumption works out at about one gallon an hour. Weather clear, sea deep blue, very good visibility, 35-40 miles according to the dip and distance horizon tables at this height (1,500 ft.), should be 45 miles. Cooke determined his position by observation on the sun and sea horizon. It is interesting to note that there were only two occasions when he was able to do this on the outward journey owing to clouds and fog.

6.15 p.m.—A five-masted schooner under full sail on starboard beam about five miles away was an interesting contrast between the old and the new, the sailing ship and the airship. We are now over the main east-bound summer route of steamers from New York to Queenstown. The s.s. *Adriatic*, due New York on 13th, should be somewhere near us, and we are on the look-out for her on the wireless. Getting much colder.

8 p.m.—Position 42.40 N., 50.30 W., making good 55 knots. Harris gives most interesting explanation of the clouds formationed to the N. and S. of us, and compares the clouds as we see them with the illustrations in a different cloud text-book we have with us. It is now time for supper,



R 34'S ARRIVAL AT MINEOLA: A photograph taken from an American Blimp sent out to welcome R 34, which is seen making its way to the landing-ground at Roosevelt Field.

soft-boiled eggs and cocoa, and we all discussed at great length our impressions of American men and American women. I wish our newly-made American friends could have heard the delightful things that were said about them. Pritchard goes to sleep under the dining-room table, while the second watch come in for their supper. This position under the dining-room table seems to be the most sought-after point of vantage in the ship.

July 11, Friday, 3.20 a.m.—Position 45.03 N., 42.57 W., estimated by observations on stars and sea horizon. Visibility good.

4.20 a.m.—The foremost of the two engines in aft car breaks down on connecting-rod fractures owing to bolts shearing, with the result that the crank-case gets badly notched and the engine is consequently quite beyond repair. Course, making good 115 deg. or 87 deg. true. At 26 knots with forward and two wing engines. Weather clear, sea moderate.

6.40 a.m.—Altered course to N. 30 deg. E., came down to 600 ft. to get under clouds, which are now appearing and threaten to block out all view of the sea completely. We now find by accurate measurements that below the clouds is a northerly wind and above them, at 3,000 ft., the wind is from south-west. The reason for this is an interesting one. We are over the Gulf Stream on a north-easterly course. The air over this Gulf Stream is warmer than the air over the sea immediately to the north of it. This warm air rises and its place is naturally taken by the cold air from the north, resulting in a 12-knot conversional wind from the north extending from the surface of the sea up to a height of about 2,000 ft. Having made this discovery, we accordingly keep at 3,000 ft., when we have a steady wind from south-west.

8 a.m.—Cloud formations in so far as they indicate weather are like an open book, profusely illustrated, with a plot that changes all the time. On our port beam away to the north-west we see the depression centred over Newfoundland written plainly in the sky in fantastic and streaky cirrus ventosus, a certain and sure indication of what is going on over there some hundreds of miles away.

9.15 a.m.—Clocks have now been put forward one hour.

10.30 a.m.—Scott and Harris are agreed that the wind is stronger in our favour the higher we go up, but in spite of that Scott decides to keep on a 3,000 ft. level to avoid necessity of losing gas from expansion, which to-day is precious. To-morrow he can afford to go much higher, and the airship will be so much lighter on account of having burned another 24 hours' petrol.

12 noon.—Weather report from Air Ministry tells us of an anti-cyclone off south-west of Ireland, and so we change course more to the north with a view to getting round into the westerly wind which we know must be blowing on the northerly side of it.

12.30 p.m.—Lunch. Mealtimes are always most welcome, and give the more responsible members of the crew a much-needed interval. Our new gramophone is a vitally better instrument than the one we endured on the outward voyage, and as I was descending the ladder down into the fore car after lunch I just caught a glimpse of Luck and Harris doing quite a nice one-step together.

1.30 p.m.—Air Ministry sent a message to say that they had made provision to land us in Ireland if necessary, and that destroyers with steam up were available at Berehaven if required. We replied—propose to land at East Fortune. One engine completely broken down.

3.30 p.m.—Still at 3,000 ft. in and out of the clouds at intervals. We have not seen the sea since 8.30 this morning, 1,600 revs. three engines, our speed 32 knots. Another weather report from London to say that the depression north of Iceland has moved easterly, and that as a result the wind is from south-west over north of Ireland and whole of Scotland. This strengthens Scott in his decision to give up going to London and go to East Fortune instead. It is sad not to take in London on our return, but with one engine lost and weather in South of England not very favourable the decision is a wise one.

4.30 p.m.—Scott brings ship down to try to see water and get an indication of our speed, but at 900 ft. it is still very thick, so he abandons the attempt. In coming down from 3,800 ft. to 900 ft. we pass through no fewer than five distinct and separate cloud strata. In these thick clouds (we have been in them now since 3.30 this morning) we have no means of telling our speed, as they extend right down to the water. We assume from general weather observations that the wind is with us, the worst condition we think fair to assume being no wind at all. There certainly ought not to be a head wind against us. There is no alternative but to keep pegging away through the clouds until other weather conditions appear.

4.45 p.m.—We appear above the clouds for a few blissful moments and see a beautiful cloud panorama. Range upon range of alternate white and slate-coloured mountains with wide deep valleys and an occasional glimpse of bright blue sky immediately above. The glare is almost blinding, and we can only look at the sun for a moment or two at a time.

5 p.m.—We are back again in the clouds with no visibility. Picked up H.M.S. *Cumberland* on our Marconi spark set. She gave her position and when plotted on the chart Cooke thinks her to be almost due north of us, and from the strength of her signal she should be within 30 miles. Durrant tried to get her with our directional wireless, but without success.

7.5 p.m.—Passing through wet rain clouds. It has been raining very heavily since 5 o'clock. Scott goes up to 5,000 ft. to get out of it, but with no success, and reduces height to 3,000 ft. again. Very cold and dark. All windows and doors are shut.

7.35 p.m.—We ask H.M.S. *Cumberland* for a weather report. She replies giving her position and reporting wind at N.N.W., 18 m.p.h., overcast, passing showers, and clouds above 1,000 ft.

8 p.m.—Supper, and a very good one too. We are well equipped with little luxuries on this return voyage, having learnt a thing or two on the outward journey, about what is necessary and what is not.

R 34's ATLANTIC CROSSING: The British dirigible at anchor on the Mineola landing-ground.

8.30 p.m.—Still pouring with rain. Height 4,000 ft. The wind whistles round the forward car. Very dark and no visibility. Scott reduces height to 3,000 ft., and an extraordinary sight suddenly presents itself beneath us. Thousands and thousands of little round clouds like tiny white puff balls packed closely together, with the blue sea just visible in between them, form a layer of cloud between us and the sea. This cloud formation is called "ball cumulus."

8.45 p.m.—Dropped a calcium flare, which floated away burning brightly straight astern and enabling Cooke to get our direction and a good idea of the speed at which we were travelling.

8.50 p.m.—Again thick clouds and heavy rain. Clifden Wireless Station sounds very loud on the wireless, which shows we are getting nearer home, and Durrant has just succeeded in getting East Fortune, 1,100 miles away. He could just faintly hear them say the words "Saturday evening."

9.15 p.m.—S.S. *Dominion* speaks us and gives her position and barometric readings. She reports us as being quite near her, though, of course, she cannot see us or even hear our engines owing to rain clouds.

12 midnight.—Still pouring with rain. Dropped flare; drift estimated as 10 deg. to southward. As we lay in our hammocks we listened to the rain beating pitilessly down on the outer cover of our trusty ship of the air, and our feelings, despite the weather, are those of complete confidence and security.

July 12, Saturday, 12.45 a.m.—Weather clearing. Sea visible at 2,500 ft.

3 a.m.—Magnificent sunrise. The sun appeared above the clouds in a blaze of colour, much impressing those of the crew who happened to be on duty at the time.

6 a.m.—Position 52.20 N., 22.35 W., 760 miles from East Fortune. Running on three engines, aft engine having broken valves. Springs changed. Air speed 32 knots. It is interesting to note that Cooke has not been able to get a single observation for plotting his position for the last 24 hours, and it is quite fair to assume that yesterday's weather with S.W. wind is quite an average day in mid-Atlantic. Clouds beneath us look just like a gigantic soft, springy, fleecy, white feather bed, and they fill one with a strange irresistible feeling of wishing to jump down into them, probably a similar sort of feeling which some people feel when they are climbing a steep mountain face.

R 34 IN AMERICA: A striking view from beneath of the airship at Roosevelt Field. Note the gas cylinders for re-filling.

8 a.m.—H.M.S. *Tiger* gives her position and reports wind N.W.—N. 15 20 m.p.h., sky overcast with low stratus, visibility five miles. Breakfast this morning is quite a festive meal, as we reckoned it should be our last breakfast on board, and we are not quite so economical with our issues as usual. Message received from Mr. G. Constantinesco, the brilliant Roumanian inventor of Sonic transmission, welcoming us back to England.

10.55 a.m.—Height 5,000 ft. We are now over a big gap in the clouds about 26 miles across, and will soon be in the clouds again. Clear blue sky and sea. No sign of a ship. Making good 35 knots, which should enable us to make East Fortune at daybreak to-morrow.

11.25 a.m.—Durrant succeeds in getting a wireless out on Clifden with directional finding apparatus. Weather has turned very cold.

12 noon.—Lunch. We are all rather anxious to get to our journey's end. Perhaps it is the strain that is beginning to tell, and it is now rather disappointing to find that a N.E. wind is preventing us from making more than 28 knots. We shall be breakfasting in the air again to-morrow, after all.

12.30 p.m.—The clouds have all cleared away, but only temporarily, I feel certain. Height 5,000 ft., perfectly clear blue sky and deep blue sea. Visibility is at its maximum, and at this height, according to our text-books, we can see 81 miles. This means that we can see 162 miles from right forward to right aft, and the area we can see over works out at 19,200 square miles, and not a ship to be seen. My ambition to see a steamer at close quarters in this gigantic Atlantic will, I am afraid, never be realised.

3.50 p.m.—Clouds rolling up again. Some very fine examples of cumulus major are to be seen. One particularly interesting cloud formation on our port beam takes the eye. It is a huge vertical column of cloud joining a lower stratus of cloud to a higher stratus, and is about 500 ft. high. It is carried by an upturned vertical current.

5.30 p.m.—Great excitement. Two trawlers are sighted on our starboard beam. They look very tiny. We try to speak the near one with an Aldis lamp, but as she has no wireless we cannot get reply. We are now down to 3,000 ft., and the difference in temperature between this height and 5,000 ft. is most marked, 8 deg. F. Making slightly better headway at this height, 32 knots. Wind N.N.W., 25 deg. drift. Cooke considers that an accuracy of more than 20 miles in estimating a position in mid-Atlantic cannot be guaranteed in an airship even in clear weather. Directional wireless, however, should, when perfected, make this much more accurate.

6.50 p.m.—We ran into a sudden squall from north-west. Low black clouds and a rough confused sea all in a space of a few minutes. Ship very steady. 1,600 revolutions on four engines.

6.57 p.m.—Passed out of squall. Got Clifden on directional wireless. 96 deg. mag. 76 true. We are not very far from the coast of Ireland.

7.15 p.m.—Another squall, but not a big one.

Land in Sight

7.25 p.m.—Land in sight on our starboard bow. Great enthusiasm on board. First spotted by Lieut.-Col. Hemsley, U.S. Army Aviation Department, 7-10 miles away. Scott alters course to make the land. Cooke gets the large chart of the west coast of Ireland, and there is keen competition to see who will fix on the exact spot when we cross the coast. Two little islands lie right ahead of us. With our glasses we see the wireless mast of Clifden. These two islands are almost certainly the same two little islands that appeared out of the fog to the delighted gaze of Alcock and Brown at the conclusion of their historical flight. A strange and happy coincidence.

8 p.m.—At 8 o'clock precisely we crossed the coast line a little to the north of Clifden, Co. Mayo, and our time from crossing the American coast at Long Island to crossing the Irish coast is exactly 61 hours 33 minutes.

8.15 p.m.—We head right in over the mountains, which at this spot are 2,900 ft. high. What a wild and rugged coast line! A magnificent cloud panorama now appears. Huge white cumulus clouds of weird and fantastic shape surround us on all sides, and over the top peep out the tops of the mountains, while through the gaps we see lakes, harbours, islands, and green fields, quite the prettiest picture we have seen on the entire voyage. It seems as if the elements have reserved their best cloud shapes to welcome us as we cross over British soil.

9.10 p.m.—Two-seater aeroplane from neighbourhood of Castlebar flying past us and under us, waving a welcome. We are now well away from the mountains over the flat country inland, heading right across to Belfast and finally East Fortune. Height 2,000 ft., making good 38 knots. Bright full moon.

The Airship's Company

Crew of the R 34 on return journey :—Officers :—Maj. G. H. Scott, A.F.C., Capt. G. S. Greenland, 1st officer, Sec. Lieut. H. F. Luck, 2nd officer, and Lieut. J. D. Shotter, engineer officer (Ship's Officers) ; also Brig.-Gen. E. F. Maitland, C.M.G., D.S.O., representing Air Ministry ; Maj. J. E. M. Pritchard, O.B.E., Admiralty ; Lieut.-Col. W. H Hemsley, United States Aviation Army Department ; Maj. G. G. H. Cooke, D.S.C., navigating officer ; Lieut. Guy Harris, meteorological officer ; Sec. Lieut. R. D. Durrant, wireless officer ; W. Mayes, coxswain ; H. J. Robinson Flight-Sergt., coxswain ; H. M. Watson, Sergt. ; R. T. Burgess, Corpl. ; F. Smith, Corpl. ; J. Forteath, leading aircraftsman, F. Borowdie, air-mech. 1st Grade (last five riggers).

Engineers :—W. R. Gent, Flight-Sergt. ; R. Ripley Flight-Sergt. ; N. A. Scull, Flight-Sergt. ; J. Shirwell, Sergt. B. Evenden, Sergt. ; P. Cross, Corpl. ; G. Gray, Corpl. G. Graham, 1st Air-Mech. ; F. Mort, 1st Air-Mech. ; J. Northeast, 1st Air-Mech. ; R. Parker, 1st Air-Mech. ; E. E. Turner, Flight-Sergt ; W. Angers, Flight-Sergt. ; H. Powell, wireless Corpl.

The Last Stage

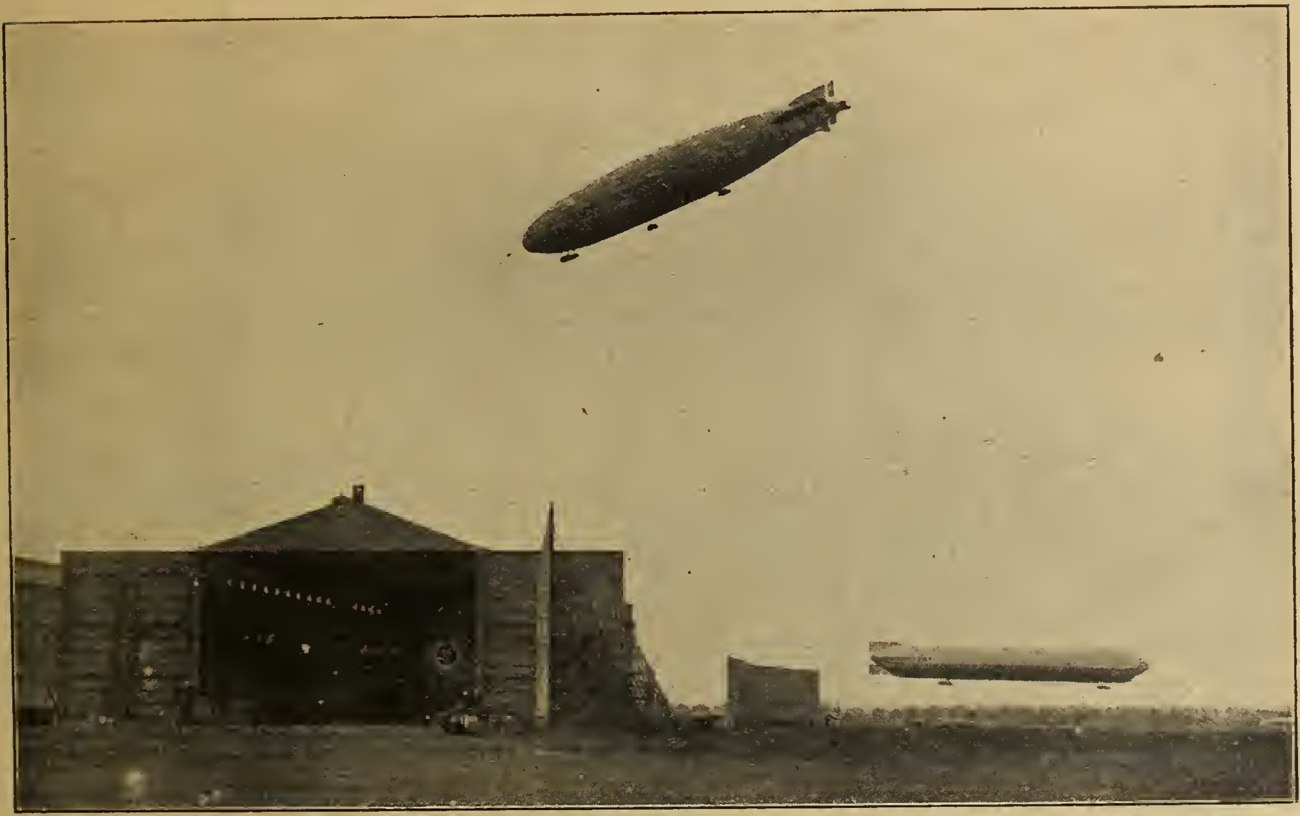
As things have turned out (though one could have foreseen this) it would have been wiser if we had kept a more northerly course after getting away from the helpful influence of the Newfoundland depression. We would then have been helped by this N.N.W. wind instead of being hindered by it and might have saved some time. Undoubtedly the captains of the big aerial liners of the future will become wily and cunning masters of the art of selecting the right way and the right height and often by making wide *detours* will by means of their air knowledge alone save many hours on long sea and land passages.

11.20 p.m.—Message from Air Ministry to say we are to land at Pulham. We ask if we may land at East Fortune as that is our original objective and the weather is reported good for landing. The reply is to land at Pulham, so we assume there is some special reason and we alter our course accordingly.

Sunday, July 13, 7 a.m.—Scott increases height to 5,000 ft., and course is steered over Isle of Man, and Liverpool 2.45 a.m., Derby 3.55 a.m., and Nottingham 4.15 a.m., direct to Pulham.

5 a.m.—A wireless message is received from His Majesty the King :—"I congratulate you all on your safe return after completion of your memorable and, indeed, unique Transatlantic voyage.—Signed, G.R." Wireless messages of congratulations were also received from Maj.-Gen. Seely, Under-Secretary of State for Air ; Maj.-Gen. Sir H.M. Trenchard, Chief of Air Staff ; Maj.-Gen. Sir F. H. Sykes. Controller-General of Civil Aviation ; and Sir A. Robinson. Secretary of the Air Council.

6.20 a.m.—Over Pulham Airship Station, and 6.57 landed.



R 34 HOME AGAIN AT PULHAM, NORFOLK : In the air, R 34 descending to enter its hangar ; R 33 in the shed, and, on the right, tethered to the steel anchoring mast, R 24.

Total time of return journey from Long Island to Pulham, Norfolk, 75 hours, 3 minutes, or three days, three hours, three minutes.

General Maitland's Story

In an interview with Mr. H. C. Bailey, of the *Daily Telegraph*, Gen. Maitland gave some further impressions :—

"One of the objects of the flight," he said, "was to demonstrate what airships could do in long-distance flying oversea with an ultimate view to their commercial use. Airships will undoubtedly be employed for commercial purposes for very long journeys over sea and land. They will not conflict with the aeroplane and seaplane. There is no question of competition. Airships will make long voyages, and from their terminii aeroplanes and seaplanes will radiate on short, quick journeys. A second object of the voyage was to cement the friendship between this country and the United States. The 'R.34' was very comfortable. There was no feeling of sea-sickness on board. On the return trip we had a wind of 45 miles an hour and a high sea. A surface ship would have been all over the place. The airship's motion was perfectly smooth.

"We came to Pulham not because we should have had any difficulty in making East Fortune, but because we were ordered here by the Air Ministry. The landing in America gave an illustration of the uses of the parachute in air work. When the 'R.34' was over the landing-ground on Long Island, Maj. Pritchard went down by parachute from a height of 1,500 ft. to assist in directing the landing party, and his services were very useful. This illustrates the employment of the parachute in air work in addition to its value in life saving. The parachute, I am convinced, will be used in all aircraft, but will be of particular value to the airship.

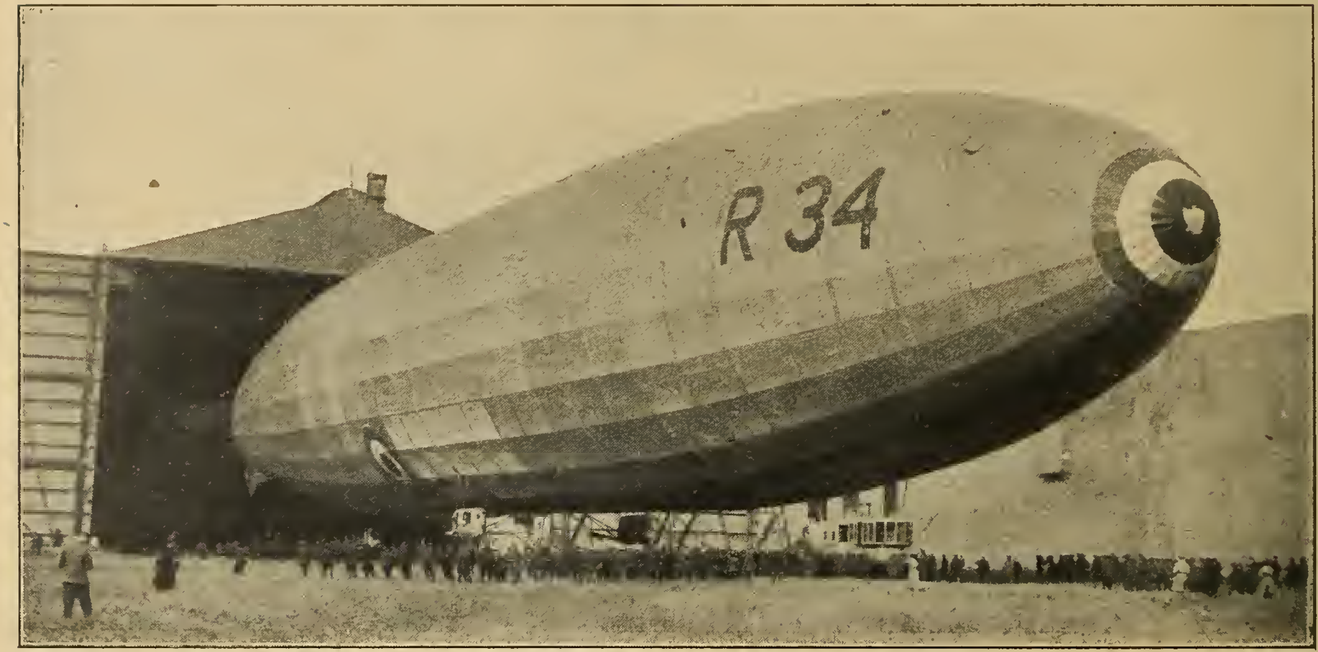
"The worst moment of the voyage? I think our worst moment was on the outward run, when we met the electric storm in the Bay of Fundy. Confident? Oh, yes, we were all confident that we should complete the round trip. The only question was whether the petrol would last out. It is certainly true that after a long flight landing is difficult, because an airship with its petrol expended is very light. We have begun experiments in mooring ships in the open. You can see the first experiment here, 'R.24'" (this is an earlier and smaller craft) "is lying moored to a mast, and she has been out since Thursday. In the future I hope that an airship will come in under her own power right over her mooring-mast, drop a cable, which will be connected by one or two men to a cable in the mast, and will then be hauled down by a winch till her bows meet the tip of the mast. Such a mast for a big airship would be some 200 ft. high. It would be a structure of some considerable diameter, a tower, let us say, and the airship's passengers would disembark by coming down inside it in a lift.

"Our damages? Oh, the damage on the landing in America was very slight, and easily repaired. In the engine which failed coming home, the connecting-rod broke, and the engine was completely wrecked."

Maj. Scott's Impressions

Maj. Scott, the Commander of the "R.34," also gave some impressions to Mr. Bailey:—

"It was an uneventful voyage," said Maj. Scott. "I estimated that it would take between 70 and 80 hours. In fact, it took 75 hours 3 min. The outward voyage lasted 108 hours. On leaving Long Island we proceeded to New York, and were over the city between midnight and 1 a.m. We circled over Broadway at a height of 2,000 ft., but we could not hear the crowds cheering on account of the noise of our own engines. Owing to the storm behind us, and the strong following wind which it caused, the first 500 miles were made at a very high speed. Our best rate was 72 knots—some 80 miles an hour. After leaving Newfoundland, which we passed on a course 150 miles to the south, the following wind failed, and we had a certain amount of head wind, which yielded to light and various breezes. We met much low cloud and fog, and could take no sight of any sort for 24 hours. Directional wireless enabled us to keep our course without difficulty. When we were still some 1,200 miles away from our destination the engine in the stern car broke down beyond repair. Fortunately, no one was hurt. Thus, as we carry five engines, the ship lost one-fifth of her power. In the conditions of the voyage it made no practical difference. I seldom have all the engines working, and, in fact, only use the whole five when running against a strong wind. Before making Ireland we were for six hours at over 5,000 ft. We reached the coast just by Clifden wireless station, in fact, at just the same point as Alcock. We approached Pulham by way of Derby, Nottingham, and King's Lynn. The signal which you saw the ship making as she approached the station was to ask for the barometrical reading on the ground in order that I might judge how to make the descent. The water which was discharged from the bows as we came down was let out to render the descent more gradual. We started out from America with 4,900 gallons of petrol. We landed at Pulham with 1,000 gallons still on board, so that the run was made on 3,900. On landing we received a message from the King. I think that there is no room for doubt that the large airship is the type of aircraft for deep sea work. Before very long I hope that we shall have airships of a size and speed which will enable them to sustain a rate of 70-80 miles an hour. The cross-Atlantic route, I think, will vary with the weather. There can hardly be for aircraft, as for surface ships, more or less fixed courses."



R 34 entering the hangar at Pulham on Sunday, July 13, after her successful return journey from America.

R 34's Engineer Officer

Probably no one on the airship would deny that the hardest work of all fell to the lot of Lieut. John Irwin Denham Shotter, engineer officer of the R 34. He was responsible for the care of the five Sunbeams, and, in fact, for everything of an engineering nature on the airship. He, like everyone else on board, depended upon Maj. Scott, but everyone in turn depended equally on him, for the upkeep and skilful management of the motors were vital to the success of the voyage, and as all the world knows by now, his post demanded the most constant attention.

His task was made all the harder, and his heroism was all the greater, for the reason, known to all his comrades, that on the eve of the start his wife was taken seriously ill with heart trouble. Under such circumstances he might well have been forgiven if he had asked to be relieved of his duty, but his heart was in the work for which he had trained so long, and no one else knew the ship and her engines as he did, so he went through with it, despite the keenest personal anxiety for the safety of his wife. Under such mental strain his devotion to duty deserves the highest praise.

Lieut. Shotter, who was born on November 7, 1890, at Freshwater, Isle of Wight, was by a curious coincidence born in a house which was the property of Gen. Sir J. B.

Seely, with whom his father had served in the South African War, and had also manned the same lifeboat on numerous occasions. This fact aroused much interest at the House of Commons luncheon at which Gen. Sir J. B. Seely presided on Monday. Our Allies will be glad to know that his mother is French.

He served his apprenticeship to locomotive engineering at Messrs. Manning and Wardle's, at Leeds, but soon turned his attention to internal combustion engines, and at the outbreak of War was chief aero engine tester at the Wolseley works at Birmingham. He joined the Royal Naval Air Service as a petty officer on his birthday in 1914, having set himself out to see how far he could progress on his merits. His career was one of steady rise, and he gained valuable experience on every type of airship. His enthusiasm suffered in no way in spite of the fact that his first trip ended in disaster and a period in hospital. For his bravery on that occasion he was specially mentioned in despatches and promoted to rigids.

He has achieved a reputation of the highest class for his handling of aeromotors on rigid airships, and has spent in all over 2,000 hours flying. The official logs of the several great and historic journeys of the R 34 give some idea of his capabilities under circumstances of extreme difficulty, where the economical use of his fuel and the hourly nursing of each motor meant all the difference between success and disaster. As illustrative of his coolness, one of his brother officers relates how Shotter was roughly disturbed in the midst of a brief spell of sleep by a mechanic who exclaimed, "My engine's all on fire!" Shotter, exhausted by his labours, calmly replied, "Well, go and put it out!"

He received the most gratifying compliments from prominent officers in the American Air Service, among them Commander Reade of the N.C. 4, and was embarrassed by the fame he had earned. No engineer officer in any Air Service ever had so gruelling a test before, and few would have emerged with such honour.

Congratulations

The following message of congratulation from the King was despatched by wireless, and was received by R 34 while on her way from Nottingham to Pulham:—

"I heartily congratulate you all on your safe return home after the completion of your memorable and, indeed, unique Transatlantic air voyage.—George, R. and I."

The Air Minister has communicated the following congratulatory message received from the Prime Minister to Gen. Maitland, Maj. Scott, and the crew of H.M.A. R 34:—"Heartiest congratulations on fine feat of airmanship.—Lloyd George."

From Mr. Churchill, Secretary of State for Air, to Gen. Maitland and officer commanding R 34:—"My sincere congratulations to all concerned on the complete accomplishment of your journey and your successful work as pioneers."

From Maj.-Gen. Seely, Under-Secretary of State for Air:—"I send my best congratulations to you and to the crew of R 34 on your magnificent achievement of being the first to cross and re-cross the Atlantic by air. We are all very proud of you."

From the Secretary, Air Council:—"Heartiest congratulations on making the return journey so successfully. The Air Council fully realise the endurance and fortitude entailed in the accomplishment of this epoch-making event.—W. A. Robinson, Secretary, Air Council."

From the Controller-General, Civil Aviation:—"Hearty congratulations from myself and Department of Civil Aviation on your successful journey and safe return. It is a really splendid augury for the future of commercial aviation.—Sykes."

From the Chief of the Air Staff:—"On behalf of the whole Air Force, I send you heartiest congratulations on your magnificent achievement in making the double journey across the Atlantic.—Trenchard, Chief of Air Staff."

In a further personal telegram to Gen. Maitland and Maj. Scott, Gen. Trenchard said:—"Please accept my heartiest congratulations on your successful accomplishment of the return journey. The flight you have just completed is, I consider, one of the main stepping-stones in long-distance aviation."

ITEMS

On her outward journey the R 34 carried a message from Mr. Long, the First Lord of the Admiralty, to Mr. Daniels, the United States Secretary for the Navy. She brought back a reply in which Mr. Daniels says,: "Our country is filled with pleasure at the successful arrival of the R 34. The Navy of America salutes the British Admiralty. It is our privilege to live in the days of fulfilment of many visions and dreams. I congratulate your great Empire on its spirit of daring and skill which is evident in this epoch-making flight."

The Governor-General of Canada received the following message from King George by the R 34:—

"I take this opportunity of sending by the first British airship to cross the Atlantic a message of good wishes to the people of Canada from the Old Country."

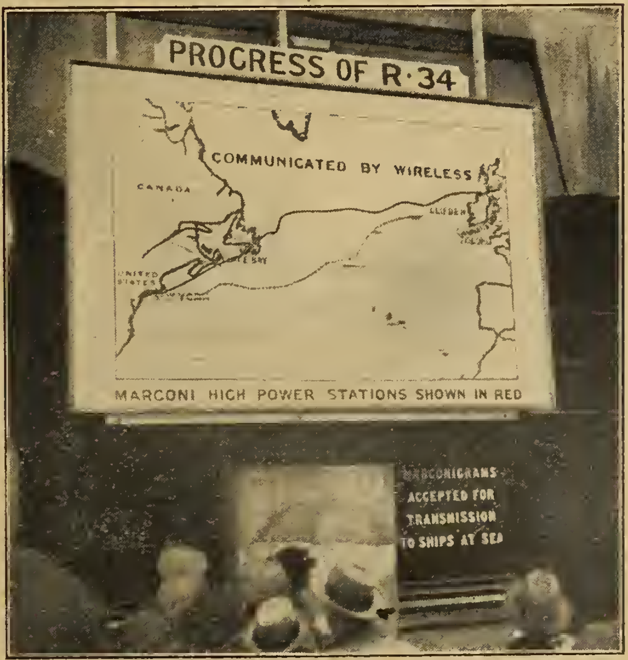
The following telegrams have been received by the Under-Secretary of State for Air, Gen. the Rt. Hon. J. B. Seely, in reply to messages sent by him on the R 34, which were dropped by Gen. Maitland when passing over Canadian territory and over Newfoundland. The Canadian Premier, Sir Robert Borden, telegraphs:—"Best thanks for your greetings. Warmest congratulations on splendid success of R 34. I earnestly join you in your aspiration that this successful endeavour may tend to bring closer together all the great English-speaking nations."

The Premier of Newfoundland replies:—"Thanks for your message dropped by dirigible last Friday. It was blown away from parachute and only recovered yestereve. On behalf of colleagues and country please accept warmest congratulations from Newfoundland on success of dirigible flight which forms yet another aviation triumph for the Briton."

Among the 40 lb. of mail brought back were the two gold medals awarded by the Aero Club of America to Capt. Sir John Alcock and Lieut. Sir W. Brown.

Sergts. Turner and Anders replaced the wireless operator Edwards and the stowaway Ballantyne in the crew of the R 34 on the return flight.

Gen. Maitland, Maj. Scott, and Lieut. Shotter arrived in London on Monday morning, and were met at Liverpool Street Station by representatives of the Air Ministry. Mrs. Winston Churchill was there with Lady Drogheda, and the War Minister was represented by Col. Scott. Gen. Swinton represented Gen. Sykes (Controller-General of Civil Aviation), Col. Chamier represented Gen. Trenchard (Chief of Air Staff), and amongst others on the platform were Gen. Masterman (chief representative of the Airship Service), Comdr. Perrin (secretary of the Royal Aero Club), Comdr. Ramsey (of the United States Navy), and a number of R.A.F. officers who were connected with the arrangements for the flight. The three officers were entertained at luncheon in the House of Commons by Gen. Seely, Gen. Trenchard, and Gen. Sykes.


PROGRESS OF R·34
COMMUNICATED BY WIRELESS
CANADA
UNITED STATES
CLIFDEN
MARCONI HIGH POWER STATIONS SHOWN IN RED
MARCONIGRAMS ACCEPTED FOR TRANSMISSION TO SHIPS AT SEA

R 34'S RETURN FROM AMERICA: The Progress Board erected at Marconi House in the Strand giving the position of the British airship regularly, from the wireless messages as received.

Included in the cargo landed by the R 34 on Sunday morning was a film showing the airship's arrival in America and scenes at Mineola up to the time of her departure. The pictures were taken by Messrs. Pathe's operator, and were brought home in the airship by permission of the Air Council, enabling events which took place over 3,000 miles away to be depicted on the screen in England within four days.

Some remarkable wireless signals were exchanged during the voyage of the R 34. The Royal Air Force station at Dundee exchanged signals at 1,000 miles. The R 34 sent messages at 1,100 miles that were read by the Air Ministry and by Wormwood Scrubbs at 1,135 miles, and by Ballybunion at 1,600. In one case, when the R 34 was approaching America, a signal was sent to her from the Air Ministry through Clifden, and a reply received *via* St. John's, Glace Bay, Clifden, and Marconi House, and then to the Air Ministry, all in 20 minutes.

Dunbar will confer the freedom of the burgh on Maj. Scott, commander of the R 34.

The R 34 brought over a batch of United States papers, among them being parcels of the *Philadelphia Public Ledger* and the *New York Times*. The London correspondent of the latter states that a copy of the *New York Times* of July 9 was received by the King at Buckingham Palace on Sunday soon after 1 p.m., while a copy of the *Public Ledger* was delivered at the Palace at 2.30 p.m.

The damage to the envelope of the R.34 is just in front of the forward gondola, and was caused in an accident to the mooring eyes that are fixed there. It was satisfactorily repaired for the voyage, but no doubt the damage will now be permanently repaired.

The Air Ministry have allowed visitors to inspect the airship each day between 2 and 8 p.m., and large numbers of people have taken advantage of this opportunity.

Leading Aircraftsman George Graham received an offer in America of $1,000 (£200) for "Wopsie," his tabby kitten, which sailed on "R.34." Graham, however, refused to part with it.

The "establishment" of the R.34 included two carrier pigeons, but one escaped in America.

EMAILLITE DOPING SCHEMES FOR RIGID AIRSHIPS

Except those who have to do with the construction and maintenance of such great airships as the R 34, there are few people who realise the important part played by the doping of the envelope, yet it is a subject which has involved a very large amount of careful study and research on the part of those who have been called upon to supply the necessary materials. For many years the British Emaillite Co., Ltd., have specialised in the production of high-grade compositions for the protection of all aircraft coverings, and as a result of the lengthy experiments and tests carried out by their comprehensive technical staff, under the control of Dr. J. N. Goldsmith. Ph.D., M.Sc., F.I.C., it may be recalled that they originated a system of complete doping combinations for various purposes, and these proved so successful in practice that in 1916 the A.I.D. called upon the trade generally to provide complete doping schemes. This had the effect of materially assisting the technical control of all doping operations carried out at the aircraft factories, and the A.I.D. inspection of the same.

In view of this success, therefore, it is hardly to be wondered at that when, some three years ago, the question of proofing compositions for doping the outer covers of airships became urgent, the Admiralty and the A.I.D. should have sought the aid of the British Emaillite Co. Dr. Goldsmith, Mr. H. Bayley, the general manager of the British Emaillite Co., and the company's technical staff, at once concentrated upon the many problems involved, which were far more numerous than a superficial survey would indicate. It may be pointed out, for instance, that they were restricted to a total proofing weight of two grams per square metre, and that this protective covering had to withstand long exposure to the weather on the entire surface of the outer cover of vessels of such large superficial areas as the R 33 and R 34.

It is necessary to bear in mind, too, that the properties required for a doping combination for use on a rigid airship are utterly different from those generally understood in relation to the dope and dope coverings for the fabric surfaces of aeroplanes. Also the outer cover surfaces, while in position on the airship are required to remain in as uniform a tension as possible, yet the proofing has to be extremely pliable in order to withstand the handling which the outer cover has to suffer in its preparation and fixing in position.

Nevertheless, this pliable proofing must be weather-proof and particularly, non-moisture absorbant. The tremendous surface exposed to the saturated atmosphere whilst in flight would, with an unsatisfactory proofing, entail the absorption of a great deal of moisture which by virtue of its weight would materially interfere with the speed of flying and lift of the ship.

The first Emaillite airship doping scheme was adopted by the Admiralty in November, 1916, but since then the subject has continued to receive extensive study, with the result that from time to time material improvements have been effected.

The scheme used on the R 33 and R 34 is that known as Airship Doping Scheme P, which, we understand, in its general properties is greatly superior to the best of the proofings employed on German airships. The fact that the R 34 was able to cross the Atlantic successfully in both directions under adverse atmospheric conditions very expressively indicates the extent to which the doping combination carried under Scheme P is resistent to atmospheric moisture. Even this scheme, however, has been considerably improved upon during the last few months, with the result that the new ships under construction schemes known as R and RA are being used.

Even now, however, the British Emaillite Co. are not resting on their laurels. They realise that there is no finality in the matter of proofing surfaces for such a purpose, and they are confident that the continuation of their work in this regard now going on and which will proceed in the future, will lead to yet a higher degree of efficiency, and to a relative extent, contribute towards the general commercial development of lighter-than-aircraft.

It is pleasing to be able to record that since the commencement of their investigations in 1916, the British Emaillite Co., Ltd., have received at the hands of the Admiralty officials responsible for airship production every kindly sympathy and encouragement, and the success of their labours has been greatly assisted by the valuable criticisms of the technical officials concerned with the question of the outer cover proofing.

Trial Trip of "R.32"

The rigid airship "R.32," which has been built by Messrs. Short Bros. at Bedford, was taken out for a trial trip on July 7. The principal dimensions of this vessel are as follows: Length, 615 ft.; maximum diameter, 65 ft. 6 ins.; total capacity. 1,550,000 cub. ft.; total lift, 47 tons; disposable lift, 16·5 tons; ratio, disposable lift, plus 100 total lift, 35; total b.h.p., 1,500; endurance at two-thirds full power in sea miles, 2,200.

Disaster to the N.S. 11

It is with great regret that we have to record that the British non-rigid airship N.S. 11, which cruised over London a week or so ago, met with disaster in the early hours of Tuesday morning, while cruising off Morston, near Blakeney. She had left Pulham about midnight on Monday on mine-sweeping patrol duty. Her crew consisted of two officers and five men. The cause of the disaster will probably never be known, but apparently about 1.15 a.m. during a thunderstorm, accompanied by lightning, the vessel caught fire, and the wreck fell to the sea. Some portions of the wreckage were salved by the Sheringham lifeboat. Last February the N.S. 11 made a record cruise of 101 hours.

Eighteen on a H.P. 1,500 ft. Up

Testing one of a considerable number of machines which Messrs. Handley Page, Ltd., are supplying to the Chinese Government, the pilot, Capt. G. T. R. Hill, M.C., took the machine, which was of the standard two-engined type, to a height of 1,500 ft. The machine carried 18 persons, including the pilot, and the total weight in the air was 12,800 lbs. During the trip the machine flew with only one engine in use.

AIRISMS FROM THE FOUR WINDS

What will the new "Centre" or "Coalition" Party do for the Nation? What a great chance for it upon really *firm* lines!

– – –

Another aeronautical £10,000 prize giver is to the fore in the *Daily Express*.

– – –

How about the Royal Aero Club and the regulations? We do not notice that they have yet been approved.

– – –

In France, profiteers of the people's necessaries are to be deprived of all civil and political rights. That's the stuff to give 'em!

– – –

Mr. Smillie at the Miners' Federation Conference on Tuesday was very insistent that "The Miners' Federation is always sane. It may from time to time do things which may seem to the outsider insane, but we know we are not insane, and we are not likely to do anything to injure our own reputation." Does Mr. Smillie then recognise that they cannot achieve the impossible.

– – –

Goods by Zeppelin between New York and Hamburg at £18 4*s*. a ton is not a bad head-line to attract. But will the hopes of Mr. Hans Kahrs of the Monopol Export and Import Unions in America to start this regular service in October be realised? A wealthy American banker (probably with some ultra-Scotch name) is supposed to be behind the venture. Wonder, anyway, what the United States Government will have to say to such a project.

– – –

In the Paris Victory March on Monday last, Lieut. Fonck, supported by Nungesser, Heurteaux, Maddon and other French "aces," was entrusted with the carrying of the colours of the French Air Service.

– – –

The Royal Air Force contingent in London's Saturday Peace March will be led by Maj.-Gen. Sir J. M. Salmond, Brig.-Gen. C. L. Lambe and Brig.-Gen. C. A. H. Longcroft. The contingent will number 50 officers and 605 men, followed by four officers and 120 representatives of the W.R.A.F. R 34, up above, is to be a feature of the Peace celebrations on Saturday.

– – –

That another milestone in aeronautics has been passed—and at top speed—by the out and return American journey of R 34 is an undeniable fact. Incidentally several other airship "records" have thereby been accomplished. American newspapers of July 9, airship borne, were obtainable in London on July 13. Another hustle was the bringing of the film recording the landing and other incidents of R 34's arrival and stay in America.

– – –

This film, weighing about 3 lbs., formed, by permission of the Air Authorities, part of the freight of R 34 on its return journey. The package reached the London offices of the Pathé Animated Gazette in Wardour Street on Sunday evening. On Monday the staff were busily engaged in preparing the copies of the film, and by the evening it was possible to distribute them to the picture theatres in the West-End area. By Tuesday the film had been circulated to all parts of the country, and the picture exhibited in some 250 cinemas. Before the active life of the film comes to an end three months hence, it will probably have been shown in 80 per cent. of the picture theatres of the country, so that millions of people will have a chance of seeing the first film brought to this country from the United States by air. Of course, it has never been possible before to exhibit a film in this country within five days of its departure from America.

Altogether 300 ft. of negative and another 300 ft. of positive film were sent over in the R 34. Before the positive could be made full use of a negative had to be obtained from it in order that further copies could be printed.

– – –

A very vivid idea can be obtained from this remarkable film of the immense size of the rigid airship, and it gives food for thought, that in the not far-distant future, the size of these great ships of the air is likely to be quite five times as great.

"Flight" Copyright.

BRIGHTON FROM ABOVE: The promenade and pier, snap taken from a five-seater passenger Avro plane

Special attention is paid in the R 34 film to the landing operations, from the time that Maj. Pritchard descended by a parachute to the moment when the giant ship was safely moored. Those who may be inclined to think that the landing presents little difficulty will doubtless change their opinion when they have seen the extraordinary skill required to accomplish the operation. There are pictures of the crew of the airship, including, of course, the stowaway cat, which receives its full share of pictorial publicity; of the American soldiers who looked after the vessel during its stay in the United States, and of the damage done to the fabric when the mooring eyes were torn away by a gale. It is a remarkably interesting film, particularly when one remembers the circumstances under which it reached this country.

- - -

A PROPHECY: At *The Times* Book Club in Oxford Street, on Monday last, the following prediction was prominently displayed:—

"I look forward with certainty to the time when London morning newspapers will be selling in America in the evening, and *vice versa* in regard to American evening journals reaching London next day.—LORD NORTHCLIFFE, June 15, 1919."

- - -

AND in view of the above facts, it may well be that time will once more prove Lord Northcliffe not mistaken. Moreover, he deserves to be right for the really consistent way in which he has never wavered in his belief in the far-reaching possibilities of aeronautics. In addition he has backed his opinion with cash, and much of it. If in return he and his papers have obtained bold publicity, why again he deserves it, and in this respect more power to his remarkable combinations.

- - -

AGAIN, could anything be more calculated to insist upon the recognition of the air-way as a factor in the world's daily life than the enterprise which enabled the *Daily Mail* to reproduce on Tuesday morning photographs, and a wonderful series at that, of the Paris Victory March and scenes? Enterprise and imagination of this calibre merit recognition, and here Lord Northcliffe again scores by publicity for his great undertakings.

THE *modus operandi* was the employment for the photographic staff of our contemporary of two Caudron planes, piloted by M. Etienne Poulet and M. Dessous. M. Dessous had to land at Calais owing to rain squalls, but M. Poulet, leaving Paris at 3 p.m., arrived at Acton aerodrome with photographs and despatches at 9 p.m., bad flying weather being experienced all the way.

- - -

A FILM of the Paris march, taken at 3 p.m. on the Monday, was also brought over by aeroplane, delivered to the Topical Film Co., at 8 p.m., was then developed and was showing on the screen at the West-End Cinema, Coventry Street, at 10.20 p.m. In this the troops were seen passing under the Arc de Triomphe.

- - -

EVEN Iceland is to feel at this early stage of development, the benefit of aviation. A company has been formed with the object of establishing regular aeroplane traffic with the northern island, the main base being at Reykjavik.

- - -

AMONGST notabilities who, on Sunday last, selected the Way of the Air for reaching Paris from London, were His Highness the Maharajah of Kashmir and Jammu, with Capt. Zulcaga, Assistant Military Attaché of the Argentine Legation.

- - -

AWAY up in the Midlands, the plane has also again helped to overcome a difficulty. In order to conduct a special service on Thanksgiving Day, the Vicar of Blackpool, in an Avro, flew from Blackburn thus literally descending from the skies, to his congregation.

- - -

"SEA-PIE," that really humorous publication, is to have a Summer Number, Wednesday of this week, July 16, being the date named for its appearance. It is in aid of King George's Fund for Sailors and should be welcomed for that cause alone, irrespective of its deserving merits.

- - -

Before or After? Mrs.—— —— goes for an aeroplane trip, which included looping the loop, at Eastbourne. This well-known War worker has been seriously ill. (*Daily Sketch.*)

"Flight" Copyright.

BRIGHTON FROM ABOVE: The West Pier, as seen from a five-seater Avro passenger machine, flying low at 80 m.p.h.

SOME DEVELOPMENTS IN AIRCRAFT DESIGN AND APPLICATION DURING THE WAR*

By the Right Hon. LORD WEIR OF EASTWOOD, P.C., Honorary Fellow

Any attempt to review the progress or development of aviation during the War, and to confine such a review to the permissible limits of a paper, involves a mere indication of some of the more salient features of the development. Moreover, it is difficult to confine any such review entirely to the scientific or engineering aspect of the problem, on account of the peculiarly close association of the technique of construction with the technique of use. The war developemnt of a technical product, such as an aeroplane, necessarily comprises the rapid embodiment of field experience in the design and production of matériel, and this compelling influence during the War largely governed the policy of design, supply and production.

In August, 1914, the British Air Services consisted of a Naval wing and a Military wing, the first controlled by the Admiralty, and the second by the War Office. The Naval wing, or Royal Naval Air Service as it was termed, possessed a total of 93 machines, the Military wing, or Royal Flying Corps, possessed a total of 179 machines. In October, 1918, just prior to the Armistice, the Royal Air Force possessed over 22,000 effective machines.

For the first two years of the War, the supply organisations for aircraft were Departments of the War Offic and Admiralty, and no distinct technical departments existed. In January, 1917, the second Air Board, under the chairmanship of Viscount Cowdray succeeded the original Air Board under Viscount Curzon, and was constituted with additional duties and responsibilities. The Board became responsible for the allocation of aeronautical supplies between the two Flying Services, and for the supervision of design of all aeronautical material, this latter responsibility being vested in the technical department of the Air Board under Brig.-Gen. Pitcher. Concurrently with this, the entire responsibility for supply and production of all aircraft matériel was handed over by the War Office and Admiralty to the Ministry of Munitions. Towards the end of 1917, a movement in favour of concentrating the entire administration of everything relating to War aviation in a single Government department crystallised in the constitution of the Air Ministry under a Secretary of State for Air, the Naval and Military Air Services being amalgamated to form the Royal Air Force in April, 1918.

The establishment of the Royal Air Force as an independent fighting force of the Crown has been thoroughly well justified, and the progress with regard to civil aviation in this country since the Armistice is largely due to the existence of a single Air Authority. Concurrently with the institution of the Air Ministry, the necessity of placing design and supply under a single authority was recognised by the constitution, within the Ministry of Munitions, of the Aircraft Production Department, which assumed full responsibility for all questions of design, supply and production.

An appreciation of the progress made in the domain of supply and production can be obtained from the fact that the average monthly delivery of aeroplanes either from British or foreign sources to our flying service during the first twelve months of the War was 50 per month, while, during the last twelve months of the War, the average deliveries were 2,700 per month. The capacity of the facilities in this country for the production of aeroplanes at the date of the Armistice was approximately 3,500 complete machines per month. To those associated with marine engineering it may be of interest to state that the total horse-power of aero engines produced in the last twelve months of the War, approximated to 8,000,000 of brake horse-power, a figure quite comparable with the total horse-power of the marine engine output of the country.

It may be of interest to recite some of the difficulties encountered in this work, although perhaps the more important of these difficulties were inseparable from the industrial position of the country at the period when the effort towards expansion was made :—

1. The lack of highly skilled labour, in particular that required for engine production, due to the almost complete absorption of such labour by other and earlier War enterprises.
2. The very high standard of material and workmanship involved so that safety might be ensured on the low permissible weight of the product.
3. The necessity of creating and building up entirely new manufacturing facilities and organisations.
4. The grave influence on production of modifications in design shown necessary by field experience, and the necessity for the rapid embodiment of these in the product.
5. The inability to take the fullest advantages of standardisation, owing to the necessity of making continuous progress in design and performances of machines.
6. The extreme complexity and variety of the elements contributing to the provision and equipment of War aeroplanes.

For example, the provision of satisfactory timber was a continual difficulty—at times an actual menace to the whole development. The textile problem became very grave when the supplies of Russian flax were cut off, and we were compelled to develop additional sources in Ireland and in the Colonies. Acute difficulties were experienced in connection with the development of the chemicals required for dope manufacture. At other times, the supply of machine guns gave much anxiety, while the development of the synchronising gear for these guns necessitated very urgent treatment.

The production of ball bearings involved the provision of new facilities on a colossal scale. The magneto supply involved the building up of an entirely new industry, while the manufacture of the numerous classes of instruments, cameras, radiators and other fittings in each case formed a problem by itself.

The solution of these problems from a production point of view constitutes an outstanding example of the enterprise courage and ingenuity of British industry. Many mistakes were made, but most of the difficulties were solved and many valuable lessons have been learned. It is a matter of great regret that so many of these enterprises, built up for specific War requirements, cannot be maintained under peace conditions. The development of civil aviation will not, for many years, absorb even a fraction of the War facilities, and a large amount of waste cannot be avoided in the reduction of these industries to a peace-time basis.

The constitution in 1917 of the first Technical Department dealing with aircraft design represented one of the most valuable steps in advance of previous organisation, and the work of this department very largely contributed to the position of technical supremacy held by this country at the close of the War. One of the factors contributing to this success was undoubtedly the adoption of a policy of giving ample freedom of opportunity to private designers, because in the development of a new art, such as aircraft design, any adherence to a single school of thought is dangerous, and the basis of design and experiment should be broadened as much as possible.

In the earlier days of the development the official Government designs of the Royal Aircraft Factory at Farnborough predominated, but the change in policy should not be taken to represent a reflection on the many valuable designs produced at Farnborough. These designs exercised a great influence on all future designs, while the meticulous care in the details, which was the feature of Farnborough practice, has been wholly useful and valuable in its general influence. To the British aircraft designers as a whole, and in particular to the pioneer designers and manufacturers, the greatest credit is due for their courage, skill and ingenuity.

Such is the briefest possible review of the political and administrative conditions under which the developments in War aviation have been carried out. In dealing with the salient features of progress and design two aspects have been separately treated—the aerodynamic aspect and the applicational aspect. As regards seaplanes it is not proposed to deal with their detail development, as this followed generally on the same lines as the aeroplanes with the special adaptations to meet marine conditions.

Part I.—*Aerodynamical Aspect*

Loading.—The outstanding feature desired in War aeroplane performance was expressed generally as the maximum of speed and climb, and it was soon perceived that this feature could be best achieved by a reduction of the weight carried per horse-power. The advance in other aerodynamic features such as wing section, reduction of air resistance, etc., was considerable, but could not be compared in importance with the reduction of weight per horse-power.

At the beginning of the war, loadings were about 23 lbs.

---

* Paper read at the Victory Meeting of the North-East Coast Institution of Engineers and Shipbuilders at Newcastle-on-Tyne on July 10, 1919.

per horse power and 4 lbs. per sq. ft. of lifting surface; at the close of the War, nearly 7 lbs. per horse power, and 10 lbs. per sq. ft. This is a remarkable result when it is considered that 7 lbs. per horse power represents the power loading of the total weight of the aeroplane, comprising the engine, its petrol and oil, the aeroplane itself, the pilot and all his fighting equipment. The rate of progress achieved in this development entailed a correspondingly large demand on the skill of the pilot, but it was found that the pilot's skill always advanced as rapidly as the demands upon it.

Wing Sections.—Wing sections steadily developed from the early sections with their hollow undersides and tops of almost circular camber, to the high efficiency sections of the present day with flat undersides bulged slightly downwards for the spars, and upper surfaces with a quick nose curvature, flattened top and easy run aft.

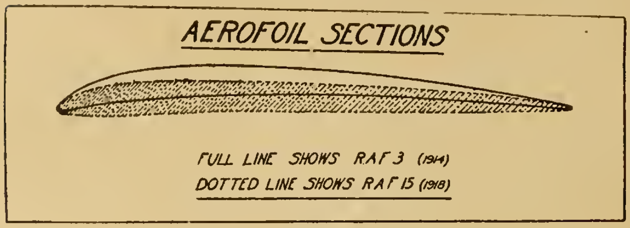


Fig. 1.

The illustration, Fig. 1, shows these differences fairly well. It may be noted as an interesting fact, that the Germans at no time made use of a high efficiency section such as the R.A.F. 15 shown.

Air Resistance.—No revolutionary advances have been made during the War in regard to the reduction of air resistance, but the general trend has been the more rigid application of previous knowledge; the conversion of piano wire or cable to streamline wires for main bracing is perhaps the most noteworthy feature. Until quite recently streamline wires were not adopted by any other country than this, although for fast aeroplanes the gain is considerable—approaching 10 miles an hour on a machine with a speed of 110 m.p.h.

The *fuselages* were made of fairer shape, and pilots and accessories were more carefully enclosed and protected.

Stresses and Factors of Safety.—At the outbreak of hostilities very little was known of the magnitude of the forces which might occur in flight, and certain more or less arbitrary rules were used in determining the strength of the aeroplane. Many possible methods of failure were never considered, and in some cases it was only through the light shed by certain accidents that progress was made. Certain definite forms of failure which are now always considered and guarded against were only discovered after long and careful examination and analysis of accidents.

When an aeroplane is flying level at a constant speed, the air loads acting vertically on the lifting surfaces (wings and tail) must of course be equal to the total weight of the aeroplane. Other conditions must be simultaneously fulfilled, but this is the primary one.

This air load on the wings is known as the normal or unit flight load and is the basis of all strength calculations. It will be clear that in order to accelerate the aeroplane, extra forces must be applied to it, and so in many manœuvres through which the aeroplane is put, extra loads are thrown upon the structure.

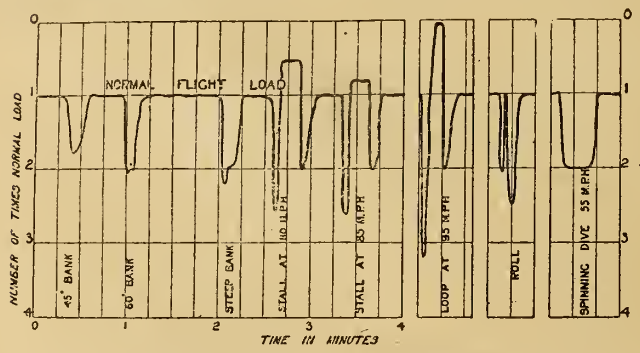


Fig. 2.—Accelerometer tests. Flight loads, B.E. 2c.

These forces are measured in terms of the unit flight load, and their magnitudes are determined either by calculation or by experiment. Both methods are used, and the advance in knowledge on this question, during the War, has been one of the principal causes of the elimination of practically all accidents which may be genuinely attributed to structural failure, and the great reduction in the percentage weight of aeroplane structures. The experimental method of determining the values of these loads consisted in carrying an accelerometer on an aeroplane. This instrument was self-recording and registered the amount of the accelerations given to the craft during various manœuvres. Developed by Professor Lindemann and Dr. Searle at the R.A.E., its value has been considerable. The illustrations (Figs. 2 and 3) were obtained from one of their autographic records, and these and the attached table will give some idea of the values of the loads which occur during aerial manœuvres. It must be understood that these loads are not the maxima which could occur, but only the maxima registered during the experiments.

Table of Loads

Ordinary bumpy weather ..	1½ to ½ normal load.
Spiral dive at 70 m.p.h. ..	2·8 times normal load.
In a mock fight between S.E. 5 A. and R.E. 8.	3 times normal load was common; at times this increased to nearly 4.

Until all the loads which can possibly occur on an aeroplane are known it is impossible to design an absolutely scientific structure, but considerable progress has been made during the War in this direction, and it is at least possible now to design a structure that will not break in the air except under certain conditions against which the pilot can be warned.

In all other branches of engineering the prevention of failure is obtained by the introduction of a factor of safety, so that the highest possible loading which can occur in the structure stresses the material to only a fraction of its ultimate stress.

With an aeroplane this method is impossible on account of weight limitations, and in consequence a method is adopted of specifying load factors instead of factors of safety.

This method consists of determining—largely as a result of previous experience—what extra loads any particular type of aeroplane is likely to meet under the conditions of flight for which it is intended, and the structure is designed with just sufficient strength to carry these loads, that is to say, when these loads occur the material is stressed either up to its elastic or its ultimate stress. In the usual engineering sense, therefore, the factor of safety under this condition of flight is only one, while the load factor may be from four to seven, *i.e.*, the loads which cause failure are from four to seven times normal flight loads as specified previously.

In aeroplanes of the scout class it has been customary to ask for a load factor of seven, but this only corresponds to a factor of safety of about 0.6. That is to say, the aeroplane by certain manœuvres could be broken in the air. This fact is well known to all pilots and such a breakage now seldom occurs. It will be seen from the above table that in ordinary bumpy weather the loads were only increased about 1½ times normal.

Since all other increased loads arise from "stunts," it would appear that commercial aeroplanes will seldom have to contend with the heavy loads met with in War flying, and it may be possible on this account to cut down load factors especially on heavier types. The illustration shows the difference between the loads in a loop and loads due to gusty weather upon the same aeroplane.

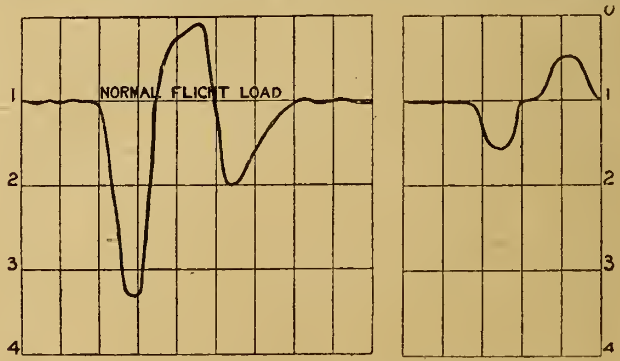


Fig. 3.—Accelerometer tests. Loads on B.E. 2c.

ENGINE. 250 Rolls-Royce Mk III
Type Water cooled V 60°
Normal B H P 270 RPM 1600
Max 286 RPM 1850
Nº Fitted One
Airscrew R P M ÷ Engine R P M ·64
Fuel per Normal B H P Hour 5706 lbs
Oil 0254 lbs
Fuel per Max B H P Hour -
Oil - - - -

AEROPLANE: De Havilland 4.
Type Two Seater Tractor
Nº of Wings Biplane
Top Wing Span 42' 6" Chord
Bottom - - 42' 6" -
~~Middle~~ - - - -
Overall Length 30' 8" Height 10' 5"
Gap. Top to Bottom Top to Mid
Gap ÷ Chord Dihedral
Dist. Bet. Lead. Edges of Lower Wing & T P

		Areas ϕ		Weights Lbs.	Wt/Sq Ft.	% Weight
STRUCTURE	WINGS	224	Top Plane	199	·9	
		212	Botton Plane	186	9	
			~~Middle Plane~~	-		
			Aileron Pulleys	5		
			Struts (Nº =)	52		
			External Bracing Wires	24		
		436	Total Wings.	466	1·1	14·1
	TAIL	38	Tail Planes	17	5	
		24	Elevators	17	·7	
		4·25	Fins	4	1·0	
		13	Rudders	11	9	
		79	Total Tail.	49	·6	1·4
	BODY		Fuselage	* 425		
			Chassis	100		
			Tail Skid	8		
			Controls (included in Fuselage)	-		
			Total Body.	533	1 2	16 1
		Total Weight of Structure Unit.		1048	2·4	31·6
POWER	PLANT		Engine Dry	880	Wt/HP 3·3	
			Propeller	70	2·6	
		Galls 8	Radiator & Piping & Water	* 160	·6	
			Engine Accessories	* 10		
			Power Unit, excluding fuel oil tanks	1120	4·2	33·8
	SUPPLIES	Galls 59	Fuel Tanks & Piping	* 66		
		" 4½	Oil Tanks & Piping	* 14		
		Hours	Fuel	425	1·61	
		"	Oil	40	·15	
		Total Weight of Power Unit.		1665	6·2	50·3
LOAD	HUMAN		Crew	360		
			Instruments	28		
	RECONNAISSANCE		Camera	27		
			W T.	-		
			Sundries	-		
	ARMAMENT		Guns & Ammunition	185		
			Bombs & Gear	-		
			Armour	-		
		Total Weight of Load Unit.		600	2·2	18·1
AIR BOARD T.S.D. DATA & ANALYSIS		Total Weight of Machine.		3313	7·6 per ϕ 12·3 HP	100·0

* approximate

Fig. 4.—Analysis of weight. De Havilland 4.

ENGINE: 130 Clerget
Type Air-cooled Rotary
Normal B.H.P. 127 75 R.P.M 1250
Max - RPM
Nº Fitted One
Airscrew R P M ÷ Engine R P M 1
Fuel per Normal B.H.P. Hour 5715 lbs
Oil - - - - 1563 lbs.
Fuel per Max B.H.P Hour
Oil - - - -

AEROPLANE. Sopwith Camel, F⅓
Type Single Seater Fighter
Nº of Wings Biplane
Top Wing Span 28' Chord
Bottom - 28' -
Middle - - - -
Overall Length 18' 8" Height 8' 6"
Gap. Top to Bottom Top to Mid
Gap ÷ Chord Dihedral
Dist bet Lead. Edges of Lower Wing & T.P. -

		Areas ϕ		Weights Lbs.	Wt/Sq Ft.	% Weight
STRUCTURE	WINGS	121	Top Plane	104	·9	
		110	Bottom Plane	90	8	
			Middle Plane	-		
			Struts (Nº = 8)	15		
			External Bracing Wires	20		
		231	Total Wings.	229	1·0	15 75
	TAIL	14	Tail Planes	13	9	
		10·5	Elevators	8	8	
		3	Fins	2	8	
		4·9	Rudders	3 6	7	
		32·4	Total Tail,	27	8	1·85
	BODY		Fuselage	108		7 4
			Chassis	70		4 8
			Tail Skid	3		
			Controls	14		·9
			Total Body.	195	·845	13 4
		Total Weight of Structure Unit.		451	1 95	31 0
POWER	PLANT		Engine Dry	375	Wt/HP 2 9	
			Propeller	30	2	
		Galls	Radiator & Piping & Water	-		
			Engine Accessories	27	2	
			Power Unit, excluding fuel oil, tanks	432	3 4	29 7
	SUPPLIES	Galls. 26	Fuel Tanks	24	·92 p gal	
		" 6	Oil Tanks & Piping (Pipes for Fuel & Oil 6½)	13	2·16 p gal	
		Hours 2½	Fuel	180	1·4	
		"	Oil	63	5	
		Total Weight of Power Unit.		712	5·6	49 0
LOAD	HUMAN		Crew	180		13·6
			Instruments	10		
	RECONNAISSANCE		Camera			
			W.T.	-		
			Sundries			
	ARMAMENT		Guns & Ammunition	101		7
			Bombs & Gear	-		
			Armour			
		Total Weight of Load Unit.		291	2 3	20 0
AIR BOARD T.S.D. DATA & ANALYSIS		Total Weight of Machine.		1454	6 3 per ϕ 11 4 HP	100 0

Fig. 5.—Analysis of weight. Sopwith Camel.

ENGINE. Rolls-Royce
Type Eagle B
Normal B H P 359 RPM 1800
Max. - 368 RPM 1900
Nº Fitted Two
Airscrew R P M ÷ Engine R P M 6
Fuel per Normal B H P Hour 50 lbs
Oil - - 025 lbs
Fuel per Max B H P Hour
Oil -

AEROPLANE. Handley Page
Type O 400 Twin Tractor
Nº of Wings Biplane
Top Wing Span 100 0 Chord 10 0
Bottom 70 0 10 0
Overall Length 62 10¼" Height 22 0
Gap. Top to Bottom 11 0
Gap ÷ Chord 1 1 Dihedral 4°
Dist. bet Lead. Edge of Lower Wing & Elev Hinge - 46

		Areas ϕ		Weights Lbs.	Wt/Sq Ft.	% Weight
STRUCTURE	WINGS	1023	Top Plane	944	9	7 2
		626	Bottom Plane	578	9	4 4
			Footplates Hinges &c	159		1 2
			Struts (Nº = 14)	226		1 7
			External Bracing Wires	258		1 9
		1649	Total Wings.	2165	1 3	16 4
	TAIL	123 5	2 Tail Planes	72	6	6
		65 3	2 Elevators	44	7	3
		14 7	1 Fin	7 5	5	3
		45 7	2 Rudders	35 5	8	
			6 Tail Plane Struts & Bracing Wires	39		3
			Total Tail.	198		1 5
	BODY		Fuselage	1425		10 8
			Chassis	724		5 5
			Tail Skid	36		6
			Controls	52		
			Total Body.	2237		16 9
		Total Weight of Structure Unit		4600		34 8
POWER	PLANT		2 Engines Dry with starting mags and exhaust manifolds	1945	Wt/HP 2 7	14·8
			2 Propellers	121	2	9
		Galls 20	2 Radiators & Piping & Water	506	7	3 8
			Engine Accessories incl. bearers and cowling	375	5	2 8
			Power Unit, excluding fuel oil. tanks	2947	4 1	22 3
	SUPPLIES	Galls 298	Fuel Tanks & Piping & Pumps	261	5	2 5
		" 30	Oil Tanks & Piping	67		
		Hours 6 at G L	Fuel	2150	3 0	16 3
		8 at G L	Oil	290	4	2 2
		Total Weight of Power Unit.		5715	8 0	43 3
LOAD	HUMAN		Crew	540		4 1
			Instruments	35		2
	RECONNAISSANCE		Camera			
			W T	-		
			Sundries	155		1 2
	ARMAMENT		Guns & Ammunition 4 Lewis 66, Amm 108 M Guns 61	235		17 6 { 1 8
			Bombs & Gear 16 112 lb Bombs 1800 Gear 120	1920		14 6
			Armour			
		Total Weight of Load Unit		2885		21 9
TECH DEP A P		Total Weight of Machine.		13200	8 0 per ϕ 18 4 HP	100 0

Fig. 6.—Analysis of weight. Handley Page 0/400.

Analyses of Weights.—As in all forms of science, progress is very largely dependent on the ability to measure accurately the various items and factors. No genius can make up for the neglect of this essential. Once all the factors, whether they be weights, sizes or performances, are accurately measured, it is not so difficult to decide in which direction to proceed. A large amount of attention was given to the careful analysis of the weights of all available aeroplanes, good or bad, and tables were prepared of which samples are given in Figs. 4, 5 and 6.

By a study and comparison of these results in conjunction with the strength of the various aeroplanes, much knowledge of the possibilities of construction was obtained. The interesting fact was arrived at—that for a range of well-designed practical war types, the structural percentage remains roughly constant for aeroplanes of total weight varying from 1,000 to 30,000 lbs.

From a theoretical point of view, this is somewhat surprising, because, as is well known to engineers, the law of dimensions lays down that area increases as the square and weight as the cube of the dimensions, and that this will therefore put a limit on size. In fact, a very eminent aerodynamic theorist, working on these lines several years ago, put the limit of the weight of an aeroplane at about 10,000 lbs. There is very little doubt now that aeroplanes of 100,000 lbs. are a practical proposition.

Some of the reasons for this apparent theoretical discrepancy may be of interest. One is, that the larger the aeroplane, the more sober is the method of progression. No one wants to loop or do vertical banks on a big passenger aeroplane, and therefore it is not necessary to maintain as high a strength factor on the big type as on the small. As far as actual flying stresses are concerned, it would be possible for an aeroplane with a load factor of only 1½ to be flown without collapse even on a windy day. This statement is only used for illustration, and must not be taken to suggest that a load factor of 1½ would produce a practical aeroplane; it would probably be too weak to stand landing. Another reason for the discrepancy is, that the bigger the aeroplane the more detailed can be the design work, and it becomes possible to use material in a more efficient way.

It is not considered probable that aeroplanes made of wood will increase to a size representing a weight of much more than 40,000 lbs., but by the use of high grade steel and duralumin, it will certainly be possible to go far beyond this limit.

Influence of Tunnel Experiments.—At one time the small scale work carried out in the wind tunnel was regarded as of little practical value; now, judging by the results, I do not think that it would be too much to say that the work which was put into tunnel research, when this work at the National Physical Laboratory was under the direction of Mr. Leonard Bairstow, before as well as during the War, was the real basis of the technical success which we undoubtedly attained, particularly in the aerodynamic field. The data from such work is more useful to the designer from a comparative aspect than for the absolute values obtained, but without their help it is only too easy to stray off into blind alleys leading nowhere except to disappointment.

Some designers have undoubtedly a wonderful facility in guessing the next step to take, but they are too few and far between for responsible authorities to rely solely upon them. In any case such men always work best if there is a solid background of research knowledge behind them, from which they draw sometimes perhaps unconsciously. In 1914 no private firms had a wind tunnel of their own or went in seriously for research. Now there are four or five first-class installations in constant use by the designers of the manufacturing firms. As instance of more important results there now exists fairly exact knowledge of the best wing sections, strut shapes, propeller blades and body resistances.

Stability and controllability.—There are two means of obtaining stability in an aeroplane: first, by means of an automatic device, such as a gyroscope; and second, by such a disposition of the surfaces of the aeroplane that the machine has inherent stability. Very little success has been obtained from the first method, but the second is now very largely employed.

Questions relating to stability and controllability are intimately connected, but in one sense they are distinct. Thus it is possible to have an unstable aeroplane which is readily controllable and very popular with pilots.

Stability may be considered under three heads:—

Longitudinal stability;
Lateral stability; and
Directional stability.

The first, longitudinal stability, is obtained by means of the tail plane, and the size of this for any particular type determines within limits the degree of stability. The fundamental point, however, is the position of the centre of gravity of the aeroplane relative to the main planes. If this is too far aft no tail plane can be found to give stability. The farther forward the centre of gravity, the smaller is the tail plane required.

The problems of lateral and directional stability are very closely connected, and must be considered together. Lateral stability is obtained by giving the main planes a dihedral angle, and directional stability is obtained by a proper regard to the dimensions and dispositions of the fins and rudders. The area of the fin and rudder required is a function of the dihedral angle.

The outbreak of war found us in a very favourable position with regard to the development of an inherently stable aeroplane. The importance of this feature from a military point of view had been fully realised, and special efforts had been made to produce a stable and at the same time controllable aeroplane. That these efforts were successful was largely due to the late E. T. Busk, of the Royal Aircraft Factory, as it was then called, and the "B.E.2c" aeroplane, which embodied the results of his work, had been fully tested and demonstrated to possess complete adherent stability prior to the outbreak of war. Unfortunately, Mr. Busk was killed in a flying accident shortly after his experiments had been brought to a successful issue. However, his full scale research had been carried so far that the principles underlying the design of this machine could be applied to any other design of aeroplane. Subsequently nearly all machines were designed for inherent stability, except such types as were considered to be more suitable for their specific work if a certain degree of stability were sacrificed for very quick manœuvrability. An impression was prevalent, at any rate during the first two or three years of the War, that a stable aeroplane must necessarily be very heavy on its controls, and since quick manœuvrability was an essential for fighting scouts, the aim of designers, encouraged by fighing pilots, was to obtain the maximum controllability and quickness of handling, irrespective of stability.

It was gradually realised that this was a mistaken view, and that the comparatively poor manœuvrability of some of the earlier stable machines was due, not to the fact of these machines being stable, but to the particular design of the controlling surfaces. A very great amount of research into the conditions governing stability and controllability was carried out both from the theoretical and experimental standpoint, and this revealed enough data to enable aeroplanes to be designed combining inherent stability with good manœuvrability, and as a result the prejudice against stability in small fighting aeroplanes quickly disappeared.

A good example of the advantage of this is afforded by Capt. Ball's wonderful return to our lines on his stable "S.E.5" machine after his controls had been almost completely shot away. The aeroplane practically flew itself back, and with only half of his normal elevator control he was able to make a safe landing on the aerodrome. Such a feat would have been out of the question on an unstable machine.

At the end of the War we were calling for aeroplanes with neutral stability for fighting work, *i.e.*, aeroplanes which followed the pilot's mind and hand in whatever attitude they were put. For bombing and long-distance work stability is a very important asset, as it relieves the pilot of fatigue, and facilitates the maintenance of his course and his sighting for bomb dropping. The disadvantages of not putting a sufficient amount of study into these features are demonstrated by German practice. Although a few of their small aeroplanes were fairly manœuvrable, their larger ones did not compare favourably with our own when tested under the same conditions, and in the case of their very large bombing aeroplanes we had evidence that the pilot's difficulties on a long flight were very considerable, and it is probably not too much to say that the heavy proportion of German bombers which were crashed on returning from their raids was largely due to lack of stability and controllability.

Monoplane, biplane or triplane.—During the War all these types have been experimented with, and, in fact, have been built on a production scale, and it cannot be definitely stated that one type is more suitable than another without knowing the exact purpose for which the aeroplane is required.

Broadly, the comparative advantages of the three types are as follows:—In comparison with the biplane, the monoplane is 5 per cent. more efficient as a weight carrier per square foot, and can be made to afford a better fighting view. On the other hand, it is weaker for the same weight of structure, and is less manœuvrable for equal total weight. Similarly the triplane, comparing it to the biplane, is 5 per cent. less efficient, but is more manœuvrable, and affords opportunities for a deeper and therefore stronger main girder, which gives it an advantage for the larger sizes. Incidentally it is also more difficult and expensive to produce. The balance between advantage and disadvantage therefore depends upon the particular function required from an aeroplane, and also on the skill of the designer in overcoming the peculiar difficulties of this problem. But the general conclusion is that the monoplane is most suited for the very small aeroplane; the biplane for all general sizes, and probably the triplane for the very large sizes. Experience during the War in general bears this out, although there have been instances which might be taken as contradictory to this statement.

The importance of the successful use the Germans made of their Fokker monoplane should not be exaggerated, as the real reason for this success was the production in large numbers of a good single-seater with a rotary engine copied from the French Gnome, combined with the new synchronised guns, and a fresh method of attack. When we tested the aeroplane ourselves, and compared it with our own under similar conditions, its performance was, in fact, very little superior to the "B.E.2c" against which it was so effective.

Our designers, on the other hand, made a very successful triplane fighter with a similar sort of engine. The main objectives of the designer in this case were handiness and view ahead. Handiness was obtained by very small span, and view by placing the pilot so that his eye was in the line of the centre plane. However, as far as this country was concerned, the general decision was the selection of the biplane as the simplest and soundest type for all ordinary work.

Climb requirements.—The most valuable quality in a war aeroplane and the one most difficult to supply is, no doubt, climb. Practically all other considerations are opposed to fast climb, such as high superficial loading, direct drive engines, high speed and long range. But the demand by pilots for a high rate of climb, both as a protection against anti-aircraft fire and to increase their fighting capacity, was so great that this quality had to be provided. The range of guns, or rather their power of accurate shooting at a height, increased in an astonishing degree during the War. In the early days a height of 3,000 ft. was reasonably safe, and aeroplanes could do their work at that height. Then it was increased to 6,000, 10,000 and 15,000 ft. By the end of the War shooting even at 20,000 ft. was unpleasantly accurate. Whenever a new type of aeroplane appeared which could operate at an increased height, it was immune for a period, and could do its work almost unmolested, and in some cases without being perceived; but this period seldom lasted long, and sometimes even before the new type was appearing in sufficiently large numbers to count seriously it was outranged.

The same state of affairs applied to the height at which fighting took place, which gradually increased from year to year up to 20,000 ft. In order that the pilot could fight in a satisfactory manner he required a good rate of climb as well as the uppermost position. The difficulty of providing climb in an aeroplane during the first two years of the War was enhanced by the constant increase in the number of accessories required to enable the extra military functions to be carried out. These accessories added largely to the weight and also to the air resistance, and it was not until specially designed aeroplanes appeared that the position became satisfactory.

Interaction of engine and aeroplane design.—Progress in aeroplane was very much bound up with the progress in engine design; in fact, it can be broadly stated that during the whole of the War the aeroplane designers were waiting upon the engine designers, and as soon as any new engine was developed to a satisfactory point it was but a short time before aeroplanes were in service, making the maximum use of such an engine, or at any rate a thoroughly effective use.

It is interesting to compare German practice with our own. The Germans realised at an early stage the necessity of large engines, and they concentrated their attention on the production of a first-class but simple type of motor. This had a straight row of six cylinders of an average weight per horse-power, neither excessively heavy nor particularly light. They standardised this type at a comparatively early date, and consequently made early advances in production and reliability.

Our policy was by no means so definite, and our engine designers worked on a number of different types: air-cooled rotary, radial, and in V, water-cooled, 8-cylinder, 12 cylinders in V, and 6 cylinders in line. At no time did we rigidly standardise a single type. In consequence we had far bigger difficulties in production, and on the whole our motors were not so reliable. Ultimately, however, we progressed much further than the Germans, both in the power of the engine and in the reduction of weight per horse-power.

The reduction of weight of the aeroplane per horse-power can be obtained in either of two ways: (1) by having a very powerful engine of average weight per horse-power, so powerful that the weight of the pilot and his military gear is relatively an unimportant factor; or (2) by having an engine of very light weight per horse-power. This point is best illustrated by a short analysis in weight per horse-power, comparing two aeroplanes which are both single-seated fighters, and of the same lbs. per horse-power.

Large aeroplane—	lbs./h.p.
300 h.p. engine, weight	3¾
2 hours' fuel, oil and tanks	1¼
Pilot and gear	1
Aeroplane structure weight	3
	9

Total weight, 2,700 lbs.

Small aeroplane.	lbs./h.p.
200 h.p. engine, weight	2¼
Fuel, oil and tanks	1¾
Pilot and gear	2
Aeroplane structure weight	3
	9

Total weight, 1,800 lbs.

The first type has a large water-cooled engine, is economical in fuel, and by reason of the size of the engine, the pilot and his gear account for only a small proportion of the total weight; whereas on the small aeroplane the engine is a light weight air-cooled engine of heavier consumption, and the weight of pilot, etc., is a much larger proportion of the whole weight.

The two aeroplanes would practically give the same performance, but the smaller probably would be the better fighter because of its greater manœuvrability. There are many other factors to take into account, such as reliability, pilot's view, ease of manufacture, etc., all of which must be considered before coming to a decision as to which is the better type.

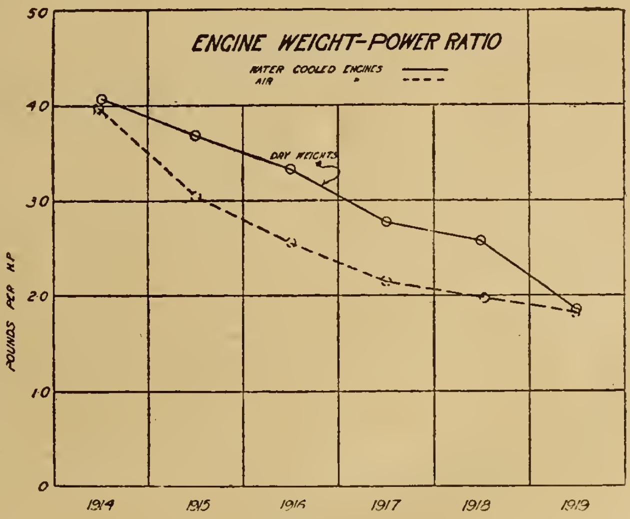


Fig. 7.

Generally speaking, the tendency during the War was towards the heavier aeroplane, although there were two periods when the light-weight engine reversed this. One was when the 80 Le Rhone Sopwith Pup supplanted the 140 R.A.F. B.E. 12, and the two 100 h.p. pushers D.H. 2 and F.E. 8; the other was when the small air-cooled Wasp engine was competing with the 275 water-cooled Rolls-Royce Falcon.

(*To be continued.*)

◆ ◆

The Douglas-Pennant Case

A second White Paper (Cmd. 254) has been issued by the Air Ministry containing a further number of letters relating to the termination of the appointment of the Hon. Violet Douglas-Pennant as Commandant of the Women's Royal Air Force.

A £10,000 RELIABILITY PRIZE

THE Australian Government having offered £10,000 for a flight to Australia and the *Daily Mail* prize of £10,000 for a flight between Great Britain and America having been won, the *Daily Express* is offering a prize of £10,000 with the object of establishing aerial communication on a commercial basis between Great Britain and South Africa and India.

The preliminary announcement of the offer states that, in general, the terms and conditions of this £10,000 competition may be outlined as follows :—

(*a*) All types of aircraft are eligible for entry.

(*b*) The competition is open to all the world, except late enemy countries.

(*c*) All aircraft entered must carry a useful load of at least a ton both on the outward and homeward flights.

(*d*) Each entrant must produce one aircraft for the flight to and from South Africa, and one aircraft of a similar type for the flight to and from India.

(*e*) The factors considered in the award will be :—

Average reliability.

Airworthiness and general conduct of aircraft entered.

Average gain in speed over the established means of transport.

(*f*) As it is aimed that each aircraft shall carry a useful load of saleable or exchangeable commodities or raw materials, it will be to the advantage of competitors to study the commercial situation as affecting this interchange.

(*g*) Particulars of entries will be announced within the next few days.

(*h*) Competitors may undertake the flights at any date between the closing of the entries list, which will be announced later, and June 1, 1920. Priority in completion will not prejudice the success of later but obviously more efficient performances.

(*i*) One complete failure by a competitor will involve disqualification for the award.

Further details will be announced later.

AVIATION IN PARLIAMENT

Navy, Army, and Air Forces (Estimates)

SIR DONALD MACLEAN, on July 7, asked the Lord Privy Seal when he proposes to re-introduce the Estimates for the Navy, Army, and Air Forces in accordance with his promise ?

Mr. Bonar Law : My right hon. friend is mistaken in saying that I gave any promise that new Estimates would be introduced, though I said that the suggestion would be considered. I did say, however, that I thought there ought to be a discussion of the whole subject in the House when we revert to a peace footing, but I do not think that the time has yet come when it would be useful to have that discussion.

Rigid Airships

LIEUT.-COMDR. KENWORTHY, on July 9, asked the First Lord of the Admiralty what will be the total cost of the six rigid airships of an improved type now under construction for the Navy ; whether the signature of Peace will enable the building of some or all of these expensive airships to be postponed ; and, if not, why is there no difference between the War and Peace airship programmes ?

Mr. Long : The estimated total cost of the six rigid airships is £2,200,000. The rigid airship programme was thoroughly revised shortly after the Armistice was signed, and was reduced as far as is consistent with the Peace requirements of the Navy, and with the necessary development of the Airship service. No further reduction is at present contemplated. It should be noted that the six airships are not, as implied in the question, of a single type, but of several types, representing successive stages of development.

Capt. Wedgwood Benn : Is it proposed to hand over the construction of the lighter-than-air-craft to the Air Ministry ; and, if so, when ?

Mr. Long : That does not arise on this question at all.

Lieut.-Comdr. Kenworthy : Is it not to be taken into consideration, in the interests of scientific experiment, at any rate, to postpone this building and the expenditure of this money until a later date, and until we have had more experience of this kind of vessel ?

Mr. Long : Those questions have already been taken into consideration by the Board of Admiralty in arriving at their decision.

Experts

CAPT. WEDGWOOD BENN asked the Under-Secretary of State to the Air Ministry whether any steps are being taken to retain for the public service the advantage of the expert designers and craftsmen engaged upon airship and aeroplane construction during the War ?

Maj.-Genl. Seely : It is for the Admiralty to reply as regards airships. As regards aeroplanes, the position during the War generally was that the expert designers were in the employment of the contracting firms, experts on such general questions as aerodynamics, strength of materials, etc., being retained by the State. It is hoped to maintain this position under the peace organisation.

Wendover Aerodrome

MR. BRIANT, on July 10, asked the Under-Secretary of State to the Air Ministry if the aerodrome at Wendover is intended to be a permanent training centre for the Air Force ; and, if so, for how many men is it intended to provide ?

Maj.-Genl. Seely : The answer to the first question is in the affirmative. The answer to the second will depend on the peace strength which may be approved for the Royal Air Force.

Temporary Opening of Oversea Civilian Flying

THE Air Ministry on July 13 made the following announcement :—

Pending a definite agreement in accordance with the Air Convention, and in order to enable French and British aircraft firms to send machines to London and Paris, should they so desire, during the forthcoming Peace Celebrations Week, arrangements have been made with the French Government for the opening of civil communication by air between London and Paris from July 13-20 inclusive.

British machines visiting Paris will land at Le Bourget only, and French machines visiting London at Hounslow only, except in emergency. All machines will cross the French coast between Calais and Boulogne, and the English coast between Folkestone and Dungeness.

All machines taking advantage of these facilities must be provided with, and carry, certificates of airworthiness, issued by their respective Governments. Passports will be carried by all civilian *personnel*. A full list of passengers, showing their destinations, will be carried by the pilot in charge of the machine. No goods or merchandise may be carried.

It is to be clearly understood that from July 13-20 inclusive, no machine taking advantage of this temporary arrangement, will, in any circumstances, fly over London or Paris.

Roll of Honour

Wounded

Lieut. D. Neil, Can. For. Corps. attad. R.A.F.

" Soldiers', Sailors', and Airmen's Families "

AT the annual meeting of the Soldiers' and Sailors' Families Association on Monday, it was decided to include the word " Airmen " in the title, following the reading of a letter from Queen Alexandra, who is president of the Association. Her Majesty's letter was as follows :—

" Dear Sir James Gildea,—I hardly like the idea of changing our old title of 'The Soldiers' and Sailors' Families Association,' the name by which we are so well known everywhere, I hope, and under which name, I am proud to think, have done so much good for the country, especially during the late War.

" It has struck me, however, from conversations I have had with others on the subject, that our airmen having helped England so splendidly to win the great War—and the new Air Force, too, being now established as a distinct service—we might, and perhaps ought, to add 'Airmen' to the name of the Association, and that in future our title should be 'The Soldiers', Sailors', and Airmen's Families Association.

" What do you think of this change ? If you approve of it, please let my suggestion be known at the annual meeting of the Association to-morrow, and tell me what is thought of it. I strongly deprecate any greater change in our name than what I have above suggested.

" ALEXANDRA."

A.M. Civil Aviation Department

THE telegraphic address of the above department should read : " Civiatory, Estrand, London "—not as misprinted last week.

First Civilian Pilot since Armistice

THE first civilian flying certificate issued by the Royal Aero Club since the Armistice has been secured by Pte. J. Hardy, an Australian soldier, living in Earl's Court Road, who claims to have learnt to fly in seven hours at Hendon.

" Flips " at Brighton

DURING the past week the passenger flights carried out by the Avro Co. from the Ladies' Mile at Brighton have proved very popular ; on the opening day more than 100 passengers were carried. Capt. Kennard is in charge.

And at Sandown

THE Avro seaplane service at Sandown, which is under the careful direction of Capt. F. Warren Merriam, A.F.C., has also been doing good business since its introduction on Monday last. The passengers are taken up at the pier-head.

Air Work on Indian Frontier

ACCORDING to a report from Chaman, *via* Peshawar, our aeroplanes on July 9 bombed a small gathering of tribesmen near the Bogra Pass.

THE ROYAL AIR FORCE

London Gazette, July 4.

Flying Branch.

The initials of Lieut. (actg. Capt.) E. C. Morris are as now described, and not "E. E.," as stated in *Gazette* of May 9.

The initials of Sec. Lieut. F. N. Hargreaves are as now described, and not "F. U.," as stated in *Gazette* of May 13.

The initials of Sec. Lieut. I. D. Macintyre are as now described, and not "J. D.," as stated in *Gazette* of May 16.

The initials of Sec. Lieut. S. G. Cockburn are as now described, and not "F. G.," as stated in *Gazette* of May 20.

The initials of Sec. Lieut. R. E. Barrett are as now described, and not as stated in *Gazette* of May 23.

The initials of Sec. Lieut. J. H. Perring are as now described, and not "G. H.," as stated in *Gazette* May 20.

The initials of Sec. Lieut. F. N. York are as now described, and not "F. W.," as stated in *Gazette* May 23.

The initials of Lieut. J. A. N. Fleming are as now described, and not "J. A.," as stated in *Gazette* May 27.

The surname of Sec. Lieut. F. W. Trend is as now described, and not "Trench," as stated in *Gazette* May 9.

The surname of Lieut. W. H. Rilett is as now described, and not "Relett," as stated in *Gazette* May 13.

The surname of E. W. Everiss is as now described, and not "Encriss," as stated in *Gazette* May 20.

The surname of Lieut. A. W. Matson is as now described, and not "Watson," as stated in *Gazette* May 23.

The surname of Lieut. A. V. Wells is as now described, and not "Wills," as stated in *Gazette* May 27.

The name of Sec. Lieut. J. McRobb is as now described, and not "J. M. Robb," as stated in *Gazette* May 20.

The notification in *Gazette* March 11 concerning Sec. Lieut. A. R. Giroux is cancelled (substituted for notification in *Gazette* April 11).

The notification in *Gazette* March 18 concerning Sec. Lieut. F. W. V. Blommestein is cancelled.

The notifications in *Gazette* April 1 concerning the undermentioned officers are cancelled :—Lieut. R. A. Maddock, Lieut. W. C. McMurray.

The notification in *Gazette* May 27 concerning Lieut. O. A. Moore is cancelled.

The notification in *Gazette* June 27 concerning Lieut. R. C. F. Nailer is cancelled.

Administrative Branch

Capts. to be Capts., from (S.O.) :—E. R. Wbitehouse ; April 11. A. P. M. Sanders (on reduction of establishment) ; May 1. F. J. Gray, O.B.E. ; June 1.

F. Tuttle, D.C.M. (Capt. and Qtr., R. Berks. R.), is granted a temp. commn. as Capt. ; April 1, 1918.

Lieuts. (A.) to be Lieuts. :—A. L. C. Hartland-Rowe ; Sept. 3, 1918 (substituted for notification in *Gazette* Oct. 22, 1918). J. D. G. MacRae ; June 18.

Lieuts. to be Lieuts. :—A. A. Kennedy, from (S.O.) ; April 28. F. D. Wright, from (K.B.) ; June 19.

Sec. Lieut. (Hon. Lieut.) G. Simmers to be actg. Lieut. while employed as Lieut. (from Feb. 1 to April 30).

Sec. Lieut. H. A. Pippett to be actg. Lieut., without pay and allowances of that rank, whilst employed as Lieut. (from Sept. 16, 1918, to April 30).

Sec. Lieut. (Hon. Lieut.) G. Dodds to be Sec. Lieut. (Hon. Lieut.), from Unemployed List ; March 24, prec. next below D. H. C. Newth).

Sec. Lieut. F. H. M. Francis-Hawkins (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. ; Sept. 18, 1918.

The following relinquish their commns. on ceasing to be employed :—Lieut. S. H. Evans (Sec. Lieut., N. Staffs. R.) ; Aug. 26, 1918. Capt. H. S. Blockey (Capt., S. Staffs. R.) ; June 23.

(Then follow the names of 32 officers who are transfd. to the Unemployed List under various dates.)

The initials of Lieut. R. S. C. D. Ashby are as now described, and not as stated in *Gazette* May 27.

The notification in *Gazette* of March 4 concerning Sec. Lieut. L. H. Meyer is cancelled.

The notification in *Gazette* of March 25 concerning Lieut. S. F. Thompson is cancelled.

The notification in *Gazette* of May 6 concerning Lieut. W. U. Hugbes is cancelled.

The notification in *Gazette* of May 23 concerning Sec. Lieut. (actg. Capt.) W. Lienard, M.B.E., is cancelled.

The notification in the *Gazette* of June 27 concerning Sec. Lieut. J. Dale is cancelled.

Technical Branch

Lieut. (Hon. Capt.) (actg. Capt.) W. E. Smith to be actg. Maj. whilst employed as Maj., Grade (A.), from Sept. 9, 1918, to April 30.

Lieut. G. G. Bailey, D.F.C., to be Lieut., Grade (A.), from (Ad.) ; May 24.

Sec. Lieut. H. Nixon to be Sec. Lieut., Grade (B.), from (Ad.) ; June 20.

Sec. Lieut. E. G. Hellard (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut., Grade (A.) ; May 14, 1918.

Sec. Lieut. (Hon. Capt.) C. B. Dick-Cleland (Capt., N.Z.A.S.C.) relinquishes his commn. on ceasing to be employed ; May 2.

(Then follow the names of 23 officers who are transferred to the Unemployed List under various dates.)

Lieut. (Hon. Capt.) C. A. E. Lloyd relinquishes his commn. on account of ill-health, and is granted the rank of Maj. ; June 24.

Capt. R. C. Gallop (Scottish Rifles) resigns his commn., and is permitted to retain his rank ; July 5.

Capt. B. May (R.W. Kent R.) relinquishes his commn. on account of ill-health contracted on active service ; June 1 (substituted for notification in the *Gazette* of April 25).

The initials of Sec. Lieut. R. B. Cherry are as now described, and not "R. O.," as stated in the *Gazette* of May 9.

The initials of Sec. Lieut. L. T. W. Sanderson are as now described, and not "L. T. K.," as stated in the *Gazette* of May 20.

The surname of Sec. Lieut. R. G. Wells is as now described, and not "Wills," as stated in *Gazette* May 20.

The notification in *Gazette* May 13 concerning Sec. Lieut. H. J. Wadkin is cancelled.

The notification in *Gazette* June 13 concerning Sec. Lieut. J. Dale is substituted for the notification in *Gazette* May 27.

Physical Training Branch

One officer transferred to Unemployed List.

Medical Branch

Three officers transferred to Unemployed List.

Dental Branch

G. F. Charles is granted a temp. commn. as Lieut. ; July 1.

Memoranda

Sec. Lieut. (actg. Capt.) W. Lienard, M.B.E., to be Lieut. ; Feb. 24, and to retain his actg. rank till April 30.

(Then follow the names of 23 Overseas Cadets granted temporary commns. as Sec. Lieuts., and 183 graded hon. commns. as Sec. Lieuts.)

Temp. Hon. Lieut. M. P. Holmes relinquishes his commn. on ceasing to be employed ; Feb. 16.

(Then follow the names of 7 officers who are transferred to the Unemployed List under various dates.)

The notification in *Gazette* March 7 concerning Sec. Lieut. (actg. Capt.) W. Lienard, M.B.E., is cancelled.

Sec. Lieut. C. W. Kerr to take rank and precedence as if his appointment as Sec. Lieut. bore date March 22, 1918.

London Gazette, July 8.

The following temporary appointments are made :—

Staff Officers, 3rd Class (Air).—Capt. R. G. Parry, D.S.O. ; July 4, 1918 (substituted for notification in *Gazette* Oct. 18, 1918).

Staff Officers, 4th Class (T.).—Lieut. S. J. Furse ; Sept. 14, 1918.

The notification in *Gazette*, June 20 concerning Capt. W. A. A. Cbauncy is cancelled.

Flying Branch.

Maj. F. W. Lucas, O.B.E., to be actg. Lieut.-Col. (Airship) while specially employed ; May 26.

Capt. W. H. Mackenzie to be actg. Maj. while employed as Maj. (A. and S.) ; May 1.

Sec. Lieut. C. W. Sutcliffe to be Sec. Lieut. (A.), from (Ad.) ; April 8.

P.F.O. G. L. Barrett (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (K.B.) ; May 16, 1918 (substituted for notification in *Gazette*, July 9, 1918).

D. J. Stewart (temp. Sec. Lieut., R.E.) is granted a temp. commn. as Sec. Lieut. (O.) ; April 24, 1918).

Sec. Lieut. G. A. Lynch (Sec. Lieut., Yorks L.I.) is granted a temp. commn. as Sec. Lieut. (O.) ; Aug. 8, 1918.

The following relinquish their commns, on ceasing to be employed :—Sec. Lieut. R. Smith ; Oct. 19, 1918, and is granted hon, rank of Sec. Lieut. (substituted for notification in *Gazette* Oct. 18, 1918). Lieut. D. Leeson (Capt., Brit. Col. R.) ; Nov. 19, 1918. Lieut. F. J. Simpson (Lieut., Bit. Col. R.) ; Dec. 18, 1918 (substituted for notification in *Gazette* June 6). Sec. Lieut. (Hon. Lieut.) A. L. G. Price (Somerset L.I.) ; Jan. 25. Lieut. A. Gibson (Lieut., Sask. R.) ; Feb. 19. Sec. Lieut. W. R. Hudson (Lieut., Manitoba R.) ; March 10. Lieut. G. E. Leishman (Lieut., Cent. Ont. R.) ; March 31. Sec. Lieut. A. E. White, M.C. (Lieut., Can. Rly. Servs.) ; April 8. Lieut. J. P. Francis (Lieut., Can. Hrs.) ; April 14. Sec. Lieut. (Hon. Lieut.) G. W. Drowne (Lieut., Manitoba R.) ; April 22. Lieut. W. J. Gillespie (Lieut., E. Ont. R.) ; April 30. Lieut. G. E. Lucas (Lieut., W. Ont. R.) ; Lieut. D. R. Smitb (Lieut., Quebec R.) ; May 4. Lieut. D. R. McLaren, D.S.O., M.C., D.F.C. ; May 14. Lieut. J. E. Price (Lieut., Sask. R.) ; May 16. Sec. Lieut. (Hon. Lieut.) H. Symons (Lieut., Herts R., T.F.) ; May 23. Lieut.-Col. A. C. Critchley, C.M.G., D.S.O. (Lieut.-Col., temp. Brig.-Gen., Lord Strathcona's Horse) ; May 31. Lieut. H. F. Moore (Lieut., Manitoba R.) ; June 10. Capt. R. I. Van-Der-Byl (Lieut., temp. Capt., Brit. Col. R.) ; June 23. Lieut. R. H. Luxton (Lieut., Can. F. Art.) ; June 27. Lieut. A. H. Hinton (Lieut., Can. F. Art.) ; June 28.

(Then follow the names of 192 officers who are transferred to the Unemployed List. We regret that owing to great pressure on our space, it is impossible to reprint this portion of the List.—ED.

Maj. G. S. M. Ashby (R.G.A.) relinquishes his commn. on account of ill-health contracted on active service ; June 25.

Capt. E. G. F. Thompson relinquishes his commn, on account of ill-health, and is permitted to retain his rank ; April 17 (substituted for the notification in *Gazette*, Oct. 1, 1918).

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank ;—W. M. Davidson (contracted on active service ; Jan. 22 (substituted for the notification in *Gazette*, Jan. 21). S. Anderson (caused by wounds) ; Feb. 22 (substituted for the notification in *Gazette*, Feb. 21). O. A. Moore ; May 23 (substituted for the notification in *Gazette*, April 15).

Lieut. F. T. S. Menendez, M C., reinquishes his commn. on account of ill-health, and is permitted to retain his rank ; June 5 (substituted for the notification in *Gazette*, March 14).

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—H. L. Buckley ; June 24. G. P. Dymond ; June 27. C. S. Gregg (contracted on active service) ; June 28. C. R. Abell ; July 4.

The initials of Sec. Lieut. W. J. Cairns are as now described, and not "W. G.," as stated in *Gazette*, May 6. The initials of Sec. Lieut. F. N. York are as now described, and not "F. W.," as stated in *Gazette*, May 23.

The notification in *Gazette*, Sept. 17, 1918, concerning Sec. Lieut. E. Tomkins is cancelled. The notification in *Gazette*, Feb. 11 concerning Lieut. R. K. McConnell is cancelled (notification in *Gazette*, April 1, to stand). The notification in *Gazette*, March 7 concerning Sec. Lieut. T. E. W. Browne is cancelled (notification in *Gazette*, April 1, to stand). The notification in *Gazette*, March 11 concerning Sec. Lieut. C. S. Muir is cancelled (the notification in *Gazette*, April 1, to stand). The notification in *Gazette*, March 18 concerning Sec. Lieut. D. J. Brooks is cancelled (the notification in *Gazette*, April 1, to stand).

The notification in *Gazette*, March 25 concerning Lieut. (actg. Capt.) R. McLaughlin, D.F.C., is cancelled (the notification in *Gazette*, April 4, to stand). The notification in *Gazette*, April 1, concerning Sec. Lieut. (Hon. Lieut.) A. K. Boning is cancelled. The notification in *Gazette*, May 6 concerning Sec. Lieut. S. A. Church is cancelled. The notification in *Gazette*, May 27 concerning Sec. Lieut. M. M. McRae is cancelled.

Administrative Branch.

Capts. to be Capts.:—W. S. Evans, from (S.O.) ; Jan. 19. A. C. Bolton, M.C., from (S.O.) ; April 1. P. F. J. Kent, from (A.) ; April 17.

Lieut. G. A. McMillan to be graded for purposes of pay and allowances of Capt. whilst employed as Capt. ; May 1 (substituted for notification in *Gazette* May 30.)

Lieuts. to be Lieuts. —A. W. Allan, from (A.) ; June 4, 1918 (substituted for notification in *Gazette*, March 28. F. A. Gill, from (O.) ; Sept. 13, 1918).

D. W. McEwan (Lieut., Arg. and Suth. Highrs.) is granted temp. commn. as Lieut. ; Oct. 28, 1918.

Sec. Lieut. P. Reed to be Sec. Lieut., from (A.) ; June 17.

Sec. Lieut. F. A. A. Hewson to be Sec. Lieut., from (O.) ; Dec. 19, 1918 (substituted for notification in *Gazette*, April 18).

Sec. Lieut. (Hon. Lieut.) C. C. Blizard to be Sec. Lieut., from (O.) ; June 17, and to be Hon. Lieut.

Lieut. L. G. Bacon relinquishes his commn, on ceasing to be employed, and is permitted to retain his rank ; April 8, 1918.

The following relinquish their commns. on ceasing to be employed :—Capt. K. H. Marshall (Capt., Lond. R.) ; Nov. 2, 1918. Lieut. T. P. L. Molloy (Lieut., Dorset R.) ; June 9. Lieut. R. T. Wilson (Lieut., H.L.I.) T.F.) ; June 11. Lieut. (Hon. Capt.) E. W. P. Newman (Scot. Rif.) ; June 12. Sec. Lieut. (actg. Lieut.) M. E. Dunham (Lieut., R. Berks R.) ; June 14.

(Then follow the names of 29 officers who ara transferred to the Unemployed List under various dates.)

Sec. Lieut. H. J. Coles to take rank and precedence as if his appointment as Sec. Lieut. bore date March 1.

Technical Branch.

Lieut. A. W. Allan to be Lieut., Grade (B), from (Ad.) ; Aug. 11, 1918 (substituted for notification in *Gazette*, March 28).

Lieut. L. L. W. Smythe to be Lieut., Grade (B), from (Ad.) ; June 26.

Sec. Lieut. H. G. Burroughs to be Lieut., without pay and allowances of that rank ; Dec. 30, 1918.

Sec. Lieuts. to be Sec. Lieuts., Grade (A) :—C. H. Marston, from (Ad.) ; May 28, 1918. L. B. Hogben, from (Ad.) ; Nov. 7, 1918. E. B. Saunders, from (O.) ; March 1.

Sec. Lieut. H. G. G. Rawlings (late Gen. List, R.F.C., on prob.) is confirmed in his rank as a Sec. Lieut., Grade (B) ; Nov. 1, 1918 (substituted for notification in *Gazette*, Nov. 4, 1918).

Lieut. M. P. Spencer (Lieut., Norf. R.) relinquishes his commn. on ceasing to be employed ; April 29.

(Then follow the names of 37 officers who are transfd. to the Unemployed List under various dates.)

The initials of Lieut. E. H. Edwards are as now described, and not "E. W.," as stated in *Gazette*, April 25.

The notification in *Gazette* of May 6, concerning Capt. C. D. Butler, is cancelled

The notification in *Gazette*, June 4, 1918, concerning Flight-Lieut. H. W. Campion (late R.N.A.S.) is cancelled.

The notification in *Gazette*, Jan. 3, concerning Sec. Lieut. H. I. Allen, is cancelled.

The notification in *Gazette*, June 20, concerning Lieut. C. E. Maryon, is cancelled.

Medical Branch.

Transferred to Unemployed List :—Capt. H. T. H. Butt ; March 3. Capt. W. F. Walker ; April 16. Capt. R. H. Dixon, M.B. ; June 3. Lieut. G. M. Mellor ; June 25.

Dental Branch.

Lieut. H. Wardill is transfd. to Unemployed List ; April 3.

Chaplains' Branch.

Rev. T. L. Beveridge (temp. Chapln. to the Forces, 2nd Cl., R.A.C.D.) is granted a temp. commn. as Chapln., with the relative rank of Capt., and is granted the relative rank of Maj. whilst employed as Asst. Principal Chapln. (Presbyterian) ; June 5.

Memoranda.

Lieut. H. D. Goldsmith, D.S.O. (Maj., Bt. Lieut.-Col.) (Duke of Cornwall's L.I.) relinquishes his commn, on ceasing to be employed ; Jan. 1.

Transferred to Unemployed List :—Sec. Lieut. (actg. Lieut.) J. W. Mayall ; April 12. Capt. G. C. V. Hewson ; May 14. Capt. G. B. Fraser (King Edward's Horse) ; June 8. Lieut. R. A. Pennington ; June 17. Sec. Lieut. H. Jones, from (S.O.), Maj. H. A. Moore, C.B.E., M.C. ; July 1.

Maj. W. J. C. Kennedy-Cockran-Patrick, D.S.O., M.C. (Capt., R. Brig.), resigns his commn. and is permitted to retain his rank ; July 9.

The notification in *Gazette*, April 29, concerning Sec. Lieut. (actg. Capt.) J. L. Brown, is cancelled.

(Then follow the names of 421 Cadets granted hon. commns, as Sec. Lieuts.)

London Gazette, July 11

Chief of the Air Staff.—The notification in *Gazette* of June 20 concerning Maj.-Genl. Sir H. M. Trenchard, K.C.B., D.S.O., is cancelled.

Flying Branch

Lieut.-Col. J. C. Halahan, C.B.E., to be Lieut.-Col. (A.), from Group Comdr. ; July 1.

Maj. R. A. Bradley to be Lieut.-Col. ; Aug. 1, 1918.

Majs. to be actg. Lieut.-Cols. whilst employed as Lieut.-Colonels (A.) :—C. H. B. Blount, M.C., A. V. Holt, D.S.O., S. Smith, D.S.O., A.F.C. ; May 1.

Maj. G. F. H. Faithfull to be actg. Lieut.-Col. whilst employed as Lieut.-Col. (K.B.) (from May 1 to June 9).

Maj. W. J. C. Kennedy-Cockran-Patrick, D.S.O., M.C., to be Maj. (A.), from (S.O.) ; July 1.

Capts. to be actg. Majs. whilst employed as Majs. (A.) :—G. C. Bailey, D.S.O., W. E. Collison, C. R. Cox, A.F.C., C. C. Durston, J. F. Gordon, D.F.C., C. H. Hayward, P. Huskinson, M.C., G. C. Pirie, M.C., V. A. H. Robeson, M.C., J. G. Selby, M.C., D. F. Stevenson, D.S.O., M.C., H. G. Smart ; May 1.

Capt. J. A. Cochrane, M.C., to be actg. Maj. whilst employed as Maj. (K.B.) ; May 1.

Capt. C. J. Galpin, D.S.O., to be actg. Maj. (A. and S.), without pay and allowances of that rank, whilst specially employed ; May 1.

Capt. W. St. J. Scott-Scott to be Capt. (A.), from (S.O.) April 10 (substituted for notification in *Gazette* of June 24).

Lieuts. to be actg. Capts. whilst employed as Capts. (A.) :—P. J. Barnett, M.C., C. K. M. Douglas, A.F.C., D. W. Grinnel-Milne, A. McGregor, D.F.C., R. K. Morris, M.C., S. E. Toomer ; May 1.

Lieuts. to be actg. Capts. while employed as Capts. (K.B.) :—(Hon. Maj.) G. T. J. Barry, W. R. Phillips, D.F.C. ; May 1.

Lieut. (Hon. Capt.) E. H. Grant to be Lieut. (A.), from (S.O.) ; June 2.

Lieut. (actg. Capt.) H. E. Hazlehurst to be Lieut. (A.), from (T.), and to relinquish actg. rank of Capt. ; Sept. 23, 1918 (substituted for notification in *Gazette* Oct. 4, 1918).

Lieut. L. V. Dell to be Lieut. (O.), from (Ad.) ; May 15.

177155 Flight Cdt. F. W. Carter is granted a temp. commn. as Sec. Lieut. (O.) ; Sept. 27, 1918.

Sec. Lieut. C. H. Taylor (Capt., I.A.R.O.) relinquishes his commn. on reversion to I.A.R.O. ; May 20.

The following relinquish their commns. on ceasing to be employed :—Lieut. S. C. Burt (Lieut., Brit. Col. R.) ; April 9. Sec. Lieut. (Hon. Lieut.) G. W. F. W. Downer (Lieut., R.H. and R.F.A.) ; May 17. Lieut. T. H. Wickett (Lieut., W. Ont. R.) ; May 31. Lieut. R. P. Baker (Capt., Brit. Col. R.) ; June 9. Lieut. G. C. T. Hadrill (Lieut., R.A.S.C.) ; June 18. Lieut. (Hon. Capt.) D. S. Inglis (Lieut., Gord. Highrs.) ; June 23. Sec. Lieut. (Hon. Lieut.) W. V. Tyrrell (Lieut., R.I. Rif.) ; June 24. Lieut. H. M. Tulloch (Lieut., I.A.) June 27. Lieut. J. P. Cunninghame (Lieut., Alberta .) ; July 2.

(Then follow the names of 215 officers who are transfd. to the Unemployed List under various dates. We regret that owing to great pressure on our space, it is impossible to reprint this portion of the List.—ED.)

Lieut. W. A. Stead relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; June 25.

The following Sec. Lieuts. relinquish their commns. on account of ill-health. and are permitted to retain their rank :—F. A. Maples ; April 10 (substituted for the notification in the *Gazette* of Jan. 28). W. A. Gurr ; April 29. C. G. Parmelee (caused by wounds) ; June 26. J. R. Roulston (contracted on active service) ; July 3. H. S. Dyson ; July 4 (substituted for the notification in the *Gazette* of Jan. 31). E. R. Moore (contracted on active service) ; July 9.

The initials of Sec. Lieut. W. J. Cairns are as now described, and not "W. G.," as stated in *Gazette* May 6.

The surname of H. C. Biard is as now described, and not as stated in *Gazette* July 30, 1918.

The surname of Lieut. (Hon. Capt.) E. C. Fernandes-Ferreira is as now described, and not as stated in *Gazette* May 16.

The notification in *Gazette* May 31, 1918, concerning Sec. Lieut. K. R. Campbell is cancelled. The notification in *Gazette* March 4 concerning Lieut. J. E. Burke is cancelled. The notification in *Gazette* March 21 concerning Sec. Lieut. R. P. Stockton is cancelled. The notification in *Gazette* April 1 concerning Sec. Lieut. N. H. Midgley is cancelled. The notification in *Gazette* April 1 concerning Lieut. E. H. Tredcroft, D.F.C., is cancelled. The notification in *Gazette* April 4 concerning Sec. Lieut. J. D. Scott is cancelled. The notification in *Gazette* April 25 concerning Sec. Lieut. S. B. Milner is cancelled (the notification in *Gazette* April 15 to stand).

The notification in *Gazette* April 29 concerning Sec. Lieut. W. V. Thomas is cancelled. The notification in *Gazette* May 6 concerning Lieut. (actg, Capt.) D. Sutherland is cancelled (the notification in *Gazette* March 11 to stand). The notification in *Gazette* May 13 concerning Sec. Lieut. M. D. McTaggart is cancelled (the notification in *Gazette* June 24 to stand). The notifications in *Gazette* May 30 (page 6658) concerning Sec. Lieut. F. E. Power are cancelled. The notification in *Gazette* June 6 concerning Sec. Lieut. (Hon. Lieut.) R. B. Francis (Lieut., Can. M.G.C.) is cancelled (the notification in *Gazette* May 6 to stand). The notifications in *Gazettes* Jan. 21 and June 20 concerning Capt. G. L. Hartgill are cancelled (the notification in *Gazette* June 17 to stand). The notification in *Gazette* July 1 concerning Lieut. E. S. C. Sen is cancelled.

Capt. E. N. E. Waldron to be Capt., from (S.O.) ; May 1.

Sec. Lieut. E. R. Webb to be graded for purposes of pay and allowances as Capt., whilst employed as Capt. ; May 1.

H. Milman (Capt., R.E.) is granted a temp. commn. as Sec. Lieut. ; May 27, 1918, and to be Hon. Capt. (substituted for the notification in *Gazette* Dec. 10, 1918).

Sec. Lieut. J. W. Thompson (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. ; Dec. 10, 1918.

The following are granted temp. commns. as Sec. Lieuts. :—F. G. L. Heyes ; June 24. W. Graham ; July 4. E. C. A. Clarke, W. Macpherson, C. S. Roads ; July 7.

The following relinquish their commns. on ceasing to be employed :—Capt. H. B. S. Stephenson (Capt., R. Mun. Fus.) ; Nov. 25, 1918. Sec. Lieut. (Hon. Lieut. F. H. Sibley (Capt., R.F.A.) ; June 13. Lieut. J. T. Wright (Lieut., R.N.) ; June 25.

(Then follow the names of 41 officers who are transfd. to the Unemployed List under various dates.)

Lieut. L. G. Hall relinquishes his commn. on account of ill-health contracted on active service, and is granted the rank of Capt. ; June 12.

Lieut. L. D. Brown relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; June 30.

Sec. Lieut. H. T. Wellard relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; July 3.

The rank of Lieut. F. R. T. Pearson is as now described, and not Sec. Lieut. as stated in the *Gazette* of March 21.

The notification in the *Gazette* of June 10 concerning Sec. Lieut. R. C. E. Vernede is cancelled.

Technical Branch

Capt. A. C. Baker to be actg. Maj. whilst employed as Maj., Grade (A.), from April 1, 1918, to March 12.

Lieut. H. E. Hazlehurst to be actg. Capt. whilst employed as Capt., Grade (A.) ; Sept. 16, 1918 (substituted for notification in the *Gazette* of Nov. 29, 1918).

Lieut. H. E. Hazlehurst to be actg. Capt. whilst employed as Capt., Grade (A.), from (A.), from Dec. 11, 1918, to April 30.

Sec. Lieuts. to be graded for purposes of pay and allowances of Capts. whilst employed as Capts., Grade (A.) :—(Hon. Lieut.) J. Drew, (Hon. Capt.) R. C. Fowler, T. E. Morton ; May 1.

Sec. Lieuts. to be graded for purposes of pay and allowances as Lieuts. whilst employed as Lieuts., Grade (A.) :—G. J. C. W. Fitzwilliam, L. T. Bulmer ; May 1.

Sec. Lieut. J. R. Hovenden to be Lieut., without pay and allowances, of that rank ; Aug. 28, 1918.

Sec. Lieut. C. R. Booth to be Sec. Lieut., Grade (A.), from (Ad.) ; Feb. 22.

Sec. Lieut. F. S. Read to be Sec. Lieut., Grade (B.), from (Ad.) ; Oct. 1, 1918.

Sec. Lieut. (Hon. Lieut.) C. O. Wright (Lieut., King's Own R. Lancs. R.) relinquishes his commn. on ceasing to be employed ; June 10.

(Then follow the names of 52 officers who are transfd. to the Unemployed List under various dates).

Sec. Lieut. (Hon. Lieut.) F. J. Colishaw relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain the rank of Lieut. ; July 3.

The notification in *Gazette* of April 25 concerning Sec. Lieut. F. E. Miles is cancelled ; notification in *Gazette* of April 15 to stand.

The notification in *Gazette* of June 13 concerning Lieut. J. W. McKee is cancelled.

Medical Branch

A. G. Graham is granted a temp. commn. as Capt. ; July 18, 1918 (substituted for notification in *Gazette* of July 19).

Transferred to Unemployed List.—Capt. M. R. Dobson ; April 25. Capt. T. R. F. Kerby ; June 29. Maj. H. F. Horne ; July 2.

Dental Branch

Capt. J. Barratt is transfd. to Unemployed List ; May 29.

Memoranda

Sec. Lieut. J. Keyes to be Lieut. ; May 22.

Lieut. (Hon. Capt.) E. H. Grant (Capt., Arg. and Suth'd. Highrs.) relinquishes his commn. on ceasing to be employed ; July 3.

Sec. Lieut. C. W. Kerr to take rank and precedence as if his appointment as Sec. Lieut. bore date May 1, 1918.

(Then follow the names of eight officers who are transfd. to the Unemployed List under various dates.)

SIDE-WINDS

THE recent epoch-making flight of the Vickers-Vimy machine across the Atlantic was an endurance test, especially for the Rolls-Royce engines. It is well known that the makers of the Rolls-Royce engines leave no stone unturned to secure the best, both as regards materials and workmanship. That is why Firth's alloy steels entered so largely into the construction of the Rolls-Royce engines which accomplished the Atlantic flight. In our last issue, Messrs. Thos. Firth and Sons, Ltd., inserted an announcement dealing with this point, but unfortunately, by a compositor's error, the words "Firth's Stainless Steels" were inserted in the centre of the advertisement. Firth's stainless steels have merits of their own, and there is no necessity for them to borrow any of the glory won by Firth's alloy steels.

* * *

THE 1919 edition of "Willing's Press Guide," published recently, is increased in price to 2*s*., but is still marvellously good value to all who have occasion to turn-up the names, addresses or publishing dates of the less well-known newspapers, etc. It is fatter than ever, but just as well printed and conveniently arranged and indexed.

* * *

Surplus, the official organ of the Surplus Government Property Disposal Board of the Ministry of Munitions, now in its fourth number, is illustrated with a number of photographs showing a few of the articles and things to be sold. Those who are on the look-out for materials of all sorts will, doubtless, find this little magazine very interesting. It is published on the 1st and 15th of each month, and is sold at all bookstalls and newsagents at 3*d*.

* * *

WE understand from Mr. J. G. Navarro, who has just severed his connection with the recently formed company, Navarro Wellesley Aviation, Ltd., Kingston-on-Thames, that he is now devoting his time to a new type of aircraft; at the same time, having some capital, he will be pleased to get into touch with any firm or individual with a view to developing their aeronautical interests either at home or abroad. Elsewhere in this issue Mr. J. G. Navarro's announcement appears with all particulars.

* * *

QUITE a new note for catalogues is struck by Messrs. Gamage's "Rules for Brighter Cricket," pictured by "Rip," with a few asides on other sports and pastimes. The actual catalogue portion is confined to two pages, while the rest is taken up with full-page sketches in the cartoonist's happiest vein. There is sure to be a run on this unique publication and any of our readers who wish to be certain of a copy should make early application.

* * *

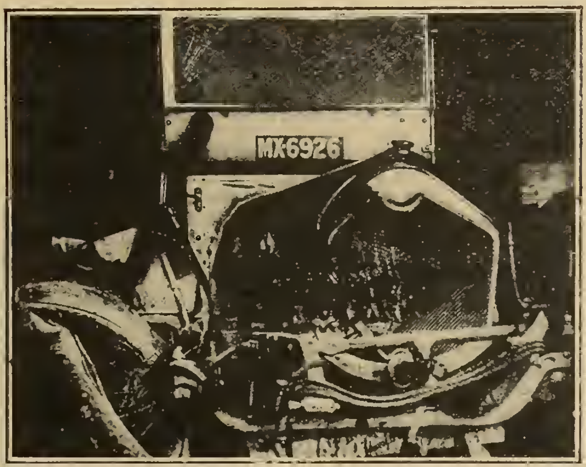
DURING the last few weeks, the Gosport Aircraft Co. have been busy delivering a batch of F 5 (Porte type) flying-boats, each fitted with two 350 h.p. Eagle Rolls-Royce engines. The first of them, after a preliminary taxi to warm up, got away after a short run of about 60 yards with a load of 190 gallons of petrol, and a crew of five, including Mr. Charles Nicholson, a director, and Mr. M. H. Volk, engineer and general manager of the firm. Lieut. D. V. Cranegie, A.F.C., R.A.F., has been the pilot, and on some of the tests has taken up as many as seven passengers. The flying-boats were delivered to various east coast stations.

* * *

MESSRS. C. C. WAKEFIELD AND CO., LTD., are very proud of the fact that "Castrol" was exclusively used on the R.34, and they were very interested in the following extract from a message from the *Daily Telegraph* correspondent at New York: "The Weather Bureau here works with the utmost personal goodwill, because, to quote its officers, 'England has shown the United States remarkable courtesy in allowing an American observer to travel both ways on the first flight, and also given us every information down to samples of the castral oil for engine-bearings, which we want to analyse for our own purposes.'" But they are wondering why our American friends did not apply to Wakefield House!

* * *

MESSRS. S. SMITH AND SONS (M.A.), LTD., advise us that their branch managers from Australia, New Zealand, Italy, Siam and Scandinavia are at present in London considering post-War problems connected with their extensive business, and at the same time are negotiating with various firms throughout the country for sole representation of their goods abroad. Messrs. S. Smith and Sons (M.A.), Ltd., are still open to undertake several additional sole agencies, and manufacturers interested will be well advised to get into touch with their export department at 179-185, Great Portland Street, London, W. 1.



"No flyer," but a very necessary adjunct to aviation. The photograph shows a Crossley tender which ran into a tramcar at Cricklewood last week and was badly damaged. The Triplex wind-screen, it will be seen, was cracked, but did not "fly" or "splinter," so no one was hurt by flying glass

◆ ◆ ◆ ◆

A Clothing Invention

AT a meeting on July 14 of the Royal Commission on Awards to Inventors, Mr. Justice Sargent in the Chair, Messrs. Robinson and Cleaver put in a claim in respect of suits for aviators.

For the claimants, it was stated that these suits enabled aviators to fly to great heights, and were superior to former suits in regard to the protection afforded to parts of the body. The claimants had been asked to waive any claim in respect of large orders received, and had replied in June, 1918, that they must reserve the right to charge a royalty on orders given to other contractors.

Mr. J. J. Evans, giving evidence for the firm, agreed that the prices paid to other firms were 12*s*. 6*d*. less than the price paid to his firm, but pointed out that Robinson and Cleaver had had to organise labour on a very extensive scale. They had to take additional factories to cope with the many orders.

Mr. A. F. Smith, assistant to the Government Contracts Department, called for the Crown, said that 25,829 suits had been supplied by Robinson and Cleaver, the average price per suit being £7 5*s*. 11*d*. The total number supplied by other contractors was 16,413, at an average price of £6 9*s*. 2*d*.

Mr. Trevor Watson said that there was no suggestion that the claimants' prices were unfair. He raised the point to show that there was no question of royalty on these suits, and also to bring out the fact that they had some advantage on the contracts received from the Government. The claim for 5*s*. a suit was equal to 4 per cent. on the value of the article. He suggested that a lump sum should be fixed, but if the award were to be on a royalty basis at all something like 1 per cent. was sufficient. He did not dispute the fact that the design had been of considerable value to His Majesty's forces.

The Commission reserved their decision.

Sinking a German Submarine

IN the Prize Court on July 14, Lord Sterndale made an order granting a bounty of £125 to the officers of H.M. Seaplane 8663 for the sinking of U.C. 36. According to an affidavit by Capt. Henry George Boswell, D.S.C., R.A.F., on May 20, 1917, he was in command, jointly with Capt. Charles Reginald Morrish, D.S.C., R.A.F., of H.M. Seaplane 8663, when he sighted an enemy submarine 20 miles E.N.E. of the North Hinder Lightship in the North Sea. The seaplane attacked the submarine with bombs, two of which struck her, and she sank by the stern. There were no survivors. The submarine had been ascertained to be the U.C. 36, manned by 25 hands.

Mr. T. H. T. Case, on behalf of the Procurator-General, said that the claim was not opposed.

COMPANY MATTERS

J. Samuel White and Co., Ltd.

THE directors of J. Samuel White and Co., Ltd., East Cowes, I.W., recommend a final dividend of 4*s.* 6*d.* per share, less income tax.

The annual general meeting will be held at the registered offices at Cowes on August 25 at 12 o'clock noon, and dividend warrants will be posted on that date.

Whitehead Aircraft (1917) Limited

AN extraordinary general meeting of Whitehead Aircraft (1917) Limited was held on July 11 to consider a resolution "That the company be wound up voluntarily and that liquidators be appointed."

Lord Wemyss, who presided, said he had not been informed of the unseaworthiness of the vessel of which he took command. He recommended the shareholders to carry the resolution of voluntary liquidation, so as to preserve the company's assets. He alluded to a proposal by Mr. Ambrose Taylor, who, he said, was not a philanthropist, but a business man, and proposed fair terms. Mr. Taylor was now investigating the books of the company. He had been told that various accusations had been made to the effect that all money subscribed had not gone into the coffers of the company. He had ascertained that that was not the fact. He concluded by moving the resolution, which was seconded by Maj.-Gen. Sir Henry de Bras.

A shareholder proposed that the winding up should be compulsory, so that the affairs of the company might be investigated, and this resolution was carried by a show of hands. A poll was demanded and showed a great majority in favour of voluntary liquidation.

In the Companies Winding-up Court on July 8 New Pegamoid, Limited, and another petitioned, before Mr. Justice P. O. Lawrence, for the compulsory winding-up of Whitehead Aircraft (1917) Limited.

Mr. Cecil Turner, for the company, said a meeting of creditors had been held at which 70 appeared, and a special resolution was passed unanimously to the effect that it would be in the interests of all that there should be a voluntary liquidation. It was hoped that all would be paid in full and that there would be a surplus. He suggested a fortnight's adjournment.

Mr. Owen Thompson, for the petitioners, said he would not oppose a fortnight's adjournment if there was a prospect of the company's suggestion being realised.

His Lordship said he thought a week's adjournment would be more advisable at the present and made an order to that effect.

* * * *

Another Trial by the Martinsyde

MESSAGES from St. John's during the week-end indicated a possibility of an attempt on the Transatlantic flight by the Martinsyde, but after an hour's trial flight on July 14 Mr. Raynham decided that the radiator was still not satisfactory, and the start was postponed.

The Canadian Air Force

THE Canadian authorities are being urged by Brig.-Gen. Odlum to hurry on the organisation of a small but efficient Canadian Air Force, as he fears that otherwise Canadian pilots will go to other countries to take up civil occupations.

Aerial Services in Argentina

AN aviation company has been formed at Buenos Aires, mainly with British capital obtained locally, to establish a regular air service between Buenos Aires and Montevideo.

Rome to Tokyo by Air

AN announcement in the *Popolo Romano* indicates that Signor Gabriele d'Annunzio has accepted the post of Director of Civil Aviation in Sardinia, and that he will shortly undertake a flight from Rome to Tokyo. The flight is expected to take 14 days, and the route will be *via* Asia Minor, India, Tonkin, and China.

Aerial Services in Germany

THE Prussian Minister of Commerce has sanctioned the establishment of a company for aerial traffic which will have its seat at Frankfort-on-Main, states the *Morning Post* correspondent at Amsterdam. The capital of the company, it is said, has been fixed at 15,000,000 marks. The promoters of the company are negotiating at present with the authorities for planning out six routes for the despatch of letters with Cologne as the chief distributing centre.

Eventually a service for passengers will also be established. The following routes are under consideration :—Cologne-Frankfort-Munich, Cologne-Stuttgart, Cologne-Basle, Cologne-Hamburg, Cologne-Berlin, and Cologne-Breslau. It is proposed to open the service with a fleet of about 200 machines.

Aeronautical Specifications Published

Abbreviations:—cyl.=cylinder; I.C.=internal combustion; m.=motors.

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 10, 1919

8,272. WARING AND GILLOW and W. H. RICHMOND. Spars, struts, etc. (127,874.)
8,309. A. TAYLOR and P. W. GRAY. Sighting devices for aircraft. (127,877.)
8,411. E. R. CALTHROP. Parachutes. (127,881.)
8,482. SOC. ANON. MATERIAL TELEPHONIQUE. Telephone apparatus for use on aeroplanes. (127,884.)
8,846. G. F. JOSEPH, PORTHOLME AERODROME and F. DE PAPE. Wings. (127,898.)
8,955. VICKERS, LTD. and T. S. DUNCAN. Landing devices. (127,904.)
8,956. D. ANDERSON. Aeroplanes, seaplanes, etc. (127,905.)
8,990. BARR AND STROUD, A. BARR and W. STROUD. Height-finders for anti-aircraft gunnery, etc. (127,907.)
9,054. AERONAUTICAL INSTRUMENT CO. and G. BREWER. Balloons. (127,910.)
9,069. LEYLAND MOTORS, LTD., and J. G. P. THOMAS. I.C. engines for aircraft. (127,911.)
12,279. O. A. DANIELSON. Indicators. (127,917.)

Published July 17, 1919

9,323. C. LANE. Mountings of guns for use on aeroplanes. (128,244.)
9,689. D. M. COWTAN and H. C. P. PICCOLOMINI. Girders, etc., for aircraft. (128,262.)
9,789. G. HERVIEU and P. M. G. MARECHAL. Portable sheds, hangars, etc. (128,266.)
9,800. M. LECUYER. Flying-machines. (128,268.)
9,896. H. J. PRINS. Process for preparing hydrogen. (128,273.)
9,963. H. DREYFUS. Fabric for aircraft. (128,274.)
10,039. VICKERS, LTD., G. H. CHALLENGER and T. S. DUNCAN. Controlling fire of guns on aircraft. (128,277.)
10,192. A. LAMBLIN. Radiators for I.C. engines for aircraft. (128,281.)
10,230. SOPWITH AVIATION CO. and H. A. KAUPER. Synchronisation of firing of gun with rotation of propeller. (128,283.)
10,414. C. BIRAULT. Sighting instrument. (128,290.)
10,420. R. A. BRUCE. Fastenings of detachable or foldable wings. (128,291.)
10,473. E. R. CALTHROP. Bomb dropping devices. (128,293.)
10,474. E. R. CALTHROP. Apparatus for destroying aerial craft. (128,294.)
10,795. F. A. ELLIS. Screw propellers. (128,301.)
10,819. AERONAUTICAL INSTRUMENT CO. and G. BREWER. Balloons. (128,304.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 10, 1919

9,109. D. J. MOONEY. Fuselage construction. (127,943.)
11,403. T. J. TAPLIN. Stabilisers. (128,040.)
11,592. G. P. ALTENBERG. Heat-retaining bottles for use on aeroplanes. (128,044.)
11,994. P. LEGH. Safety belts and shoulder straps. (128,049.)
21,607. E. E. BROWN and D. J. MOONEY. Metal construction for aircraft. (128,131.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages li, lii, liii and liv)

NOTICE TO ADVERTISERS.

IN order that "FLIGHT" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates* :—

UNITED KINGDOM.	s.	d.	ABROAD.	s.	d.
3 Months, Post Free	7	1	3 Months, Post Free	8	3
6 „ „	14	1	6 „ „	16	6
12 „ „	28	2	12 „ „	33	0

These rates are subject to any alteration found necessary under war conditions.

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank otherwise no responsibility will be accepted.*

FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World.
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 552 (No. 30, Vol. XI.) JULY 24, 1919 [Weekly, Price 6d. Post Free, 7d.

"Flight" Copyright

PEACE DAY, SATURDAY, JULY 19, 1919

His Majesty King George taking the salute in front of Buckingham Palace. On the dais are Queen Mary, Queen Alexandra, the Prince of Wales, Ex-King Manoel and Mr. Lloyd George. Gen. Trenchard (on extreme left) and a group of generals and staff officers are in front of the Royal box.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28s. 2d. Abroad.. .. 33s. 0d.

These rates are subject to any alteration found necessary under war conditions

CONTENTS

Editorial Comment:

PAGE
The "Encouragement of Civil Aviation" .. 966
What is Wrong? .. 966
Germany Going Ahead .. 966
The Official View .. 968
R 34—and after .. 968
The Pay of the R.A.F. .. 970
Oil in the Eastern Counties .. 970
Flight—and the Men: Maj.-Gen. Sir John Maitland Salmond .. 967
The Victory March .. 969
Milestones—The Sage Machines .. 971
The Royal Aero Club: Official Notices .. 976
R.A.F. Pay .. 977
The British Navy Airship S.R. 1 .. 979
The Airship Old Comrades' Association .. 982
Aviation in Parliament .. 982
Airisms from the Four Winds .. 984
Some Developments in Aircraft Design .. 987
Air Tours in the North .. 993
International Flying Convention .. 994
The Royal Air Force .. 997
Side-Winds .. 998

EDITORIAL COMMENT

The "Encouragement" of Civil Aviation

IN our last week's issue there appeared an advertisement of the London and Provincial Aviation Company which is of the most serious portent. We refrained from comment then because we thought it best to wait until the exceedingly grave announcement made by the advertisement in question could be given full consideration, and we could approach the subject without the heat that must necessarily be engendered by the light it sheds on the methods of the Air Ministry. We refer to the announcement that the company, after a long and creditable association with the development of aviation, has, according to its own allegation, been forced out of business by the methods of "encouragement" extended by the Civil Aviation Department of the Air Ministry.

We have examined the alleged facts of the Air Ministry's action toward the enterprise of the company, and we must say that there is a *prima facie* case made out. Briefly, the Ministry refused, so it is said, to license as airworthy certain machines built by the company because they were fitted with the 50-h.p. Gnome engine, and it also declined to license aerodromes selected by the company in connection with a scheme for pleasure flights at certain well-known resorts. Obviously, the company could not, in the time available before the end of the season, change the design of the machines or secure other aerodromes, and has thus decided that the game is not worth the candle, and intends to go out of a business in which its directors see no chance of making good.

These are the bald facts as they are stated to us. There may be another side to the story, but if there is the Air Ministry has not thought it worth while to give it. Therefore, we accept the view of the case as presented by the company, at least until the Air Ministry deigns to give its explanation of the circumstances which have led to the closing down of an important enterprise at a time when we ought to be straining every nerve to foster the cause of civil aviation. It is not so much the alleged reasons for the attitude of the Ministry which cause us concern as the attitude itself. What is the meaning of it? We have a special department of the Ministry which ostensibly exists for the purpose of encouraging such enterprises as the London and Provincial Aviation Company desired to carry out. It would seem that even if the company's scheme was weak in details, which does not appear from the evidence before us, it was the business of that department to point out where it was lacking, and even to give advice as to how to remedy those weaknesses and to assist in bringing the scheme within the limits of Air Ministry requirements. Nothing of the sort appears to have been done. On the contrary, the usual official attitude appears to have been taken up, and the result is that an important firm has withdrawn from the lists and will have no more of it.

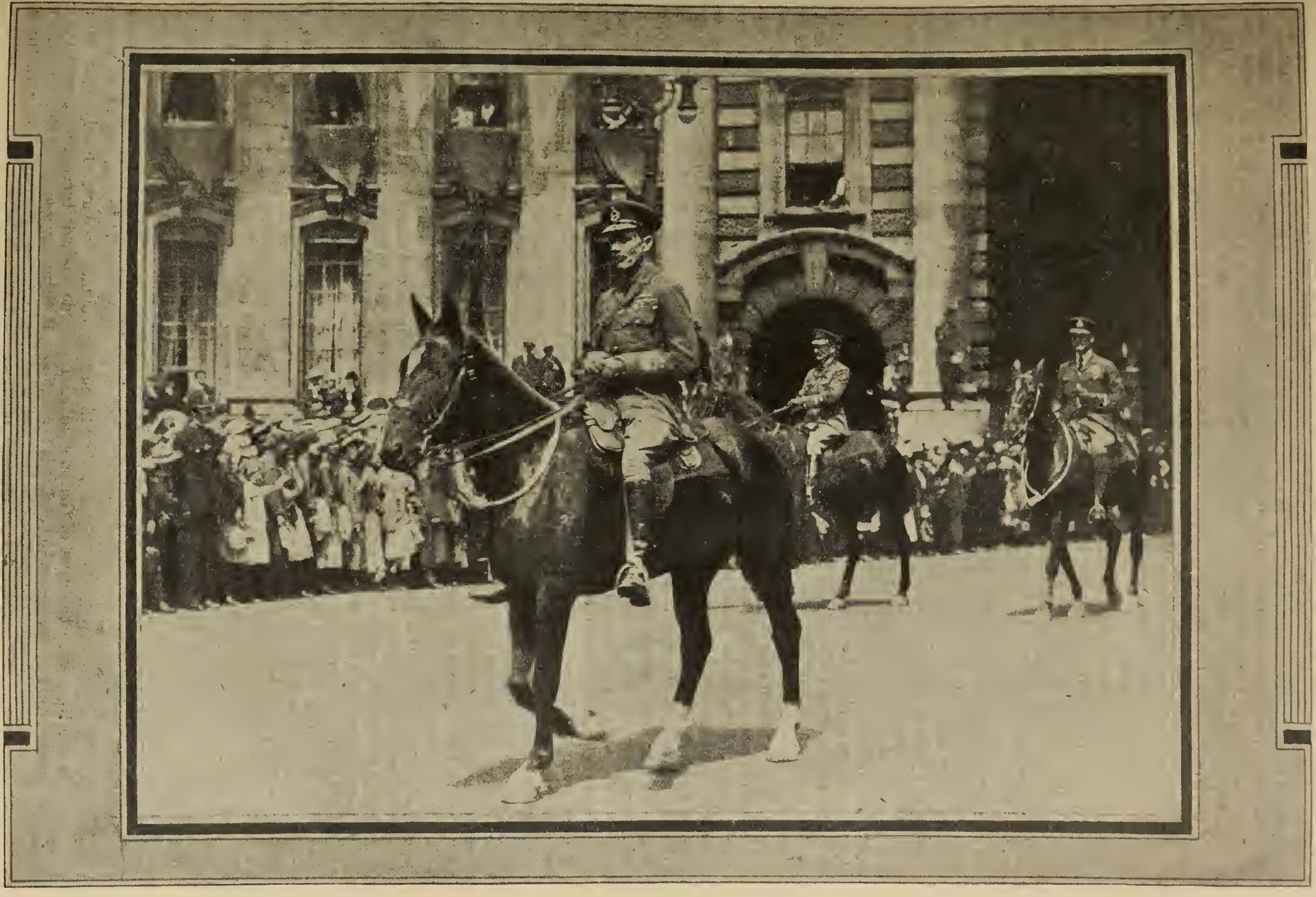
◆ ◆ ◆

What is Wrong?

We are at all times more than a little critical of official crassitude. We have a very poor opinion of official methods of administration when they are applied to the affairs of civilian business, but we hesitate to impute moral turpitude to the officials of a Government department. As a rule, they may be hidebound by official precedents and traditions, but they are generally honest in thought and action. The very serious question arises now of whether the prevailing doctrine of "every man for himself" does not enter into the attitude of the Air Ministry toward civilian flying enterprise. We do not allege that the official attitude and policy of the Ministry is not all that could be desired, nor would we suggest that the heads of departments are otherwise than perfectly honest and enthusiastic in their desire to further civil aviation as one great movement. But we are not so convinced that others who have to do with the administration of that policy are so completely disinterested as to be above putting a spoke in the wheel of enterprise in order to gain time for the furtherance of their own schemes. As a matter of fact, we are very much inclined to think that there is more than a little in this suspicion, and that it would be well if those at the head of certain departments of the Air Ministry would personally go out of their way to enquire closely how far certain members of their staffs are interested in civil developments which require time to bring to fruition and which might be prejudiced by too rapid a march of events before these schemes have come to a head. Of course, we may be quite wrong in our theory of cause and effect, nor do we specifically allege that it has had anything to do with the sequence of events which has led up to the closing down of the London and Provincial Aviation Company. Nevertheless, certain things we have heard and observed lead us to think that it would be just as well to make sure that every official connected with the Air Ministry is really and disinterestedly keen on the most rapid development of the civil side of aviation.

Germany Going Ahead

Although the internal state of Germany is not all it might be, there would seem to be little doubt that she is intent upon the development of aerial services for the conveyance of passengers and goods. According to official information received here, it appears that



"Flight" Copyright.

Major-General Sir JOHN MAITLAND SALMOND, K.C.B., C.M.G., C.V.O., D.S.O., at the head of the R.A.F., in the Peace Procession, July 19, 1919 there are already passenger services in operation radiating from Berlin to various more or less remote parts of the country. Some of these routes are from the capital to Weimar, Frankfort, Leipzig, Warnemunde, Hanover, Westphalia, Hamburg and Breslau. There are also services from Weimar to Hamburg, Hamburg to Warnemunde, Weimar to Leipzig and Hanover to Westphalia. The Berlin-Weimar route has been in operation since the beginning of February, and up to the end of that month 120 flights were attempted, of which all but 18 were successful, while there were no accidents at all.

Similarly, the service between Berlin and Hamburg was opened early in March, and during the month a total of 108 flights were successfully carried out and a load of no less than 3,737 kilogrammes carried, while the percentage of failures to complete the trip was only 6·1.

The services are operated by the Deutsche Luft Rederie, a combination of various German aeronautical firms. The whole thing seems to be organised on typically German lines, with nothing left to chance. Return tickets are issued, and are valid for a period of thirty days. Flying kit and motor transport to and from the aerodromes are provided at an inclusive charge covered by the cost of the ticket. From Berlin to Hamburg costs for the single journey 450 marks, and for a return ticket 700 marks. From Berlin to Breslau the charge for a single ticket is 500 marks, with a return rate of 750 marks. Serial tickets available over any of the routes operated by the combine are obtainable for 3,600 marks, and are transferable. Railway troubles seem to have had a favourable reaction on the aerial services, and a considerable increase in the traffic is reported. On the Berlin-Weimar route, which seems to be the most important and popular, the number of flights from February to the end of April was 538, while between Hamburg and the capital, from March 1 to the end of April, there were 262 flights.

This seems in marked contrast to the laggard way we are conducting things here. We have not a single regular aerial service running even now—nearly at the end of July—and we see no real prospect of any such service being established for some time to come. We fully realise that some of the delay was unavoidable, but it does seem that Germany has once more stolen a march upon us, and has got going while we have been endeavouring to turn round. It is quite evident that if we want to retain our lead in the air we shall have to move faster than we have been doing. We shall have to keep an eye on Germany. It is very evident that the Hun realises the value of aerial communications, and will use his utmost endeavours to exploit aerial travel as a means to getting his place in the sun again. He, with all his manifold faults, is a clever and enterprising competitor, and we shall do well not to assume too readily that he is "down and out" as a possible competitor. But at the same time where will all this German air activity ultimately lead, having regard to that country being restricted under the Peace terms in respect to aircraft.

◆ ◆ ◆

The Official View

At the time when the news of German aerial developments comes to hand, it is interesting to see the semi-detached view taken by our own Government officials of the possibilities of aerial communication. During the recent debate on the Post Office Vote, Captain Wedgwood Benn suggested that it would be a good thing if the Post Office were to inaugurate an inland air post and a service to the Continent. Mr. Pike Pease admitted that "an aerial mail service was not a matter to be thrown aside as a wild dream." He believed in the possibilities of aviation for commercial purposes and for the carriage of mails. In fact, he thought these possibilities were very great.

Why not put them to a practical test? During the peace *pourparlers*, Cabinet Ministers, from the Premier down, had ample opportunity of testing these possibilities, and surely their experiences might have convinced even the Assistant Postmaster-General that aerial carriage of mails has more than mere possibilities. A very large number of flights were made between London and Paris with, so far as we remember, only a single serious accident. Even that was a matter of sheer bad luck, which would not have operated on one occasion in a thousand. May we once more remind the Post Office authorities that the Germans have been operating mail and passenger services with considerable success for the past five months?

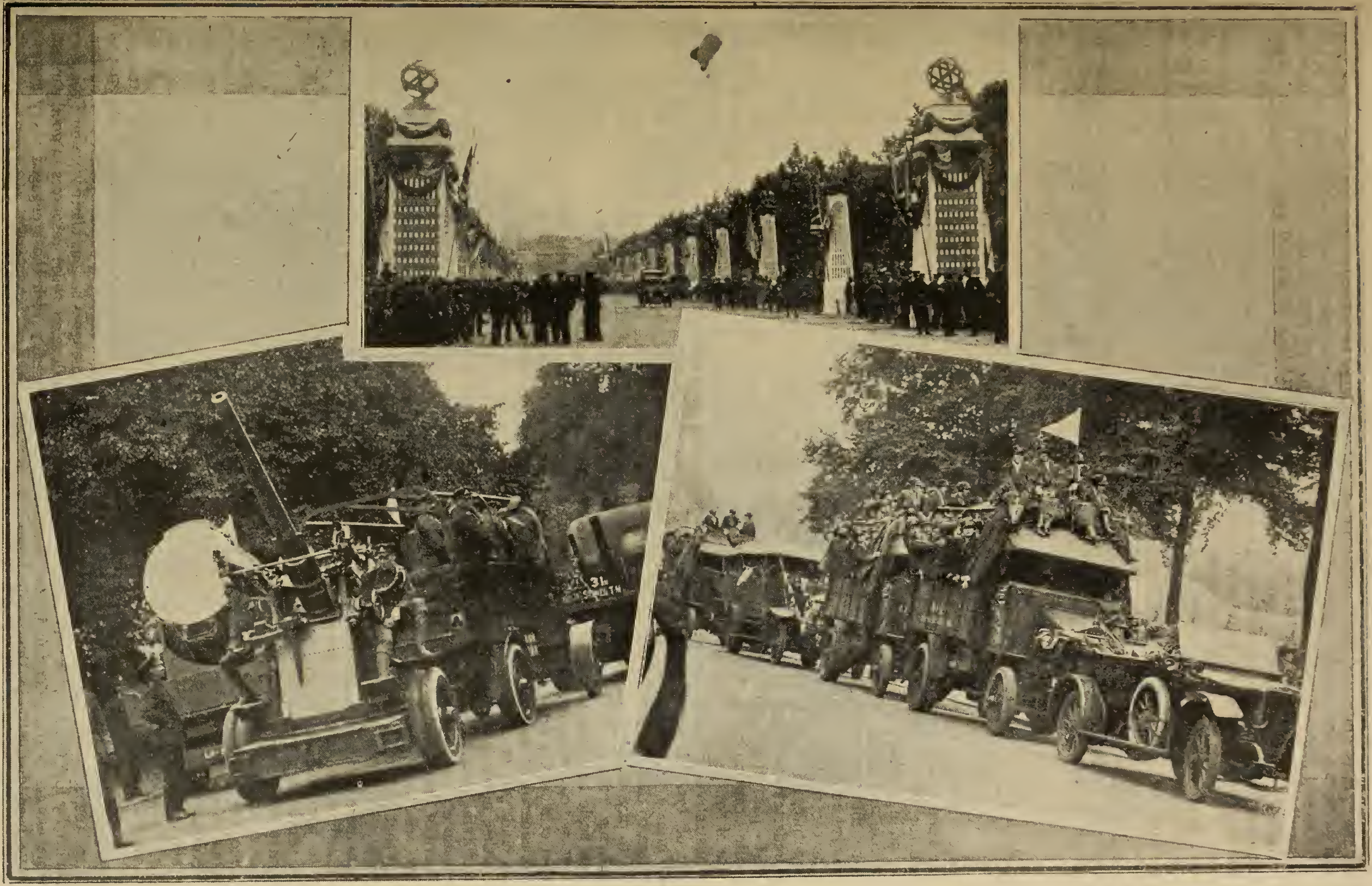
◆ ◆ ◆

R 34—and After

British officialism is an exceedingly peculiar thing. It has neither soul nor imagination, while its high priests live in a rut out of which there is apparently no escape. These reflections are inevitable when we regard the story of the home-coming of the captain and crew of the airship R 34, after having made history by their successful double voyage across the Atlantic. Did General Maitland and Major Scott arrive in the capital of the Empire at the end of their epoch-making enterprise to be received with open arms and with the official plaudits which their exploit deserved? Not at all. A small group of officers, gathered spontaneously and because of their personal friendship for the two men most concerned in bringing home to England the glory and the credit of a unique exploit, which has demonstrated that aerial navigation is not only possible but practical, represented all the welcome vouchsafed them. Why?

We are given to understand that the question of giving these gallant officers and their men an official reception worthy of their feat was mooted and was peremptorily turned down by the authorities, on the ground that the Atlantic crossing was a "Service flight" only, and therefore in the strict routine of duty. Heavens! What imagination! What an appreciation of the fitness of things! We have a profound admiration for General Trenchard's work during the war, but we must say we entirely disagree with his attitude towards the great performance of R 34 and her crew. The Americans showed a much better appreciation of the importance of the thing by the reception they gave the crew of R 34 on her arrival at Mineola, and we dare wager that had she been an American vessel they would still be talking about it.

The question we cannot help asking ourselves is: Have we really any policy in regard to aviation? In another column we have already dealt with the official attitude towards the encouragement of civil aviation. Is there any reason to think, in the light of what has happened in connection with the flight of R. 34, that the official mind is any more imaginative in regard to purely Service developments?



"Flight" Copyright

THE GREAT VICTORY MARCH THROUGH LONDON, JULY 19, 1919: Above, The Mall, with Buckingham Palace in the distance, and a "sausage" balloon up above; left, a unit in the Anti-Aircraft section, and right, the W.R.A.F.s in their "automobiles."

We think not. It is quite obvious that the mind which can view the first double crossing of the Atlantic by airship as being in the nature merely of a routine service flight, and can miss the significance of its historical incidence, must be equally obtuse to the importance of all development save that of "THE SERVICE." And we know only too well what that means. It means simply the stiff regulation of a stiff mechanism swaddled in the stiffest of stiff red tape. That is not what we want. We need more imagination than the Service mind seems to be capable of displaying. We want a greater breadth of outlook and a more generous view generally than appears possible to men who are brought up in the routine and traditions of "THE SERVICE."

◆ ◆ ◆

The Pay of the R.A.F.

At last the long-anticipated announcement of new rates of pay for officers of the Royal Air Force has been made. Gen. Seely stated in the House of Commons on Monday last that the new scale had been completed and approved and was being circulated with the votes. The full details of the scale will be found in another part of this issue of FLIGHT.

Under the new scale officers of the non-flying branches benefit considerably, since a single standard rate of pay is laid down for all branches,, except such services as the medical branch and school-masters, while, in future, all officers, whether they intend to fly or to undertake technical or administrative work, will have to pass the flying test on entry. Under the old scale a captain in the flying branch drew pay at the rate of 19*s.* per day, plus 7*s.* flying pay, while the administrative officer of the same rank drew a maximum of 17*s.* 6*d.* per diem. The pay of the technical branch was also lower than that of the flying officer, so that the levelling up of all branches in regard to pay makes a considerable difference to the non-flying officer.

The new scale has been calculated with reference to the increased cost of living, and it has been decided that 20 per cent. of the rates of pay and retired pay will be considered as due to the present high cost of living, and will be subject after five years to change, either upwards or downwards according as the cost of living rises or falls. Subsequent revisions will be made at three-yearly intervals on the basis of the Board of Trade food prices. We really do not altogether see the need for this announcement, unless it is that the Air Ministry and the Government are under the impression that service in the R.A.F. is worth no more than a bare subsistence rate of pay. However, as it is, the officers of the R.A.F. can look forward to periodic adjustments of their rates of pay from which they may or may not benefit as the case may happen to be.

These new rates are intended to apply only to officers who are given permanent or short-service commissions in the R.A.F. as reconstituted, or to officers seconded from other Services to the Forces. They do not apply to officers awaiting demobilisation or who are temporarily retained. On the whole, the new scale is eminently satisfactory, and will be welcomed by the R.A.F. as setting at rest the uncertainty which has existed for so long as to the future of pay and prospects—a state of uncertainty which has undoubtedly lost the Force a very large number of valuable officers whose retention in the Service would have been distinctly in the public interest. There seems to be only one point on which controversy may—probably will—arise, and that is the levelling up of pay in the administrative branch. It will probably be argued that the flying officer takes all the risks incidental to his calling in peace or war, while the administrative officer shares in none of these and yet receives the same rate of pay and allowances. That, however, is a point upon which we need express no present opinion, since it opens up all sorts of questions which, for the moment, are of purely Service interest.

◆ ◆ ◆

Oil in the Eastern Counties

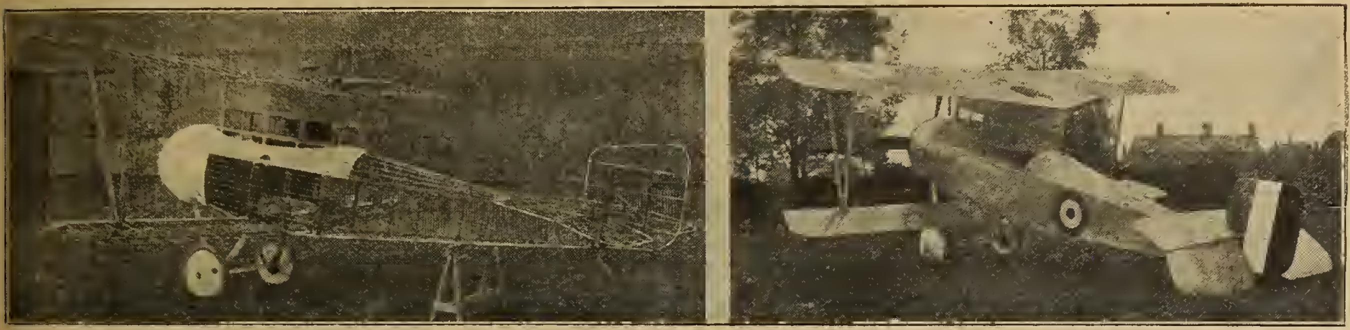
For years past more or less spasmodic attention has been directed towards the oil-bearing shales of Norfolk as a potential source of fuel oils and motor spirit. Dr. Forbes-Leslie, the eminent geologist, has been persistent in declaring that the richest shales in Britain, if not in the world, lie within the rectangle defined by King's Lynn, Great Massingham, Downham Market, and Cockley Cley. Until quite recently no steps had been taken to actively develop the resources of this area, but work is proceeding now on a fairly ambitious scale. According to a *Times* correspondent who has recently traversed the oil-bearing area, a first shaft has been driven, the driving of the roads well advanced, and the key detail of the distillation plant complete. Everything, he says, is ready for the genesis of an industry which, richer far than the Midlothian shales enterprises, holds prospects of the very highest importance. The programme of development is the definition of the area into fields of approximately 2,000 acres each, of which the No. 1 Mine at West Winch, to which reference has already been made, is the outlet of the first, each of these fields being equipped for the recovery and distillation of 1,000 tons per day of the shale, the crude oil produced being taken to a central refining plant designed for the Setchey centre.

Apparently, the enterprise is still only in its initial stage of development, and it would thus seem to be too early to speculate upon its chances of success. We are convinced, however, that it is quite possible that Norfolk will turn out to be one of the greatest centres of shale oil production in the world. It is many years since our sister journal, AUTO., first drew attention to the possibilities of the Norfolk shales, and urged that they should at least be experimented with in order to ascertain whether they were really worth developing as an oil-producing enterprise. Other responsible journals have, from time to time, made similar references, yet it is not until now that anything serious is being attempted, so slow are we to do the obvious thing that lies ready to hand. We are spending a great deal of money in boring for oil, which may or may not be found in paying quantities, but we will not spend anything on developing resources that are patent to everyone. We have been content to import all our fuel oils and most of our motor spirit from overseas, risking the complete breakdown of our aviation and transport services, the while we made no effort to develop resources to which attention has been directed time after time over a long period of years. We are indeed a curious people! However, it seems as though a serious effort were now going to be made to develop those resources in good earnest, and we sincerely wish those engaged every success in their task.

"MILESTONES"*

THE SAGE MACHINES

THE entry of Messrs. Fredk. Sage and Co., Ltd., into the world of aircraft manufacture dates back to 1915, in which year a contract for building Short seaplanes of the 184 type was received. The manager of the aviation department was Mr. E. C. Gordon England, who is well known both as a designer and pilot, having at various times during his long career been associated with, among others, the British and Colonial Aeroplane Co., of Bristol, with Mr. James Radley, of Huntingdon, and with J. Samuel White and Co., Ltd., of Cowes. Isle of Wight. In January, 1916, Mr. Clifford W. Tinson—who for three years previous to the War was Capt. F. S. Barnwell's assistant—left the Air Department of the Admiralty with the sanction of Commodore Sueter, who was then Director of Air Services, and joined the firm as designer. The design of the first Sage machine was at this time already in hand under the direction of Mr. Gordon England and Mr. L. Bonnard.

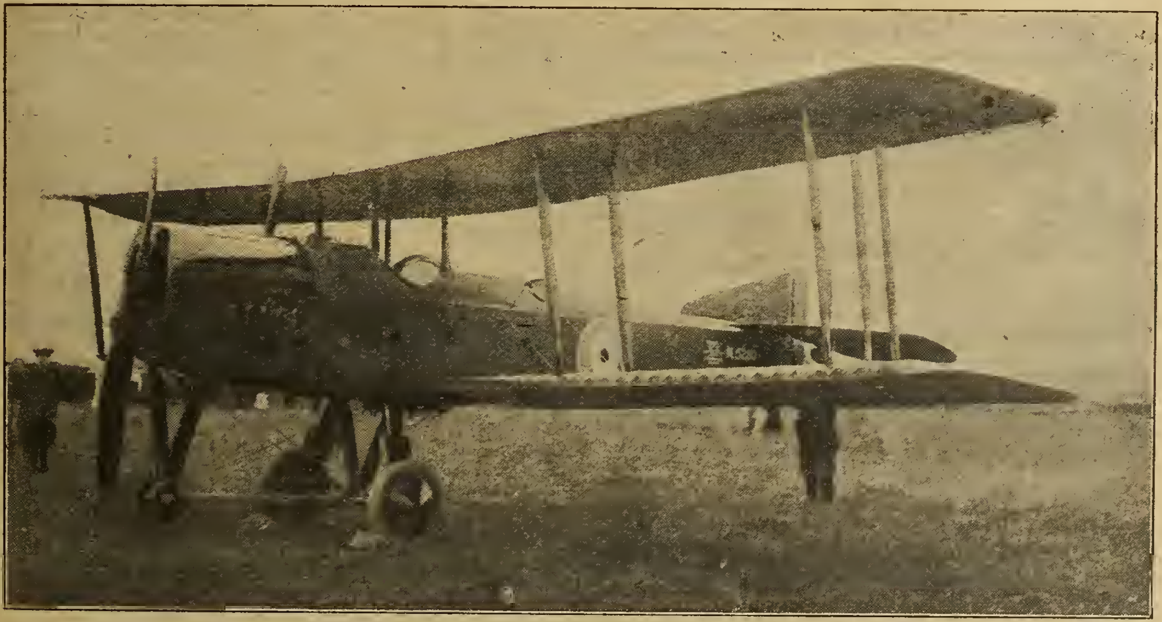


TWO VIEWS OF THE SAGE TYPE 2 : In the photograph showing the machine uncovered the gunner may be seen standing up taking aim with a machine gun.

The Sage Bomber, Type 1 (1916)

For some reason unknown to us this machine was never finished, and the figures of performance, etc., in the accompanying table must, therefore, be taken as estimates, and not as accomplished facts, although they are probably not far wrong one way or the other. As the machine was not finished no photographs of her are in existence. The plan and elevations of our general arrangement diagrams, however, give a very good idea of the lines of the machine. It will be seen that Type 1 was a twin-engine tractor, with the engines placed between the wings. The two Rolls-Royce engines—of 190 h.p. each—are placed very high in the gap between the wings, the thrust line being approximately half-way between top and bottom planes. This disposition arises from the fact that, although the *fuselage* is placed very low, the top plane is of much greater span than is the bottom one, the centre of resistance being, therefore, raised to a certain extent. Apart from their high position the engine mountings are of interest in that there is no part of the landing carriage placed under the engines. The weight is taken, when the machine is on the ground, by the anti-lift wires going from the foot of the engine-struts to the top of the centre section body struts. Whether this arrangement is advisable is, perhaps, open to doubt.

As regards the undercarriage of Type 1, this is, it will be seen, arranged along rather unconventional lines. The two main wheels are mounted direct on the body, through the bottom of which they project. The consequence of this arrangement, which obviously has for its object the reduction to a minimum of under carriage resistance, is that the wheel track is very narrow indeed, and as the lower wing is very close to the ground it has been protected by wing tip wheels of smaller diameter. In order to protect the *fuselage*, should

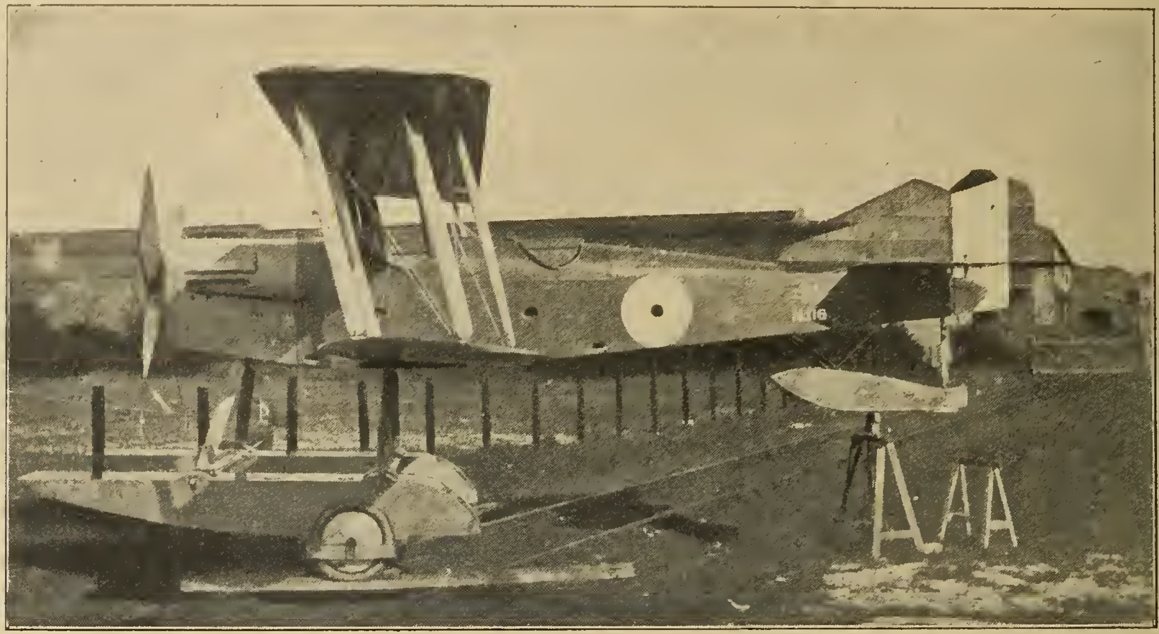


The Sage Type 3 training tractor.

---

* Previous instalments of this series appeared as follows :—Airco machines, January 9, 1919; Bristol machines, January 23, 1919; Sopwith machines, February 6, 1919: Avro machines, March 20, 1919; Armstrong-Whitworth machines, April 3, 1919; Vickers machines, June 12, 1919. All the scale diagrams of the "Milestones" series are to a uniform scale, and are thus immediately comparable as regards relative size.

the machine tend to turn over on her nose, another pair of wheels are mounted near the nose of the body, projecting through the floor in the same manner as do the two main wheels. The tail it will be seen, is chiefly remarkable as being of the biplane type. The armament of the Type 1 was to consist of three machine guns, one placed in the nose and one between the trailing edges of the planes, while a third was to be mounted immediately below the upper rear gun, and was to be fired through an opening in the floor of the *fuselage*. For its time, therefore, the Sage Bomber, Type 1, was very well armed, but as it was never finished its merits as a fighter were never ascertained. The estimated performance was quite good for the power and loading.

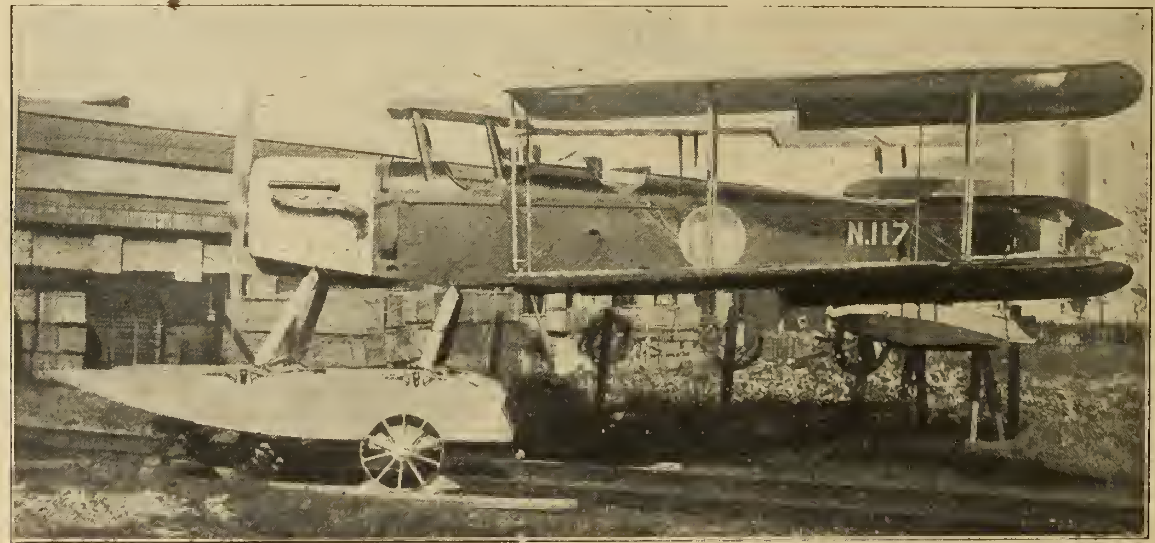


The Sage Type 4b seaplane.

The Sage Scout, Type 2 (1916)

Before synchronised gun-gears became generally adopted the tractor type of machine was of comparatively little use as a fighter, in spite of its inherent advantage over the pusher type as regards performance. In order to overcome the difficulty the Sage Type 2 was designed. As already mentioned, when this machine was first conceived, the synchronised gun had not become generally accepted, there being at the time, not unnaturally, a certain doubt as to the feasibility of devising a mechanism which would prevent the gun from being fired while a screw blade was in line with it. We say not unnaturally because on the face of it the problem of designing such a gear is a serious one, considering the speed of revolution of the screw and the rate of firing of the gun. However, at the time Sage No. 2 was conceived this problem was still being tackled, and so instead of experimenting with gun gears this firm turned their attention to the design of a machine which should mount its gun in such a position as to provide a free field of fire. It may be remembered that quite early in the War the French Nieuport firm produced a little two-seater in which the observer could stand upright with his head and shoulders projecting through a circular opening in the top plane. This was more or less the type adopted by the designer of Sage No. 2, but realising the discomfort caused to the gunner by standing upright in the slipstream of the propeller, and the effect this draught would have on the gunner's sighting, provisions were made for sheltering the gunner inside an enclosed cabin. How this was accomplished will be seen from the accompanying illustrations.

The Type 2 is a small machine, and may be said to belong to the scout class as regards dimensions, although it is designed as a two-seater. The upper plane is of greater span and chord than is the bottom one, and the inter-plane struts are of the Vee type, with but one pair on each side. The top plane, it will be seen, has its centre section mounted on



THE SAGE TYPE 4c SEAPLANE : This machine is very similar to the Type 4b, except that it has folding wings.

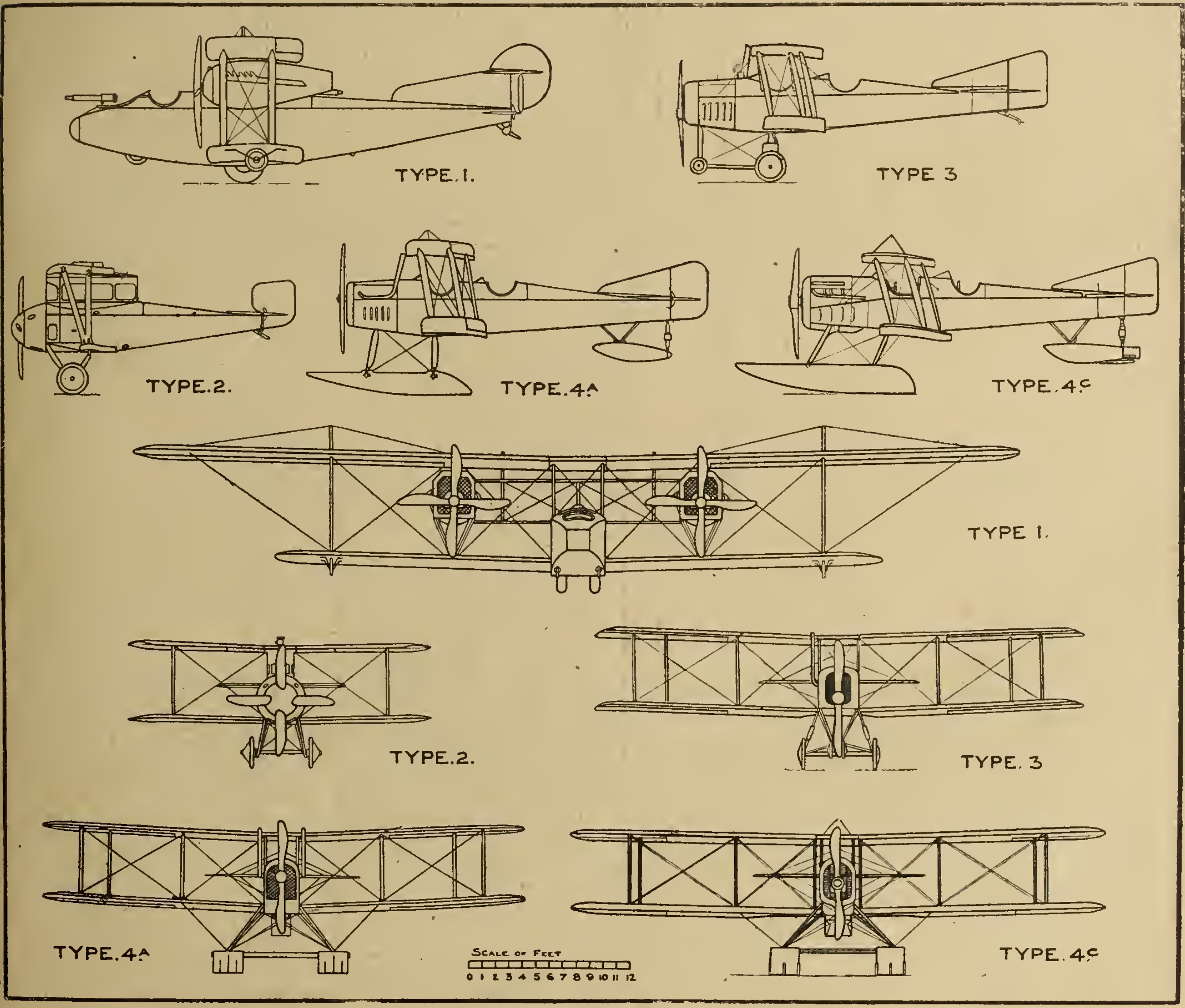
and forming the roof of a streamline structure enclosing the heads and shoulders of pilot and gunner. When standing up in his cockpit the gunner can just see over the top of the top plane, where his gun is mounted. He thus has an uninterrupted field of vision extending through the whole of an upper hemisphere. It will no doubt have been noticed that the gap of the Sage Type 2 appears to be greater than is called for by aerodynamical reasons. This is occasioned by the desire on the part of the designer to provide the gunner with a free field in a forward direction also. This—without some form of synchronised gear—was only possible by placing the gun so high that it would fire over the tips of the propeller.

It is interesting to note that in spite of the large amount of side area presented by this cabin the machine was, we are informed, quite easy to handle and appeared to be reasonably stable. During a trial flight the rudder post gave way, with the result that the machine became unmanageable and in

Table of weights, etc., and Performances of Sage Machines

Type of machine.	Engine.		Weight of machine (loaded).	Fuel capacity (gallons).		Range in miles.	Speed (m.p.h.).			Climb (in mins.) to		Ceiling.	Landing Speed.	Load sq. ft.	Load h.p.	Military Load.
	Type.	H.P.	lbs.	Petrol.	Oil.		Near Ground.	10,000	15,000	10,000	15,000	ft.	m.p.h.	lbs.	lbs.	lbs.
Bomber, Type 1 ..	R.R.	190	5,500	100	14	540	93	—	—	30	—	—	52	6·48	13·2	500
Fighting Scout, Type 2	Gnome	100	1,546	27½	8	308	112	109.75	104	14·75	35	16,000	55	9.22	15·48	50
Training Machine—																
Type 3A	R.R.	75	2,064	26	4	315	74	—	—	—	—	9,000	39	6.25	23·9	64
Type 3B	R.R.	75	1,980	26	4	315	76	—	—	—	—	9,000	39	6·0	26·4	—
Training Seaplane—																
Type 4A	H.S.	140	2,662	48	6	328	83.5	79	—	32	—	12,600	45	8.06	16·0	—
Type 4B	Sunbeam	200	2,709	35½	4½	220	95.5	85·1	—	25·0	—	14,400	53	8.2	13·54	—
Type 4C	H.S.	200	2,875	35½	4½	220	97·0	—	—	21·44	—	15,500	45	7·34	14·16	—

R.R. = Rolls-Royce. G. = Gnome. H.S. = Hispano-Suiza. S = Sunbeam.



Side and front elevations of the Sage machines.

landing it crashed into a tree with somewhat serious results to its wings. It was not, we think, perpetuated, probably because by then the synchronised gun-gears had been found to work well in practice.

The Sage Type 3

The next Sage machine to be designed was a two-seater tractor intended for training purposes. It was, therefore, designed with a view to good visibility, ease of handling, and low landing speed. As the machine was intended for instruction purposes she was fitted with dual control. The most unusual feature of the Type 3 is the undercarriage, which as will be seen is fitted with an extra pair of wheels in front to prevent overturning when in the hands of a novice.

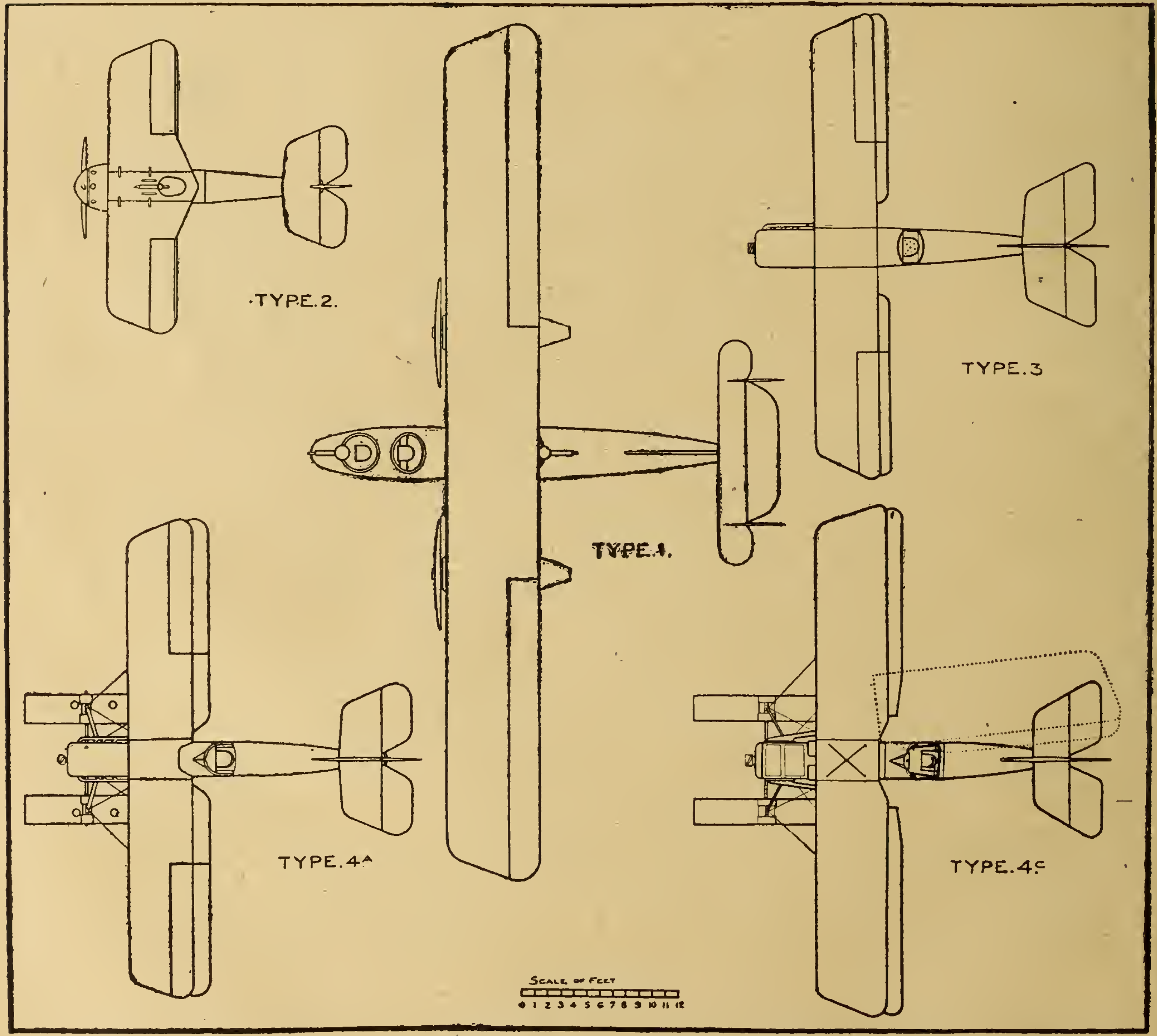
The Sage Seaplanes (1917)

Following on Sage 3 came a seaplane, which was produced in July, 1917. This machine was designed for wireless work with the Fleet. In general lines it was very similar to Sage 3, but it was fitted with a 140 h.p. Hispano-Suiza engine instead of the 75 h.p. Rolls-Royce Hawk. Also it had single control, in the front cockpit, leaving the rear cockpit clear for the wireless installation and operator. The floor under the rear cockpit was made to slide out of the way so that the wireless

Table of dimensions of "Sage" machines.

Type of machine.	Length o.a.	Wing span.		Wing chord.		Wing area.*			Incidence.		Gap.	Stagger.	Dihedral		*Aileron* area.	Area.			Area.		
		Top.	Bot.	Top.	Bot.	Top.	Bot.	Total.	Bot.	Top.			Top.	Bot.		Tail-plane.	Elevator.	Total.	Fin.	Rudder.	Total.
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	square feet.			°	°	ft. in	ft. in	°	°	sq. ft.	square feet.			square feet.		
Bomber Biplane, Type 1 ..	38 0	66 0	45 0	7 0	7 0	462	315	777	3	3	7 2	—	2½	2¼	117	440	30	74	20	15	35
Scout Biplane, Type 2 ..	21 1⅝	22 2½	22 2½	5 0	2 8	100	68	168	2	5	5 6	—	2	2	25	20	14·5	34·5	—	9	9
Training Biplane Type 3A	32 10	34 6	34 6	4 9	4 9	165	165	330	5	3	5 0	11 8	2½	2½	72	26	24	50	4	10	14
,, ,, ,, Type 3B	32 10	34 6	34 6	4 9	4 9	165	165	330	5	3	5 0	11 8	2½	2½	72	26	24	50	4	10	14
Training seaplane, Type 4A	32 6	34 6	34 6	4 9	4 9	165	165	330	5	3	5 0	11 8	2½	2½	72	26	24	50	4	10	14
,, ,, Type 4B	34 0	34 6	34 6	4 9	4 9	165	165	330	5	3	5 3	14 7	2½	2½	72	26	24	50	5	9	14
,, ,, Type 4C	37 6	39 7½	39 7½	5 3	5 3	193	193	386	3·10	3·10	5 3	16 7	3	3	84	24·4	21·2	45·6	5½	8	13½

* Including *ailerons.*



Plan views of the Sage machines.

operator could look straight down. As in the Type 3 a very good view was obtained from both cockpits, and the type was recommended for training purposes. This entailed the fitting of dual controls, while also the nose of the *fuselage* had to be modified to take either a Hispano-Suiza of a Sunbeam Arab engine. Consequently by the time this had been done the machine was a good deal different from the original, and it was given a different series number. While the original experimental machine was known as the Sage 4A, subsequent models were called 4B and 4C respectively. The latter two models were very similar in appearance, but whereas the 4B type had rigidly fixed wings, the 4C type was provided with folding wings. The increase in power, of from 140 h.p. to 200 h.p., naturally improved the performance, in spite of the additional weight of the engine and dual controls. The last machine turned out before the Armistice had a speed range of from 45 m.p.h. to 97 m.p.h., and climbed 10,000 ft. in 21 minutes.

The chief feature of all the Type 4 machines is the ease with which they can be stunted, and at the same time they are very stable, the pilot on one occasion leaving the machine to itself at 400 ft. and flying for a distance of about 50 miles.

◆ ◆

Investitures: Distinguished Flying Cross and Air Force Cross

IT is notified by the Air Ministry that officers should understand that they cannot be allowed to present themselves for Investiture unless they receive a summons to attend from the Lord Chamberlain's Department. Officers who have not received instructions to attend will understand that their names remain noted for another occasion, and that no further action is required of them. It is not practicable to indicate beforehand when Investitures will be held at which any individuals will receive his decoration.

There are now sufficient applications in hand to occupy a considerable time, and no further names are therefore required until about September 1, 1919.

Service dress should be worn by serving officers and by officers demobilised or released from service if so desired, otherwise morning dress (frock coat or morning coat) should be used.

Investitures for the Order of the British Empire will be arranged next October, and applications for attendance may be submitted to the Air Ministry at any time after October 1, 1919.

British War Medal, 1914–1918, for the R.A.F.

HIS MAJESTY THE KING has been graciously pleased to signify his pleasure that a medal be granted to record the bringing of the war to a successful conclusion, and the arduous services rendered by His Majesty's Forces.

The medal, in silver, will, provided the claims are approved by the competent Royal Air Force authorities, be granted to the undermentioned classes who either entered a theatre of war on duty, or who left their places of residence and rendered approved service Overseas, other than the waters dividing the different parts of the United Kingdom, between August 5, 1914, and November 11, 1918, both dates inclusive :—

(*a*) Officers, warrant officers, attested and enrolled non-commissioned officers and men of the Royal Naval Air Service, Royal Flying Corps or Royal Air Service.

(*b*) Members of women formations employed under a direct contract of service with the Royal Air Force Medical Service.

(*c*) All who served on staffs of Royal Air Force hospitals and all members of recognised organisations who actually handled sick and wounded.

(*d*) Members of duly recognised or authorised organisations.

The medal will also be granted to all officers, warrant officers, attested and enrolled non-commissioned officers and men of the Royal Naval Air Service, Royal Flying Corps and Royal Air Force who :—

(i) Have been actively engaged in the air against the enemy whilst borne on the strength of an operational unit in Great Britain.

(ii Have been employed in flying new aircraft to France.

(iii) Have formed part of the complement of an aircraft carrying ship.

The medal, in bronze, will be granted to all British subjects who were enrolled as followers or members of Native Labour Corps units and who served in theatres of war.

The riband will be—centre orange, watered, with stripes of white and black on each side and with borders of royal blue.

Instructions as to the submission of claims and the disposal of the medals will be issued in due course.

Air Force Secrets

THE Air Ministry calls the attention of all persons who have served but are no longer serving in the R.A.F., the R.N.A.S. and the R.F.C., or who have been employed either directly or indirectly by the Government in research or experimental work in connection with flying, or engaged in the manufacture of aircraft, or parts, or accessories of aircraft, to the fact that no information obtained through secret and confidential service publications or technical apparatus, or in any other manner consequent upon their employment by the Government, as above mentioned, may be disclosed to any other person without the written consent of the Air Ministry.

Disclosure of information so obtained may constitute an offence under the Official Secrets Act, and attention is directed to the obligations and penalties imposed by that Act.

Air Ministry's New Home

THE Air Ministry is being removed as quickly as possible from its present home at the Hotel Cecil to three adjoining buildings in Kingsway—Empire House, India House, Canada House. All communications should now be addressed to the Air Ministry, Kingsway, W.C. 2.

The official entrance to the Ministry will be in Empire House, but letters and parcels should be delivered at the Canada House entrance.

"Flight" Copyright.

"THE COLOURS OF THE GUARDS" in Peace Day Procession, July 19, 1919.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE FLYING SERVICES FUND

A MEETING of the Flying Services Fund Committee was held on Wednesday last, July 16, 1919, when there were present :—Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., in the Chair, Mr. Chester Fox and Mr. B. Stevenson, Assistant Secretary.

Grants and Allowances.—The following Grants and Allowances were made :—

(41) An allowance of £3 a month for three months to the mother of a C.P.O. II in the Royal Naval Air Service who had been killed on active service.

(45) A Grant of £5 to an Ex-1st Class Air-Mechanic in the Royal Flying Corps who had been incapacitated on active service.

(74) A Grant of £10 to the mother of a Corporal in the Royal Flying Corps who had been killed on active service.

(83) An allowance of £3 a month for six months to the widow of a 1st Class Air-Mechanic in the Royal Flying Corps who had been killed on active service.

(116) An allowance of £4 a month for six months to the widow of a 3rd Class Air-Mechanic in the Royal Air Force who had been killed on active service.

(132) An allowance of £1 a month for six months to the mother of a Private in the Royal Air Force who had died on active service.

(134) An allowance of £2 a month for six months to the widow of a Sergeant in the Royal Flying Corps who had died on active service.

(138) The school fees, etc., for at least one year, of the child of the widow of a Private in the Royal Air Force who had died on active service.

(188) An allowance of £1 a month for six months to the widow of a Private in the Royal Air Force who had died on active service.

(220) An allowance of £2 a month for twelve months to the mother of a Sergeant in the Royal Air Force who had been killed on active service.

(221) An allowance of £1 10*s.* a month for six months to the widow of a Sergeant in the Royal Air Force who had died on active service.

(223) An allowance of £2 a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Air Force who had died on active service.

(226) An allowance of £2 a month for six months to the widow of a Corporal in the Royal Air Force who had died on active service.

(227) An allowance of £2 a month for six months to the mother of a 2nd Class Air-Mechanic in the Royal Air Force who had been killed on active service.

(229) An allowance of £2 a month for six months to the mother of a 2nd Class Air-Mechanic in the Royal Air Force who had died on active service.

(230) An allowance of £1 10*s.* a month for three months to the mother of a 3rd Class Air-Mechanic in the Royal Air Force who had been killed on active service

(231) An allowance of £2 a month for three months to the mother of a 2nd Class Air-Mechanic in the Royal Air Force who had been killed on active service

(232) An allowance of £1 10*s.* a month for three months to the widow of a 1st Class Air-Mechanic in the Royal Air Force who had died on active service.

(233) An allowance of £1 a month for six months to the widow of a Private in the Royal Air Force who had died on active service.

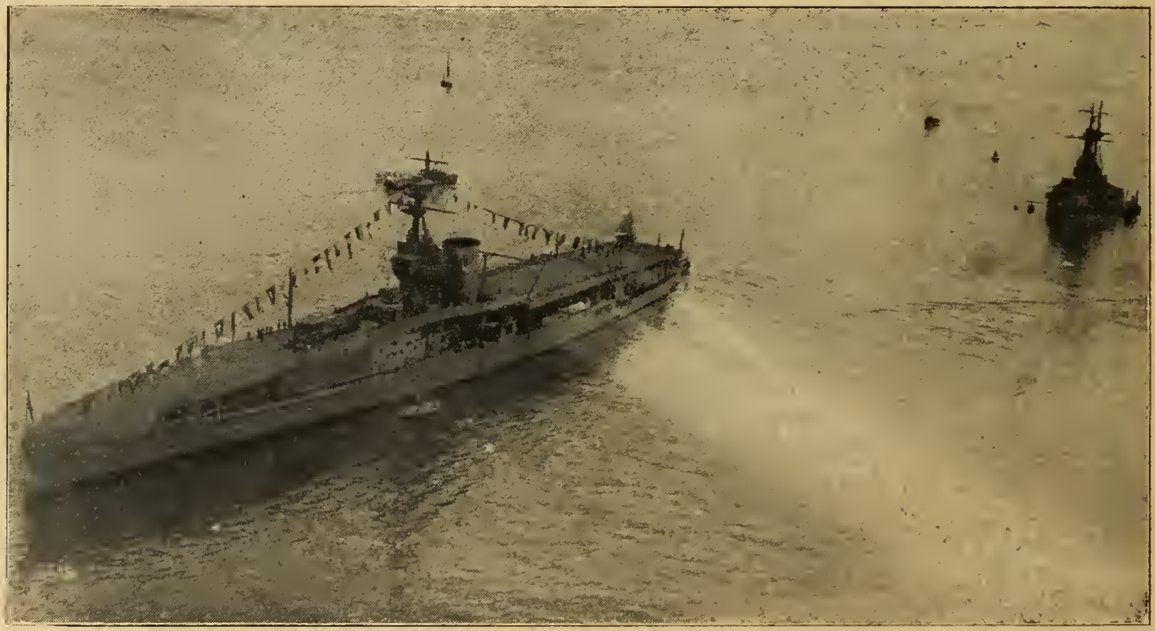
Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

Doctors Wanted for R.A.F.

THE Air Ministry announces that the Royal Air Force requires the services of a limited number of medical practitioners, including those who have already served. All candidates must be fit for general service at home and abroad, should be under 35 years of age, and must be willing to fly, if called upon to do so.

The terms of service are :—Candidates who have served before will be commissioned in their previous substantive rank, those who have not served will be commissioned as Lieutenant. The period for engagement to be for one year or until no longer required, whichever shall first happen. Pay to be at the rate of £550 a year, inclusive of all allowances, except travelling allowances and expenses when travelling on duty, and rations or the allowance in lieu. Outfit and kit allowance will be issued to candidates who have not received them for previous service.

Applications should be addressed to the Secretary, Medical Department, Air Ministry, London, W.C. 2.



"Flight" Copyright.

H.M.S "Furious," in line with the fleet at the mouth of the Thames on Peace Day, July 19. Photographed from above

ROYAL AIR FORCE PAY

The following official statement with reference to the revised rates of pay for officers of the Royal Air Force was issued on Monday last :—

1. The rates of pay, pensions, and allowances for officers of the R.A.F. have been under review, and the standard rates now authorised are as shown in the accompanying statements. The present system, under which the various branches each had their own rates of pay, has been replaced by a uniform system of rates for all branches, with the exception that certain specialist services (such as medical and dental) will continue to have special rates as hitherto. These specialist services will be dealt with separately, except in so far as reference is made to them below.

2. The rates have been fixed with reference to the present high cost of living, and it has been decided that 20 per cent. of the rates of pay and retired pay will be considered as due to the present high cost of living, and will be subject after five years to change, either upwards or downwards, according as the cost of living rises or falls. Subsequent revisions will be made at three-yearly intervals on the basis of Board of Trade food prices.

3. The new rates will not apply to officers awaiting demobilisation or who are temporarily retained. They are intended for those officers who are given permanent or short-service commissions in the Force as reconstituted, or who are seconded to the Royal Air Force from the other Services.

Pay

The rates will be as follows, and will apply generally to officers (including Staff officers) performing duties of the present Flying, Technical, and Administrative branches :—

Rank.	Pay per diem. £	s.	d.
Cadet ..	0	5	0
Cadet after 1 year	0	10	0
Second Lieutenant	0	18	0
Lieutenant	1	3	0
Lieutenant after two years as such	1	5	0
Captain	1	9	0
Major ..	1	14	0
Major after 5 years as such	1	16	0
Lieutenant-Colonel	2	0	0
(Rising by 1*s*. per day after each year to a limit of £2 10*s*.)			
Colonel	2	15	0
Colonel after 2 years as such	2	18	0
Colonel after 4 years as such	3	1	0
Colonel after 6 years as such	3	4	0
Brigadier-General	3	4	6
Brigadier-General, Command Pay	0	5	0
Major-General	5	0	0
Lieutenant-General	6	0	0
General	7	0	0

Special Rates for Quartermasters

—	Rank.	Pay per diem £	s.	d.
On appointment	Lieutenant	0	19	0
After 4 years	Lieutenant	1	1	0
After 8 years	Captain	1	3	0
After 12 years	Captain	1	5	0
After 15 years	Major	1	10	0
	Lieutenant-Colonel	1	15	0

(The establishment of Lieutenant-Colonels will be a very small one.)

Special Rates for Chaplains

—	Rate per diem. £	s.	d.		Rate per diem. £	s.	d.
On entry	1	0	0	After 18 years	1	18	0
After 3 years	1	3	0	After 21 years	2	1	0
After 6 years	1	6	0	After 24 years	2	4	0
After 9 years	1	9	0	After 27 years	2	7	0
After 12 years	1	12	0	After 30 years	2	10	0
After 15 years	1	15	0	Chaplain-in-Chief	£1,000 p.a.		

Temporary Chaplains in the Royal Air Force will receive a gratuity of £50 for each complete year of service, subject to conditions to be hereafter published.

Medical officers will receive the same rates of pay as may be approved for the Medical Service of the Army.

Pay of Officers Employed at the Air Ministry

	Rate	
Directors	£2,000 per annum	Consolidated rates.
Deputy Directors, 1st Class	£1,500 per annum	
Deputy Directors, 2nd Class	£1,200 per annum	

Other officers.—Down to and including the rank of Major.—Full pay and allowances, *plus* £100 per annum. Below the rank of Major.—Full pay and allowances, *plus* £75 per annum.

Attached officers.—Full pay and allowances of their rank, *plus* 10*s*. a day up to three months; thereafter they will come on to the ordinary Air Ministry scale.

Allowances

The allowances will be as given below, and will be reviewed periodically :—

Table Money.—Is under consideration.

Subsistence and Travelling Allowances

—	Up to 8 nights in one place.		After 8 nights.		Daily absence 5-9 hours.		Daily absence over 9 hours.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
A. Rank of Colonel (or similar staff grading) and upwards	30	0	15	0	6	0	15	0
B. Below rank of Colonel	22	6	12	6	4	0	11	6

Lodging, Fuel, Light and Ration Allowances

Home Stations.—The standard rates will be as follows :—

	Lodging.		Fuel and Light.		Rations.
	Per diem.		(average) Per diem.		Per diem.
	s.	*d.*	*s.*	*d.*	
2nd Lieuts. and Lieuts.	3	6	1	0	No change
Capt., Maj., and Lt.-Col.	4	6	2	0	No change
Other officers	No change		Increase of 1*s*. per day.		No change

Note.—Married officers over 30 years of age for whom no married quarters are available and who are, therefore, obliged to provide accommodation for themselves and for their families, may draw lodging, fuel, and light allowances.

Servants' Allowance.—2*s*. for each authorised servant at home and abroad if no servant is provided.

Field Allowance.—To be granted to all officers on active service in the field, and to be issuable whenever officers are under canvas. The rate is still under consideration.

Children's Allowance.—Existing rates of children's allowance will continue until the end of 1919, after which they will be abolished. In the meantime children's allowance will be continued, and officers now receiving the allowance will not become ineligible for it if the effect of the increases in pay now granted is to raise their salaries beyond the limit of income laid down for the grant of the allowance.

Colonial Allowance.—The same as for the Army.

Conveyance of Families.—The cost of conveying the wives, families and baggage of officers will be charged to the public only in respect of changes of station in this country.

Furniture Allowance and Charges.—Furniture allowance and furniture charges are abolished. In future all quarters, including the commanding officer's quarters, will be furnished.

Mess Allowance.—This allowance is abolished.

Travelling Concessions.—The question of the continuation (*a*) of the rule allowing officers proceeding on leave two free passes a year, (*b*) of the reduced fare for officers travelling on leave, is still under consideration.

Pensions

(Applicable to officers performing duties of the present Flying, Technical, and Administrative Branches.)

A.—General Officers

Lieutenant-General.—£975 after 24 years' service, increased by £22 for each year beyond 24, with a maximum of £1,195.

Major-General.—£790 after 22 years' service, increased by £22 for each year beyond 22, with a maximum of £1,010.

Brigadier-General.—£650 after 20 years' service, increased by £22 for each year beyond 20, with a maximum of £950.

An officer must complete three years' service in any of these ranks before being entitled to the special pension attaching to it. This condition will not, of course, affect his title to the pension earned by service in the ordinary way, and an officer may reckon service as lieutenant-general or major-general towards his service in a lower rank if that would entitle him to special pension for that lower rank.

B.—Colonels and Lower Ranks

There will be a minimum qualifying period for pensions—20 years. Subject to this the scale is as follows :—

—	Age.	Retired Pay. £	Service.	Addition for each extra year of service.*	Reduction for each deficient year of service.*
Cols. retire at 55, max. ret. pay £900	55	790	24	22	15
	54	765	24	22	15
	53	742	23	22	15
	52	720	23	22	15
Lt.-Cols. retire at 48, max. ret. pay £600	51	697	22	22	15
	50	675	22	15	15
	49	637	21	15	15
	48	600	21	15	15
Majs. retire at 45, max. ret. pay £450	47	562	20	15	15
	46	525	20	15	15
	45	487	19	15	15
	44	450	19	15	15
Capts. and subalterns ret. at 40, max. ret. pay £400	43	412	18	15	15
	42	375	18	15	15
	41	337	17	15	15
	40	300	17	15	15

* Limited to 5 years.

Gratuities to officers who retire before qualifying by length of service for Service pensions :—

A gratuity of £75 for each completed year of service will be awarded, with a maximum of £1,000, provided that no officer is to be allowed to resign with a gratuity unless he has completed 10 years' service.

While these pension scales will be applicable generally to officers appointed to perform the duties of the present Flying Technical and Administrative branches, including chaplains, the following will be dealt with under special regulations which will shortly be issued :—

Officers seconded from the Navy and Army. Officers who may be appointed as Quartermasters on the special Quartermasters' rates of pay.

Commissioned Warrant Officers, Warrant Officers and Ratings from the Royal Navy on regular engagements who have been given temporary commissions in the R.A.F.

Warrant Officers, N.C.O.s and men from the Army on regular engagements who have been given commissions in the Army or were given temporary commissions in the R.A.F.

It should also be noted that these scales do not apply to specialist services such as Medical and Dental officers, Pay officers and Schoolmasters.

Notes

1. The application of these standard rates of pay, pensions and allowances to the existing and future *personnel* will be carried out under administrative regulations which will shortly be published.

2. The new rates will begin to take effect from the date of the first *Gazette* containing the names of officers appointed to permanent and short service commissions in the Royal Air Force. They may begin at somewhat later dates for officers not dealt with in the first *Gazette*.

◆ ◆ ◆ ◆

EX-R.A.F. OFFICERS' CLUB IN THE CITY

With the double purpose of celebrating Peace and of drawing attention to the existence of such an institution the members of the ex-R.A.F. Officers' City Luncheon Club, ("Ye Olde Birdes") held a Victory Luncheon on July 17 at their meeting place at the Mansion House Restaurant, in Queen Victoria Street, E.C.

Maj. C. O. F. Modin, D.S.C. (chairman of the club) presided, and the guests included Maj.-Gen. Sir W. S. Brancker, Col. W. O. Beatty, Col. J. T. C. Moore-Brabazon, M.P., Lieut.-Col. L'Estrange Malone, M.P., Mr. W. Joyson-Hicks, M.P., Mr. A. Baldwin Raper, M.P., Sir Charles Wakefield and Sir Edward Mountain.

The Chairman in a commendably brief speech proposed the toast of "Success to British Aviation."

Maj.-Genl. Sir W. S. Brancker, in responding, said that they had had a wonderful five years in the air, and he thought they could say without boasting, that British aviation had fought its way from very small beginnings to an absolutely paramount position in the world. When the Armistice was signed our most bitter rivals frankly admitted the superiority of our pilots, and our systems of training, organisation, and leadership. Apart from that we had also led the world in policy by the creation of an Air Ministry and the R.A.F.

Another factor in our success was our powers of organisation and our ability to carry out schemes thoroughly and efficiently. The life-blood of commercial aviation of the future was organisation. If we played our cards properly and went ahead on the right lines, the success of British aviation in the future was assured. At the moment the situation was somewhat difficult. The whole world was talking of aviation, but very little really was being done. A great deal of capital and lengthy preparations were necessary before any great imperial air routes could be made a paying proposition.

At the moment, aircraft construction was languishing. War orders had finished and peace orders had not come in and would not do so for some time. The Air Ministry was torn between an enthusiastic Press and a cold and unsympathetic Treasury, which has not yet been bitten by the "bug" of aviation. A committee had been appointed, with Lord Weir at its head, to study the question of air routes. He had absolute confidence that the report which they produced would be most sound and useful, and when the Government considered that report he hoped they would remember that the future of the Empire would probably depend on our power in the air, just as it had depended upon our power on the sea.

Col. Moore-Brabazon proposed "The Old Birds' Club" warmly, the idea of the club as a means towards fostering the spirit of brotherhood which had done so much towards inspiring the flying officers in their gallant work.

Mr. Leslie Guyer briefly responded.

The club, which was opened in May this year aims at providing a meeting place where demobilised officers of the R.A.F. can spend the luncheon interval in congenial surroundings and keep in touch with one another. All ex-officers of the R.A.F. are eligible for membership, and hon. membership is extended to all serving officers and members of the Royal Air Force Club, Bruton Street.

◆ ◆ ◆ ◆

Triple Fatality at Farnborough

While an Avro and a S.E. 5 were flying at Farnborough on July 14 they collided, and Lieut. A. Herbert and Mechanic C. Hieley, of the former machine, and Lieut. H. A. P. Bizion were killed. At the inquiry held by the Coroner, the evidence threw no light on the cause of the accident. It was stated that the authorities had held an inquiry and were satisfied that the disaster was entirely accidental. The Coroner recorded a verdict of "Accidental Death."

Baroness de la Roche Killed

It appears almost ironical that the Baroness de la Roche, who was the first woman pilot, should have been killed while flying as a passenger. What happened is not very clear, but it would seem that the machine in which she was flying, overturned during a trial flight. Baroness de la Roche was killed instantly and the pilot, Barrault, died very shortly afterwards. Baroness de la Roche, secured her pilot's certificate in France on March 8, 1910, having qualified on a Voisin biplane, and in the following November she won the Femina Cup with a flight of 200 miles. During the War she tried without success to join the French Air Service. A few weeks ago she took a machine up to a height of 4,900 metres (16,170 ft.) but the French Club refused to recognise "women's records," a decision which has caused some discussion across the Channel.

The Death of Lieut. Navarre

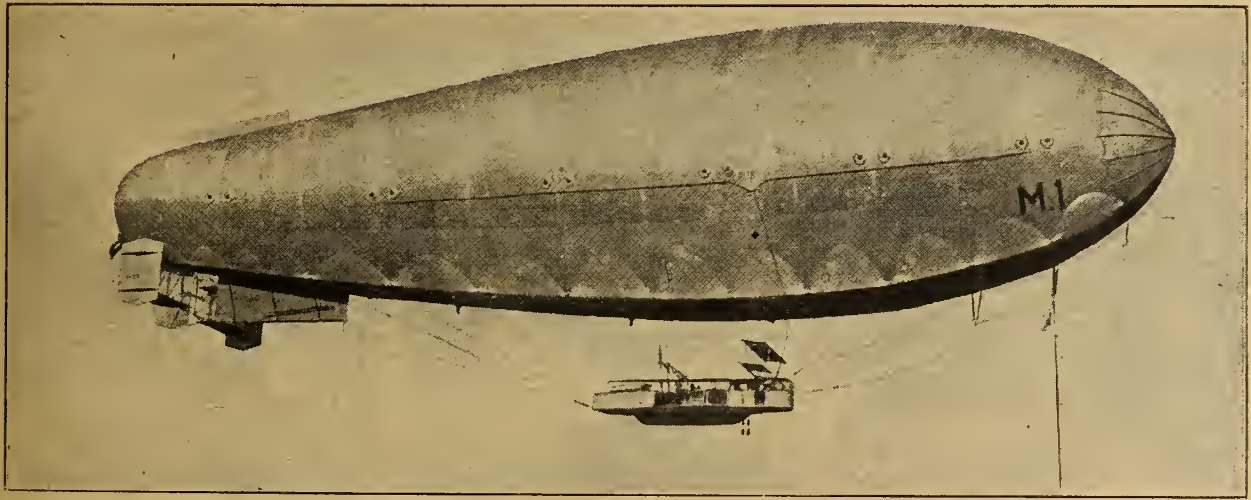
By an accident at Villacoublay on July 10, France lost another of her famous aces, Lieut. Navarre, who held the lead in the French Flying Corps for some time until he was wounded in 1916. The cause of the accident has not been ascertained ; he was trying a new machine, and Capt. Mado, who witnessed the accident, thinks the pilot was overcome by a fainting fit.

AIRSHIPS

THE BRITISH NAVY AIRSHIP S.R. 1, ITALIAN "M" TYPE

On July 2 an airship, bearing the title S.R. 1 on its envelope, flew leisurely over London for some considerable time to assist the Victory Loan. People in the metropolis have become accustomed to see the North Sea airships and also the Zeros and Twins, moreover on occasions they have been vouchsafed glimpses of still larger aircraft such as the rigids R 23 and R 26, but this type of airship was something entirely different and occasioned universal curiosity and speculation. As a matter of fact this is the only airship of its kind in the country and though owned by the Navy and bearing the British identification marks is of Italian design and manufacture.

S.R. 1 is an abbreviation for semi-rigid 1, a design as distinct and separate as the rigid and non-rigid, which has been exploited largely by the Italians. Except in the case of the smallest type of vessel, similar in many respects to our own S.S. Zero, all Italian airships are of semi-rigid design, and vary in capacity between the 141,000 cub. ft. of the Usuelli and the 635,000 of the Forlanini.



The Italian "M" 1 Airship, which is the forerunner of the S.R. 1.

The most successful of the various types of airships is undoubtedly the M class, and following a visit to Italy made by several airship officers in 1917, a decision was made to purchase a ship of the latest M design for experimental purposes. This ship, known as S.R. 1, was completed in September, 1918, and was flown from Italy to this country after an arduous voyage during which much bad weather was encountered. A short description of this airship will show the many salient differences in construction and design from those with which we in this country are more familiar.

The envelope, composed of two-ply fabric, has a capacity of 450,000 cub. ft., or nearly 100,000 cub. ft. more than that of our North Sea airship. It is divided into six separate gas chambers by means of varnished silk diaphragms, while the air balloonet extends along the total length of the bottom of the envelope and is 45·9 per cent. of the envelope volume, equivalent to a rise of 15,000 ft. Fourteen air valves are disposed along the bottom of the envelope fitted with opening and closing controls. The balloonet is charged with air through a valve of the shutter type situated in the nose of the ship. Each of the six gas chambers is fitted with two gas valves, on the starboard side of the envelope about half-way up. The keel which renders the ship semi-rigid, is composed of triangular girder sections formed of high-tensile steel tubing and runs throughout its entire length. All the connections are universal joints, which allow the keel to take up the different angles occasioned by the various stresses and strains. The car, as compared with those designed for British airships, is entirely devoid of comfort, and provides the scantiest accommodation for officers and men. The frame is made entirely of steel tubing with a flooring of wood.

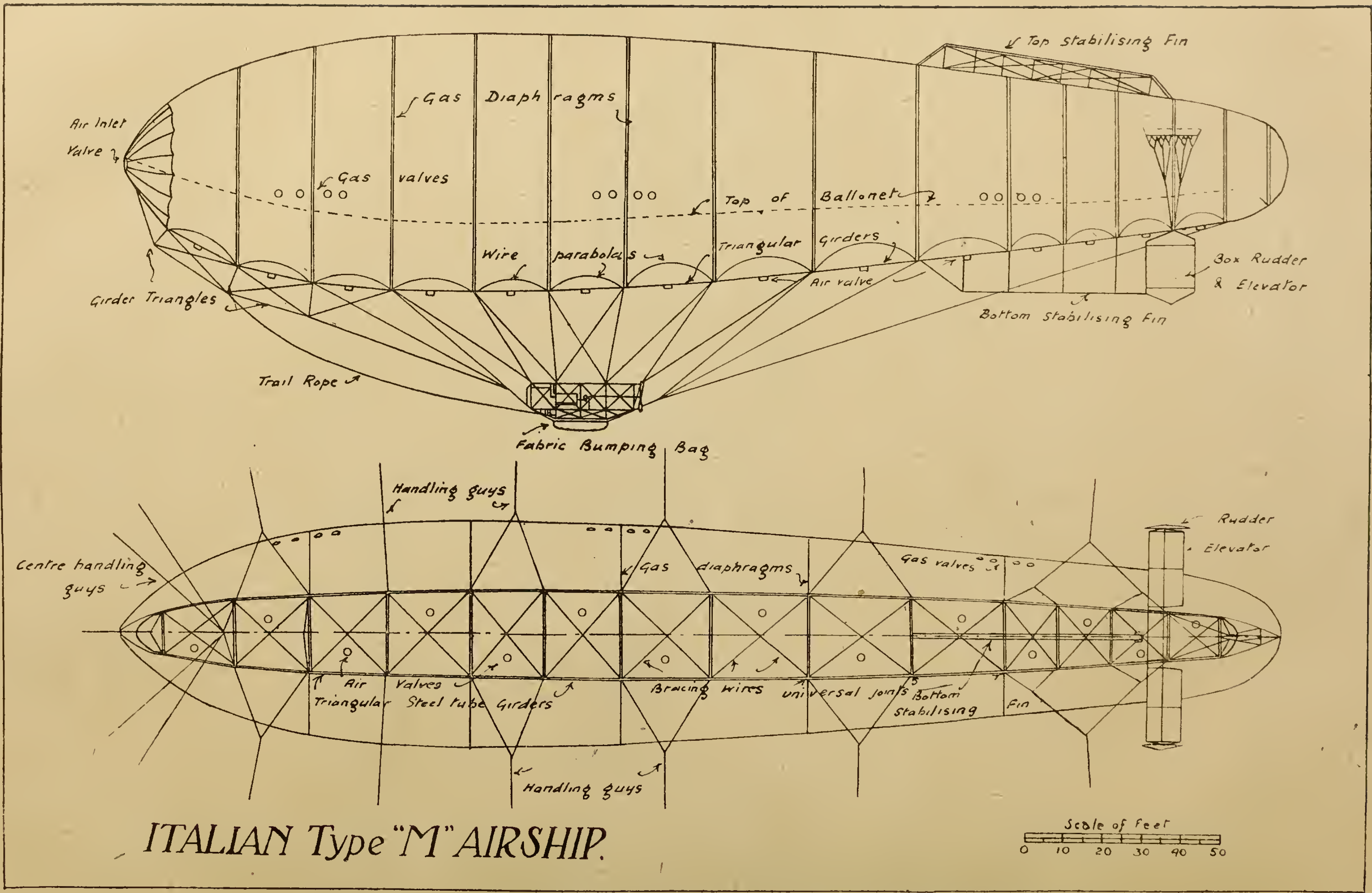
The control position is at the forward end of the car, where are placed the steering and elevating wheels. The valve controls and pressure tubes are also lead to this portion of the car. Engine power is provided by two Itala-Maybach engines which are mounted on either side of the car about 9 ft. from the forward end, the framework being specially strengthened at these points. Each engine drives a single propeller astern of the car through long driving-shafts which are supported by struts from the car and wire suspensions from the keel. Through these tubes runs the drive for changing the angle of the propeller blades. Petrol and water ballast tanks are carried in the car.

The car is suspended by wire cables attached to the joints of the keel girders. These are supported in their turn by parabolic wires sewn into the envelope and connected at each end to the side girders. The keel itself is also connected to the envelope by means of flexible cables which are attached to the ends of all the cross girders of the keel. These cables meet in the form of inverted V's, and pass through the balloonet as single wires to a point about two-thirds of the envelope's height. Here the wires again separate, and the ends are attached to two canvas bands suspended from each end of the envelope near the top. These canvas bands run for the entire length of the envelope. The ship is fitted with top and bottom stabilising fins, composed of girder work covered with fabric.

The elevators and rudders are designed on the box-rudder principle, which is still adopted in all airships in Italy, but which has been abandoned in all modern airships both in this country and in Germany. In Italy, according to all reports, they are considered to be highly efficient and are light and strong.

To summarise, the dimensions and performances of this class of airship are as follows :—

Length	290 ft.
Diameter	58 ft.
Overall height	72 ft.
Disposable lift	7,700 lbs.
Speed	46–50 m.p.h.



THE BRITISH NAVY AIRSHIP S.R.1, ITALIAN "M" TYPE: Plan and elevation to scale.

It is capable of reaching a height of 17,000 ft. with a crew of five.

As mentioned before, the purchase was made for purely experimental reasons, as the authorities of this country had had no experience with a semi-rigid airship of modern design. For practical purposes she is too slow for the work that would be required of our naval aircraft, and her powers of endurance are insufficient for our needs. In Italy, however, the conditions for War purposes were entirely different, as the following three main reasons will prove :—

(*a*) Height was of primary importance.

(*b*) Speed was of secondary importance.

(*c*) Flights were never of long duration.

Height was of the utmost importance as these ships were used for bombing the Austrian ports, and enemy gunfire had to be avoided at all costs.

Speed was of minor importance, as the prevailing winds of Italy are of very low velocity.

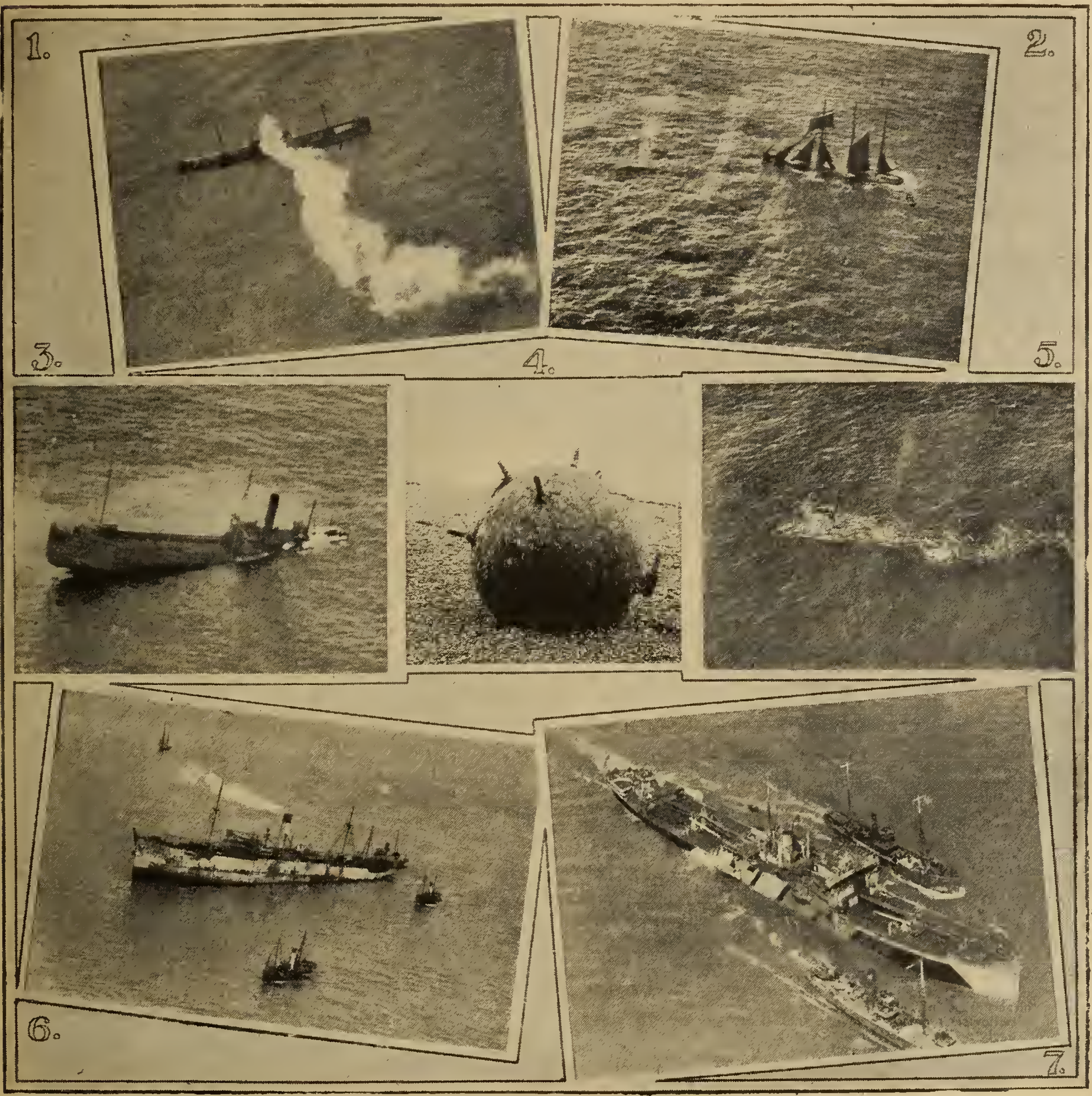
The duration of flights as carried out by the Italians averaged six hours for a bombing cruise and twelve hours for anti-submarine patrol.

When it is considered that patrols of over 24 hours were quite a common occurrence for our airships during the War, it will be seen that a comparison, for instance, with the North Sea type of airship, is absolutely futile.

S.R. 1 arrived in England only a short time before the signing of the Armistice. There was, therefore, but little opportunity of using her for War purposes, although on the occasion of the surrender of the German submarines she met them out at sea and escorted them into Harwich Harbour.

She is, however, so entirely different to our own ships, as to be of interest, and doubtless experience will be gained that will render the purchase worth the money.

* * *



A FEW SNAPSHOTS SECURED BY OUR PATROLLING AIRSHIPS 1. Torpedoed Spanish ship sinking 2. A schooner aground on the Manacles 3. A torpedoed steamer off East Fortune 4. A floating mine ashore near Capel 5. Wreckage of a torpedoed steamer 6 and 7. Torpedoed vessels being escorted to port.

THE AIRSHIP OLD COMRADES' ASSOCIATION

UNDER the above title an association has now been formed, in connection with and under the auspices of the Airship Officers' Club, whose address for the present is at 4, Dean Stanley Street, Westminster, where the Honorary Secretary will be pleased to receive any communications from those interested. The idea of the committee of the Airship Officers' Club in bringing this association into being, is to help ALL ranks, including officers and N.C.Os., both men and women. With this point in view, the primary objects of the association will be the formation of a Mutual Benefit Society and Headquarters for obtaining, without charge, employment both relating to airship construction and flying, as well as any other form of employment, and to that end a register will be kept up-to-date. To join up, only a nominal annual subscription of 2*s.* 6*d.* is payable. A feature of the association will be the organising by the Committee of "Old Comrades" dinners, meetings and other entertainments, thereby helping to keep the past and present airship men in touch with each other. In every way the very excellent objects of this "offspring" of the Airship Officers' Club have so commended themselves to the Editor of "FLIGHT," that arrangements have been concluded for official notices of the association as to meetings and other matters concerning the members to be published regularly in the pages of "FLIGHT." A point to be noted is, that the association is for the benefit of its members only and is to be kept entirely outside all political parties. Service questions is another subject which is also taboo. Altogether the conception of the association should be a valuable airship asset in keeping the threads together of what promises in the near future to be a vast undertaking and industry, whatever the difficulties which at the moment may appear to militate against progress. In fact the more clouds on the horizon of the airship future, the more the need for an association of this character.

Brig-Gen.. E. M. Maitland is the President of the club, the Committee for the first year comprising Lieut.-Col. F. Boothby, Maj. Roberts, Capt. J. H. Hagon, Capt. Montague, Capt. Bellew, Maj. A. Congreve, Capt. G.-E. Stringer, and Maj. G. F. Herron, the Hon. Secretary. This committee will also act for the association.

For the guidance of those directly concerned the following are the official objects of, and regulations for guiding the carrying on of the new body:—

(1) The Airship Old Comrades' Association is intended for the benefit of officers, warrant officers, N.C.Os., men and women who have served in the Airship Service. This will include Government civilian staff, male and female, who have been employed at airship station and establishment.

Officers, men and women, now serving may become hon. members, and as such be able to enjoy the social benefits only.

(2). *Objects.*—The primary object of the association will be to form a mutual benefit society and to provide headquarters for obtaining employment in any way connected with airship construction or flying. It will also endeavour to assist members of the association to obtain any other form of employment, but will in no way be responsible should it fail to do so. The association will not make any charge, but it is hoped that anyone for whom work is found will make a donation to assist the association if he or she is able.

(3) *Subscription.*—The subscription shall be 2*s.* 6*d.*, payable on joining and thereafter annually on July 1, payable to the Hon. Secretary, 4, Dean Stanley Street, S.W. 1. Any alteration in the annual subscription shall only take effect after confirmation at the annual general meeting.

(4) *List of Members.*—A book containing the names, addresses and trades of all members will be kept up-to-date and circulated annually free to all members and to hon. members on payment of 2*s.* 6*d.*

Register.—In addition an unemployment register will be kept, stating the trade qualifications of the members on the list from which employers of labour will be regularly circularised and kept informed.

(5) *Committee.*—The committee shall consist of eight members. For the first year the committee of the Airship Officers' Club will act. Thereafter the committee will be elected by ballot of the members (not hon. members) of the association. Any member willing to serve and who is proposed and seconded by two members shall be eligible to be balloted for. Ballot forms will be included in the book issued to members together with the list of members proposed for election. The form shall be returned to the Hon. Secretary within 14 days and the results published in one month. The new committee shall take over on July 1.

(6) *Powers of the Committee.*—The management and control of the property, funds and affairs of the association shall be vested in the committee.

(7) *Foreign.*—Members going abroad should advise the Secretary and may be asked to represent the interests of the association in various parts of the world. They should in any case inform the Secretary of any suitable vacancies they may know of and keep the association in touch with the local labour condition.

The association is already represented in the Malay States, Ceylon.

(8) *Social.*—The committee will also organise "old comrades" dinners, meetings, or any other entertainments at the request of the members, that the committee may think desirable (probably one for each station annually) which members and hon. members may attend on paying expenses.

The Editor of "FLIGHT" has kindly placed his journal at the disposal of the association for the notice of meetings, etc., and all official notices will be published in it.

The committee are responsible that the association keeps clear of all political parties and is used solely for the benefit of its members. It shall not interfere in Service questions in any way.

◆ ◆ ◆ ◆

AVIATION IN PARLIAMENT

Airship Construction, Parrow-in-Furness

MR. T. WILSON, in the House of Commons on July 14, asked the Secretary of State for War whether he can indicate the policy of his Department in connection with the building of airships; whether he is aware that, owing to the change over from war to peace conditions, numbers of workpeople are unemployed in Barrow-in-Furness; and whether he can hold out any hope of expediting the construction of airships at Barrow-in-Furness, and thus facilitate the employment of the workpeople now unemployed, and who have in the past been employed on airship construction?

Dr. Macnamara: I have been asked to answer this question. As regards the first part, I am not quite sure what information it is that my hon. friend desires. As regards the second and third parts of the question, so far as we are concerned, Messrs. Vickers' airship shed is not large enough for the construction of rigid airships of the sizes now required by the Navy, and it is therefore impossible, under present conditions, to order further rigid airships for construction at Barrow-in-Furness.

Anti-Fire Devices

MR. RAPER, on July 17, asked the Under-Secretary of State to the Air Ministry whether his attention has been called to the destruction by fire of a British postal aeroplane in the South of France; and whether he is satisfied that all anti-fire devices are used on such machines?

Maj.-Genl. Seely: From the preliminary reports received by the Air Ministry it would appear that the aeroplane in question caught fire after "crashing." The provision of "self-sealing" petrol tanks is a great safeguard against fire in accidents of this kind, but the progress with this type of tank has been so recent that it has only been possible to fit them in the very latest design of aeroplane. All future designs will provide for "self-sealing" petrol tanks.

Amsterdam Exhibition

CAPT. W. BENN asked the Under-Secretary of State to the Air Ministry what steps the Controller of Civil Aviation is taking to assist commercial firms to show machines at the forthcoming exhibition at Amsterdam?

Maj.-Genl. Seely: Assistance is being given to private firms by the release of machines and engines, where they have passed the experimental stage, and can be spared from the Royal Air Force. Negotiations have been in progress with the Dutch Government for the opening of civil communication by air between England and Holland during the period of the exhibition.

Aerial Mails

IN his speech introducing the Post Office estimates in the House on July 17 the Postmaster-General said: The question of air mails is one which, naturally, has occupied our attention very much during the War. This has been placed entirely, and quite rightly, under the care of the Air Force. It does not do to have half a dozen people interfering with one thing. The results which have been achieved—I believe mainly privately—in flying the Atlantic have been very remarkable. The first attempt by Hawker, unfortunately, was not a complete success, but he managed to deliver a small number of letters which he was bringing, and they were quite safely delivered in London. I received a letter from the Postmaster-General of Newfoundland, to which I replied in suitable terms. The next attempt, by Capt. Alcock, was completely successful. He flew in 16 hours from Newfoundland to Ireland, and managed to deliver his mails in a very satisfactory condition and in a short time. What I consider to be one of the most remarkable achievements was that just accomplished by the R 34—the lighter-than-air ship—which went from here to America in an incredibly short time, made a round, and came back to this country again. I sent a letter to the Postmaster-General of Canada by the R 34, and a few hours after she arrived back in this country his reply was delivered to me at the General Post Office in London. Of course, these things do not make the question of air mails a practical proposition, but it has been shown that there are great possibilities. In the course of time, if the progress made is as rapid as has been made in the flying branch of the Army, before many years the long-distance post, at any rate, will be carried by either lighter or heavier-than-air machines.

Capt. W. Benn: What about internal mails by air in these islands?

Mr. Illingworth: At present the great difficulty is the state of the atmosphere. I am told there is great difficulty in navigating in a hazy atmosphere and also in landing. I am informed that when that is overcome it will be a practical proposition for the longer distances. I do not know what means are taken to fly and land in thick weather, but I gather that it will not be beyond the resources of the people of this country to do that.

V.C. FOR THE LATE CAPT. MANNOCK

It was announced in the *London Gazette* on July 18 that H.M. the King has been pleased to approve of the award of the Victoria Cross to the late Capt. (acting Maj.) Edward Mannock, D.S.O., M.C., 85th Squadron, R.A.F., in recognition of bravery of the first order in aerial combat.

On June 17, 1918, he attacked a Halberstadt machine near Armentières and destroyed it from a height of 8,000 ft.

On July 7, 1918, near Doulieu, he attacked and destroyed one Fokker (red-bodied) machine, which went vertically into the ground from a height of 1,500 ft. Shortly afterwards he ascended 1,000 ft. and attacked another Fokker biplane, firing 60 rounds into it, which produced an immediate spin, resulting, it is believed, in a crash.

On July 14, 1918, near Merville, he attacked and crashed a Fokker from 7,000 ft., and brought a two-seater down damaged.

On July 19, 1918, near Merville, he fired 80 rounds into an Albatros two-seater, which went to the ground in flames.

On July 20, 1918, east of La Bassee, he attacked and crashed an enemy two-seater from a height of 10,000 ft. About an hour afterwards he attacked at 8,000 ft. a Fokker biplane near Steenwercke, and drove it down out of control emitting smoke.

On July 22, 1918, near Armentières, he destroyed an enemy triplane from a height of 10,000 ft.

Maj. Mannock was awarded the following distinctions for his previous combats in the air in France and Flanders :—

Military Cross. (Gazetted September 17, 1917.)

Bar to Military Cross. (Gazetted October 18, 1917.)

Distinguished Service Order. (Gazetted September 16, 1918.)

Bar to Distinguished Service Order (1st). (Gazetted September 16, 1918.)

Bar to Distinguished Service Order (2nd). (Gazetted August 3, 1918.)

This highly distinguished officer during the whole of his career in the R.A.F. was an outstanding example of fearless courage, remarkable skill, devotion to duty, and self-sacrifice, which has never been surpassed. The total number of machines definitely accounted for by Maj. Mannock up to the date of his death in France, July 26, 1918, is 50—the total specified in the *Gazette* of August 3, 1918, was incorrectly given as 48, instead of 41.

* * *

AIR COMPETITIONS AT SOUTHPORT

The hum of the Avro Air Fleet attracted a large crowd to the Birkdale Palace Aerodrome, near Southport, last Saturday. It is estimated that some 10,000 people witnessed the flying from the enclosures and the sandhills round the aerodrome ; in fact, it is stated that no such crowd had been seen at Southport since King Edward VII visited the city.

The occasion was Lancashire's first Aerial Fete and Gymkhana. Machines came from Morecambe, Manchester, Blackpool, Liverpool and Preston to compete in the events. Punctually at 3 o'clock the Avro Band, which had flown over from Manchester, struck up as two flights took the air and flew round Southport in formation, the first flight of five machines led by Capt. E. Maitland-Heriot, D.S.C., landing in formation, making a very pretty spectacle.

The next event, a landing competition, in a space of about 50 yards square, gave the spectators some idea of what a modern machine is capable. An imitation fence had been planted in the sand, and competitors had to land as near over it as possible. One or two pilots landed on the near side and demolished part of the hedge, which the officials and judges quickly repaired. This event was very exciting both for competitors and spectators, as two or three machines would land side by side within a few seconds of each other.

An aerobatic display followed, all the usual stunts being performed in order, so that the spectators had an opportunity of distinguishing between such manœuvres as a continuous vertical bank, a spiral and a spin.

The big event of the day was a 12-mile race over the sea and sand. This attracted 10 entries, all of whom got off within a few seconds of each other. Lieut. Brown led from start to finish, closely followed by Lieut. Adams and Capt. Heriot. It was surprising the difference in speed between the machines, in view of the fact that they were similar in all respects.

The "Follow-My-Leader Competition" concluded the display, a long string of machines imitating the leader's example in such manœuvres as diving, zooming, turning and landing.

A silver cup, value 30 guineas, presented by the directors of the Birkdale Palace Hydro, was awarded to Lieut. Brown for the best all-round performance of the day. Fitter Rigby and Fitter Gower, mechanics on the winning machine, were also presented with prizes. Lieut. Adams was judged second and Capt. Collison third in the day's performance.

Maj. Crossley, R.A.F., and Messrs. C. H. Parr and A. Whittaker, of Birkdale, officiated as judges. After the event 10 machines did passenger flying, and were kept very busy for several hours. The whole exhibition was organised by Maj. McMinnies, late R.A.F., who is running the Avro enterprise in the North of England.

The Avro "Aerodrome" on the sands at Southport for the flying meeting

AIRISMS FROM THE FOUR WINDS.

So at last those "Victory Medals" for all and sundry who have done their bit are to be forthcoming. It would have been in keeping that they should have been "out" in time for the Victory march last Saturday. But there are many disturbing causes which prevented such a consummation to the efforts of the International Committee appointed to decide upon the matter in principle and in detail. But it's something to have got going so far as to be able to set out the final conclusions arrived at by the Committee. "Victory Medal" is the official title decided upon. Each Power is to entrust the carrying out of the design to an artist of its own, but the following general principles will guide the artists :—

(*a*) On the obverse there will be a winged figure of Victory, full length in the middle of the medal, and full face ; the borders and the background plain, without either inscription or date.

(*b*) On the reverse there will be an inscription "The Great War for Civilisation," translated into the different languages, and either the names of the different Allied and Associated Powers or their coats-of-arms.

(*c*) The rim is to be plain, and the medal is round (36 mm. in width) and made of bronze.

This medal will be distributed on principles to be decided by each Government, but in such a manner that it cannot be confused with a purely commemorative medal which might be given to all mobilised men.

The ribbon is identical for all the countries, and consists of two rainbows joined by the red in the centre.

- - -

IN regard to how the distribution to the troops throughout the British Empire should be governed, the obvious scheme of restricting it to troops who had been engaged in actual fighting at once presented itself to the Committee. But on referring the matter to experts at the War Office who had been engaged in former distributions of war medals it was found that, owing to the great depth of fire zone under modern conditions, the expressions "under fire" and "in the presence of the enemy" were very difficult to define with any degree of accuracy, and therefore, that even if any precise definitions could be made, it would take many years to examine and adjudicate the claims of so many million men. Even then this distribution would be unsatisfactory. It was, therefore, decided that all that was possible was to give a distinctive reward to those who had entered a theatre of War. As regards the Army, it was therefore, proposed to restrict the Victory Medal to those officers and men who had entered a theatre of War on the strength of any military unit

- - -

THE problem as regards the Navy was somewhat different. Although there would not be the same difficulty as would be experienced when dealing with the Army in distinguishing between those who had been engaged in fighting and those who had not, yet it was considered that the definition "all officers and men who had been afloat on duty" would be analogous to the definition applied to military personnel, viz., "all officers and men who had entered a theatre of War on duty and on the strength of any unit." It was, therefore, decided to adopt the former condition of award for naval personnel.

- - -

IF this analogy was carried on to the Air Force, it would necessarily follow that all those who had been up in the air would be eligible for the Victory Medal, but after consideration it was found that the qualifications in the Army and Navy could in no way be applied to the Air Force, and that distinct conditions of service would have to be drawn up. The Air Council therefore proposed the following :—

(1) All officers and men who had been posted to a unit in any theatre of the war outside Great Britain.

(2) All officers and men of operational units in Great Britain who have been actively engaged in the air against the enemy.

(3) All officers and men employed on flying new aircraft to France.

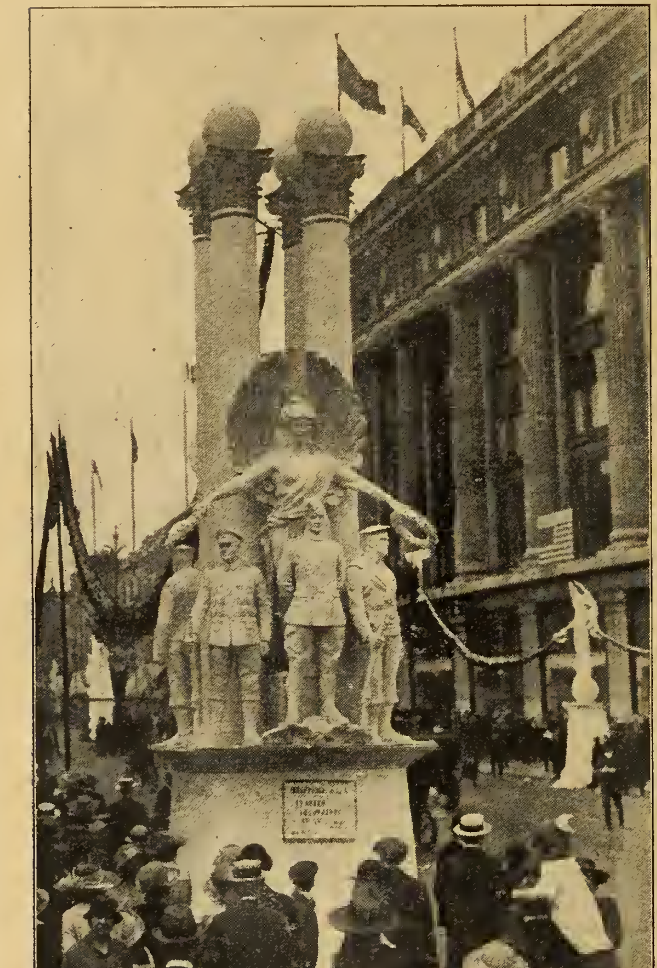
(4) All officers and men who have formed part of the complement of aircraft-carrying ships.

The operational units include those employed on the following duties :—

(*a*) Airships employed on Fleet reconnaissance, convoy work, and anti-submarine patrols.

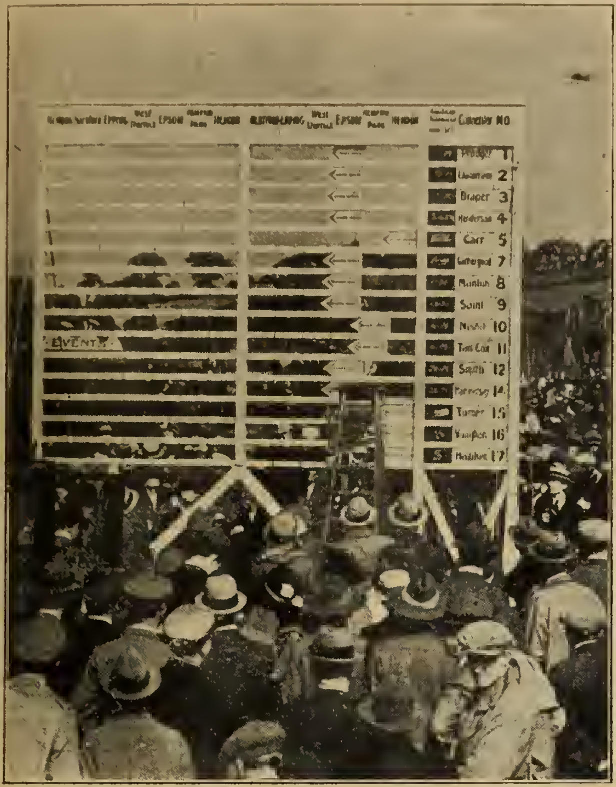
(*b*) Aeroplanes and seaplanes employed on coast reconnaissance and anti-submarine patrols.

(*c*) Aeroplanes and seaplanes employed to protect Great Britain from hostile air raids.



"Flight" Copyright.

A striking group in the scheme of decoration in Oxford Street, outside Selfridge's, and undertaken by that firm. Note the R.A.F. figure in the centre of the group.



"Flight" Copyright.

A nearer view of the very practical "scoring-board" which was used for the first time at Hendon for the Aerial Derby. We publish this by request, as it should be a feature at any race meeting to enable the public to follow closely the positions from time to time of the competitors. It is to be a regular feature at the London Aerodrome, Hendon, and should add considerably to the popularity of this great open-air London resort

THE British War Medal will be given to all officers and men who have left their native shores in any part of the British Empire, whether they eventually entered a theatre of war or not. Men who left the United Kingdom to garrison any part of the British Empire, and equally men from the Dominions who came to this country, but did not later go to France, will therefore be entitled to this medal.

A general desire was expressed to have a separate medal for each theatre of war, but on enquiry it was found that there were several hundred thousand men who had served in more than one theatre of war. As many as 150,000 had even served in four. As it would obviously be unjust to give these men four medals, while the greater portion of the Army serving in France would only receive one, it was decided to abandon the idea of separate medals for each theatre of war.

– – –

IT was first considered that, owing to the kaleidoscopic nature of the War and the protracted periods and extensive areas covered by the battles, it would be impossible to award "battle" clasps. It was thought that the examination of different claims would be such a vast undertaking that the issue of clasps would not be possible for many years. It was therefore decided to award "date" clasps only.

A very strong desire was, however, expressed that "battle" clasps should be awarded. It was represented that there was not the same urgency with regard to the issue of clasps as there was with regard to the issue of medals, and that the British soldier would prefer "battle" clasps, even though their issue would be protracted, than none at all. The matter was therefore reconsidered, and a special committee, composed of representatives of all three Services—the Navy, the Army, and Air Force—and each of the Dominions, has been appointed to report on whether battle clasps are possible, and, if so, to decide what "battle" clasps should be awarded.

– – –

WOMEN borne on the strength of an organised Force will, if they have entered a theatre of war on duty, be entitled to both the British and Allies Medal, but women belonging to any independent organisation recognised by the Admiralty, War Office, or Air Ministry in any theatre of war will receive the British Medal only.

– – –

AS regards precedence, it has been decided that these medals and stars shall rank in the following order :—

The 1914 Star.
The 1914-15 Star.
The British War Medal.
The Mercantile Marine War Medal.
The Victory Medal.

The British War Medal will be made of silver, but all the others in bronze. The design for the British War Medal has been the subject of an open competition among artists, and the best artists in this competition have now been asked to design the Victory Medal for the troops of the British Empire.

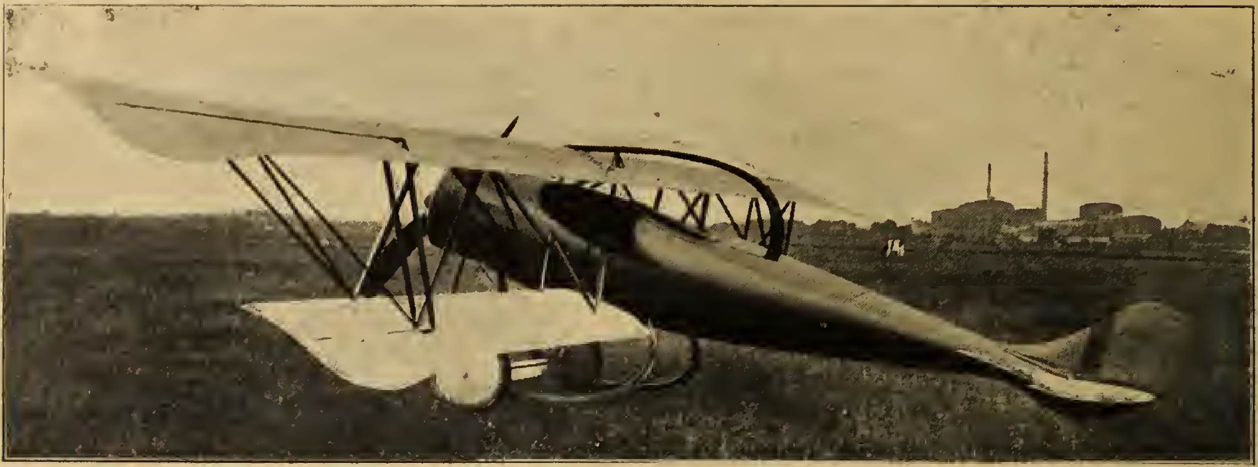
– – –

IN Federal official circles in Melbourne it is freely stated that a minimum of £300,000 is to be expended during the present financial year on constructional aviation work. Compared with the amount set aside Imperially by our Home Parliament, the amount is generous.

– – –

PROVISIONALLY, flying in Denmark with passengers has

PEACE DAY ON EARTH.—SMITH (*ex-Lieut. Smith, R.A.F., a very small man, finds himself firmly wedged in the crowd on Peace Day*): **"Jove! I'd give a thousand pounds to be in my old Camel just now."**



THE DIMINUTIVE BIPLANE RECENTLY CONSTRUCTED AT THE PAALSON FACTORY IN SWEDEN: It weighs 700 lb., and carries 400 lbs. at 80 m.p.h. with a 50 h.p. Thulin-Gnome engine. Note the strutting and the peculiar "gadget" above the body—presumably a sort of hand-grip for picking up the machine and carrying it home!

been forbidden, and foreign pilots desiring to fly to Denmark must first obtain official permission.

- - -

FROM Copenhagen comes information in regard to the plans of a German aerial company for obtaining the leading position in Scandinavia, as opposed to British and French enterprise. It is boldly stated by the Berlin correspondent of the *Ekstrabladet* that this company is at work on a big scheme to establish a regular airship line between Berlin, Odense, Copenhagen, and Stockholm. Trial flights have recently been made with a giant Zeppelin, intended for the new route, which is driven by seven powerful motors and able to carry 100 passengers besides its crew. The trials have proved satisfactory, and, if all goes well, the line will presumably be opened in two or three weeks. What we do not, however, quite follow is how this activity can be reconciled with the terms in the Peace Treaty whereby Germany is debarred from building or possessing aircraft.

- - -

THERE is, of course, a natural sequence to a clause of this sweeping character. What is to prevent the Huns running big aircraft shows in Norway, Sweden, Denmark, etc., and should the Prussian junker in time still have a stomach for war, what is more likely to happen than for clouds of these aircraft of peaceful nations suddenly to take wing for Germany, and thus form the nucleus of a fighting force to start once again the disturbance of the world? It will be a case of Der Wacht on the members of the League of Nations!

- - -

Apropos this L. of N., with Victory Day over and the millennium of the L. of N. arrived, it is quaint to note that Roumania has now started a general mobilisation for combating the dangers anticipated from Hungary, even young students of aviation in France having been commanded to return immediately, with or without pilots' certificates. As a famous conjurer used to say "Isn't it wonderful?"

- - -

AND how does this L. of N. stand in regard to roping in with its tentacles, the handling of the "Direct Action" Bolshie Johnnies who are just now out so strenuously to help forward the peace of the world?

◆ ◆ ◆ ◆

When the "bhoys" would not be denied: Col. Warwick-Wright's Rolls-Royce full-up, inside and out. This car, upon the occasion of the photograph (the home-coming of Hawker after his Atlantic attempt), accommodated no less than 37 passengers, in the procession to the Royal Aero Club—10 inside, 11 on the roof, 4 standing on the petrol tank, 4 on the driver's seat, and 2 on the bonnet, the balance being distributed on the running boards and mudguards. It was rough on the springs, but the engine never made a murmur.

SOME DEVELOPMENTS IN AIRCRAFT DESIGN AND APPLICATION DURING THE WAR

By the Right Hon. LORD WEIR OF EASTWOOD, P.C., Honorary Fellow of the N.E. Coast Institution of Engineers and Shipbuilders.

(*Continued from page* 959)

PART II.—*Construction and Application*

Wing Structure.—General development in wing construction of aeroplanes, during the War, has been more in the nature of refinement of detail, than of evolution of methods.

With increased knowledge concerning the loads to which the structure is subjected during flight, has come the possibility of more scientific proportioning of the structural members; but beyond this the general arrangement of the wing has remained unchanged The structure percentage weight has shown the effect of increased knowledge, and this percentage has now reached a very low value.

The effect of attention to detail has also been to give a general cleaning up and simplicity to the appearance.

In external bracing, changes have taken place in some particulars. In 1914 the duplication of the main lift wires was considered to be very important, if not essential; now, in the event of one wire getting shot away, the loads are taken through the incidence wires, which are those seen when looking at a wing from the side. At the commencement of the War, hard-drawn piano wire was used for the main lift and anti-flying wires in many types; when this was not used, stranded cable was employed. The use of these materials has been superseded by streamline wires. These consist of high tensile steel rods of a lenticular section rolled from bar. The ends are left circular, and threaded to form a simple means of attachment to the fittings. These wires have proved very satisfactory, and initial troubles, due to crystallisation of the metal through vibration, having been overcome, this is now the commonest form of bracing. Hard-drawn piano wire has disappeared, but cable is still extensively used, particularly in types where high performance is not essential.

Tthe design of interplane struts has undergone certain changes. The earlier aeroplanes had struts of streamline section made from solid spruce, and occasionally steel tubes faired off to a steamline form by light fairings were used. With the growth in size of aeroplanes and the increasing scarcity of suitable wood, built up or laminated struts were used. Also, with the standardisation of steel tubes for aeroplane work, and an enormously increased production of these, this form of strut became very popular. It is a most efficient construction, particularly for the landing chassis.

Internal bracing wires have gone through much the same process as the main-plane bracing wires—at the commencement of the War, piano wires were invariably used, but these have now almost universally been superseded by swaged rods, screwed at the ends for fitting purposes.

During the War also, the scarcity of silver spruce occasioned the development of new methods of spar construction. These were originally always in one length from the centre section to the wing tip and spindled from a solid section. The first effect of timber shortage was to introduce a system of splicing, and much experimental work was carried out to determine the best form of splice to be used. The result of this work was that a straight scarf joint sloped 1 in 9 was adopted as a standard. This scarf was glued, pegged and wrapped with fabric. Its efficiency was high when compared with the solid spar, and it was a simple job when considered from a production point of view.

The splicing of spars was not found sufficient to overcome the timber shortage, and the need became evident for some change in design by which small scantling timber could be used, even for the spars of large aeroplanes.

Further experimental work was put in hand, this time to determine the effect of laminating spars, *i.e.*, glueing thin strips together, and from this built-up section constructing spars in the ordinary way. At the same time experiments were made on box spars, *i.e.*, the spars instead of being made of the common "I" section were made in box form, the flanges and webs being formed of separate pieces of materials, glued and bradded together. Both the laminated and box spars were found to be very successful, and both types were immediately put into service. No trouble has been met with from their use. Indeed, it is probable that better quality spars are obtained by this means than by cutting from the solid, at any rate for large aeroplanes. The smaller the scantlings, the easier inspection becomes, and the more guarantee is there that first-class material only is being used.

Splicing and the building up of spars have proved such successful innovations, that there is no doubt that these methods of spar construction, introduced purely as War measures to overcome the serious timber shortage, will remain as standard in the future.

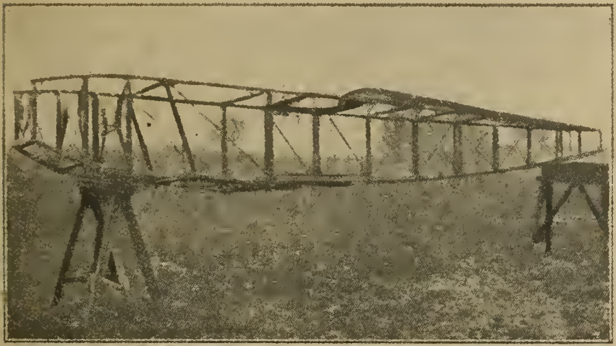


Fig. 8.—Braced N-girder *fuselage*. Fairey.

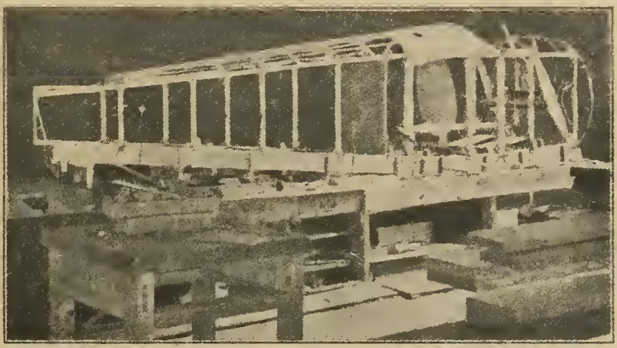


Fig. 8a.—Braced N-girder *fuselage*. Camel.

Fuselage Construction.—*Fuselage* construction has undergone very few changes, during the period of the War, as regards methods. Larger aeroplanes have been built, and this has naturally meant greater attention to the construction, but the broad lines of design have remained fairly well the same.

There are three principal types of construction adopted in present-day practice:—

1. The braced N-girder *fuselage* (Figs. 8 and 8A).
2. The three-ply covered *fuselage* (Fig. 9).
3. The monocoque *fuselage* (Fig. 10).

The first of these consists of four *longerons*, or fore and aft rails, braced by a system of struts and diagonal wires in all four faces. Fabric covering completes the structure. This is the commonest type of design.

The second system retains the *longerons* and the vertical and horizontal struts, but in place of bracing wires and fabric, thin three-ply is glued and bradded to the framework.

The *monocoque fuselage* dispenses with the *longerons* and consists of a single sheet of three-ply or veneer moulded to shape on formers.

As a general rule, three-ply frames are provided as bulkhead bracing at intervals along the length. There are several varieties of this construction, but the essence of them all is the tubular construction of thin veneer, the formers or bulkheads merely being inserted to stabilise this skin.

Of the three methods of construction, the first and third were known and adopted before the War, and modifications have been more in the nature of improvements in manufacture than in fundamental alterations in principle. The second method was, I believe, first used by the Germans in their early Albatross scout at the beginning of the War, but has since been used with great success by British designers, notably in the case of the De Havilland designs.

Monocoque Construction.—The *monocoque* method of construction was adopted by the Germans at an early date and was later almost universally used by them. The probable reason for this was their ample supply of high-grade three-ply, rather than any constructional or aerodynamical advantages which they attached to this method of construction.

The chief advantage, from the service point of view, of a *monocoque* method of building *fuselages* lies in its invulnerability to casual bullets. In an ordinary *fuselage* a bullet striking a main *longeron* or strut might quite possibly cause the structure to collapse, whereas a *monocoque* will stand up to any number of bullets. A disadvantage is that truing up becomes difficult and special arrangements are necessary to overcome this defect.

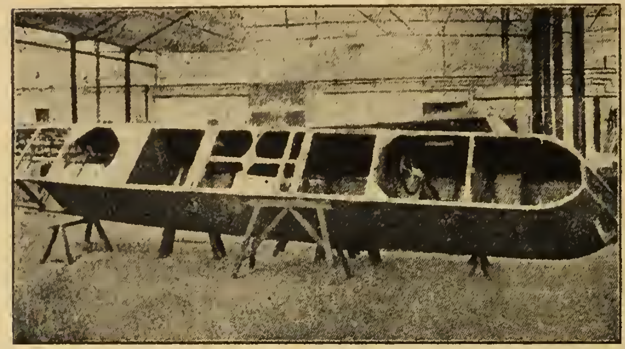


Fig. 9.—Three-ply covered *fuselage*. De Havilland 10.

Our supplies of three-ply were deficient almost up to the end of the War owing to the failure of the Russian supplies, and this no doubt had a considerable influence on our designers and manufacturers. One of our firms did develop a very simple method of constructing in three-ply, which would have admitted of a large production, but the particular aeroplane was not adopted for other reasons.

It was thought at one time that the rounded fish-like form of *monocoque* would considerably lessen air resistance, and would enable a higher speed to be developed. The importance of this, however, has been a good deal exaggerated ; the advantage gained is not worth very much.

The *monocoque* construction offers great opportunities of development for commercial aeroplanes, as it leaves the space inside the skin free from obstruction, a very considerable advantage when carrying mails, goods or passengers, and in this respect it has a great pull over the standard braced *fuselage* where diagonal bulkhead bracing wires occur at every panel. It has also a considerable advantage in the almost complete absence of metal fittings, making for ease of construction.

The largest aeroplane yet built—the Tarrant Tabor—has a *fuselage* 11 ft. in diameter, which has been built on a modification of this principle, the skin being made of layers of thin laths glued and tacked over formers until set. The skin is stabilised by latticed hoops of wood, and the resulting structure is a very light and strong *fuselage* with the whole of its interior free from obstruction.

The regrettable accident to this machine on its first trial in no way reflects on the basis design of the machine.

In a flying-boat, the hull has to function both as a boat, as a landing carriage, and as a *fuselage*, and it is not uncommon to hear of the seaplane, as a class, being under serious disadvantage to the aeroplane, because of the heaviness of its hull. Our experience during the War has brought us to the point of being able to state that a well-designed hull is no heavier than a *fuselage* and landing-carriage, and that sea aircraft are, therefore, under no disadvantage under this heading as compared with land aircraft.

Metal Construction.—There is no doubt that the future of metal construction for aircraft is very promising. The amount of work and time entailed in designing metal structures is very much greater than that required for wooden ones, owing to the experimental work involved. There is also the difficulty of introducing modifications during the production stage, modifications which were continuous, during the War, owing to Service demands to meet new and unexpected conditions. During the War, therefore, metal construction has not been generally adopted. Its future, however, was clearly seen, and a great deal of experimental work was done, principally in connection with the Avro Training aeroplane. At the end of 1917, as I have said before, there was a shortage of good quality timber, and a still greater shortage was foreseen as probable in the future, owing to the demands of the enlarged programme. A big effort was made to employ metal for the Avro which was absorbing something like one-third of our total wood supplies, and which was a thoroughly well established type, with an assured future for training purposes.

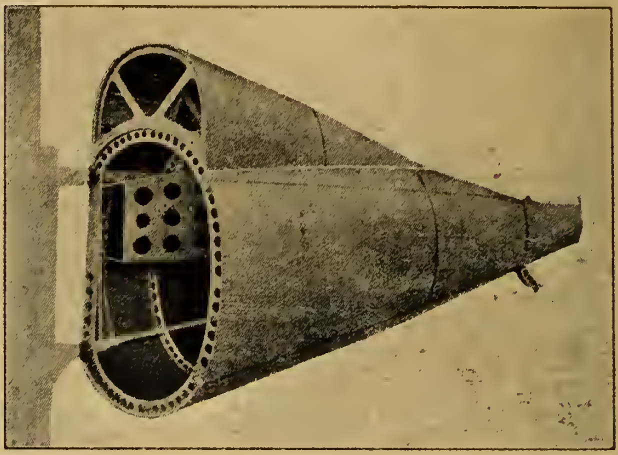


Fig. 10.—Typical *monocoque fuselage*. Parnall Panther.

The experimental work done in this direction was very considerable and much interest was aroused among manufacturers. As a result, it can be definitely stated that, even for such a small type, the use of metal enables the wings to be made slightly lighter and distinctly stronger than is possible with the best quality spruce. The experimental work necessary to get at this result was so extensive and protracted that the type was not actually produced in metal in quantities, but the information obtained was of the utmost value and was well worth the effort.

Experimental work was also carried out in the application of metal construction to larger aeroplanes, and there is no doubt that the constructional gain both in weight and in reliability will be more marked in the case of large types than in small ones. The uniformity of strength obtainable in metal will give it a marked advantage over wood, and will enable aeroplanes to be made without such large allowances for variations of material.

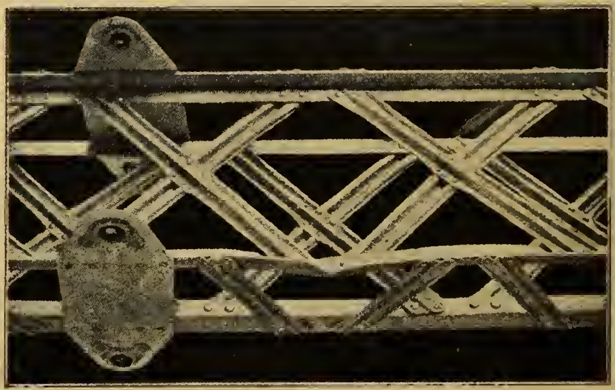


Fig. 11.—Metal construction. Vickers duralumin.

The Germans, on the other hand, were driven to the necessity of employing metal at an earlier date than ourselves, and although they never turned out any metal structure which would have satisfied us, this form of construction was very considerably employed. Their A.E.G. twin-engine bomber was almost entirely made of metal, but it was relatively heavy and allowed only a very small weight of bombs or fuel, before it became dangerously overloaded. For the spars they used high tensile steel tubes which are not altogether satisfactory for use as a combined strut and beam.

At the end of the War there certainly did appear an all-metal German aeroplane which was called the Junker monoplane. This was of a quite novel type of construction, the wings being covered with corrugated aluminium sheeting and having multitudinous internal tubular bracing. A very thick wing section was employed. The performance was not good, and it is doubtful if the type would have really been of any serious value, but as a piece of construction it showed considerable merit.

The Progress of Design and Construction of Propellers.—The screw propeller has for many years been used as an organ of propulsion for marine craft. It was not, therefore, a totally new problem with the advent of aircraft. In its use on aircraft the propeller altered its shape, and the blades became longer and narrower as compared with marine practice.

At the outset trial and error methods were applied, and a suitable propeller was arrived at only after the trial of a large number of designs. The variations met with in aircraft work are very great. At the present day, aircraft speeds vary from 40 m.p.h. in the airship to 150 m.p.h. in the aeroplane. The engines vary from 40 h.p. to 600 h.p., while the propeller revolutions vary from 500 to 2,200 per minute. With such wide variations in conditions a surer and quicker method of arriving at the best results was demanded. Curiously enough, aircraft propeller designers had recourse to a method devised by M. Drezweichi in 1882 for the design of marine propellers, which consisted of a mathematical analysis treating the propeller blade as a rotating wing. The method was tested at the National Physical Laboratory, and is now in general use, with the result that it is rarely necessary to test more than two propellers to arrive at the desired result. Frequently the result is obtained with sufficient accuracy in the first trial design.

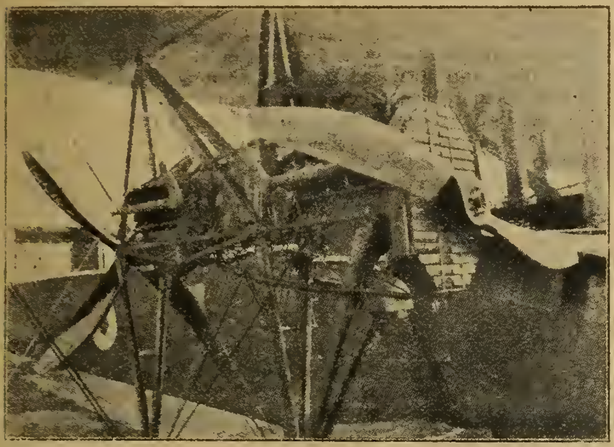


Fig. 12.—Tandem propellers. Handley Page V. 1500.

The efficiencies now obtained, in aircraft propellers are high, being 75 per cent. as an average, and frequently 85 per cent. under optimum conditions.

As regards construction the peculiar vibration and variation or torque prevented the use of metal, which quickly fatigued and failed. For this reason and also for quickness in manufacture, wood became and still is the principal material used.

Only the highest class material was suitable, for, at the speed at which modern aircraft engines run, the radial pull at the root of a propeller blade may be as much as 5 tons, while at the same time the propeller has to pull the aircraft along, involving bending moment due to forces of as much as ½ ton per blade. The stresses due to these combined forces were satisfactorily met with for the smaller powers, but at one time it was thought that the size of engines would be limited by the maximum power which could be transmitted through a single propeller. And such might have been the case, had it not been discovered that instead of the stresses due to these two forces adding to each other, it might be arranged so that the bending stresses due to centrifugal action would completely neutralise those due to the thrust.

The only limits now imposed on propeller design are :—

1. Tip speed.
2. Constructional limitations.

As regards the first, experiments have shown that a tip speed equal to the speed of sound should not be exceeded, and to this speed we are rapidly approaching. In the standard propeller for the American Liberty engine in the D.H.9A, the tip speed is 880 ft. per sec. as compared with 1,050 ft. per sec. for sound. This difficulty, however, is met by gearing the engine so as to reduce the propeller speed. Provided the engine is suitably geared so that the tip speed does not exceed 900 ft. per sec., there appears to be practically no limit to the amount of power which can be transmitted through a single propeller. Even with present-day methods of construction it is safe to say that 2,000 h.p. can be transmitted through a propeller mounted on an aircraft flying at 80 m.p.h. and as much as 6,000 h.p. on an aircraft flying at 140 m.p.h.

As regards the question of commercial construction, development has been along normal lines; improvements have been made in the details of manufacture such as the glueing of the numerous wood laminations, and the protection of the blade with fabric and metal edgings; and the general result has been a better and more reliable article. Nevertheless, the use of wood is not wholly satisfactory, especially for future commercial work, involving flight through tropical countries, and we, therefore, look forward to the solution of the problem of the metal construction of propellers.

Division into Types.—When the War began the only aeroplane function which was considered seriously by the Army Authorities was that of reconnaissance, and there is no doubt that the B.E. 2A, which was developed by the Royal Aircraft Factory for this function, was an excellent aeroplane, thoroughly well adapted for its work.

Reconnaissance Aeroplanes.—These early aeroplanes were not intended to carry any military load other than crew, but almost from the very start of the War the military load required began to increase, with the result that all through 1915 and well into 1916 our reconnaissance aeroplanes were over-loaded with all kinds of equipment, such as guns, gun-mountings, cameras, wireless apparatus, etc., which were attached to any available part internally or externally. In order to carry out their requisite functions, this additional equipment was necessary, but it naturally meant a very considerable reduction in performance. The speed was brought down 10 or 15 miles an hour, while the extra weight and resistance had a very serious effect on the rate of climb.

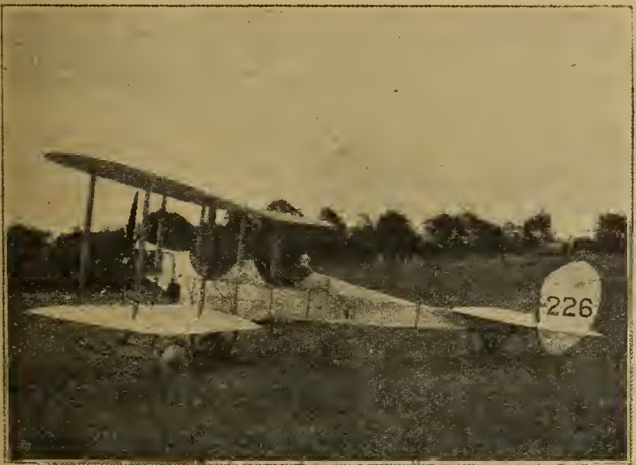


Fig. 13.—B.E. 2a.

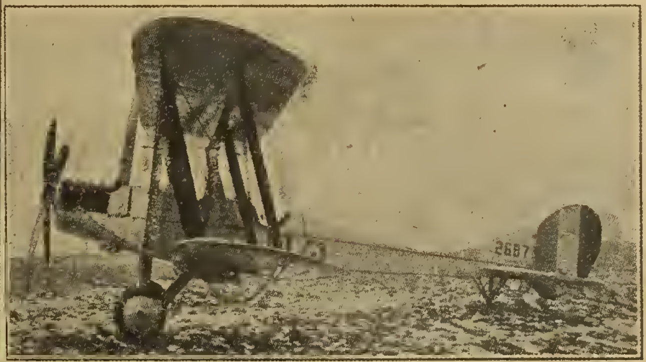


Fig. 14.—Reconnaissance machine. B.E. 2c.

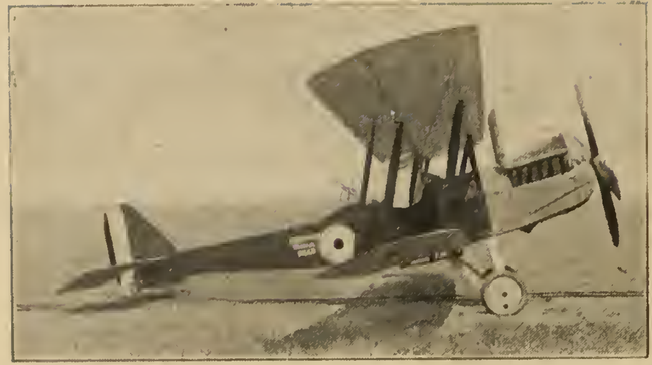


Fig. 15.—Reconnaissance machine. R.E. 8.

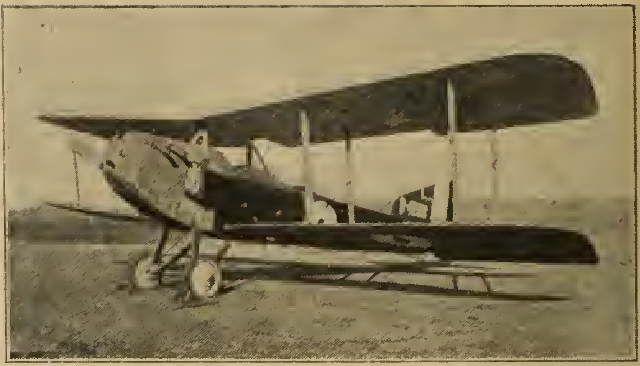


Fig. 16.—Artillery machine. Armstrong-Whitworth F.K. 8.

This is shown by the diagrams giving the performances at the different periods of the War; it is not until the latter part of 1916 that any appreciable improvement in performance can be seen, and then both the speed and the climb go up rapidly.

It was at this period that the special military aeroplanes, designed subsequently to August, 1914, first came into use, and in these full allowance was made for all equipment to be carried. The increase in performance was due not only to the higher power engines used, but also to the fact that the aeroplanes were designed to carry the equipment as far as possible internally, thus avoiding all unnecessary resistance.

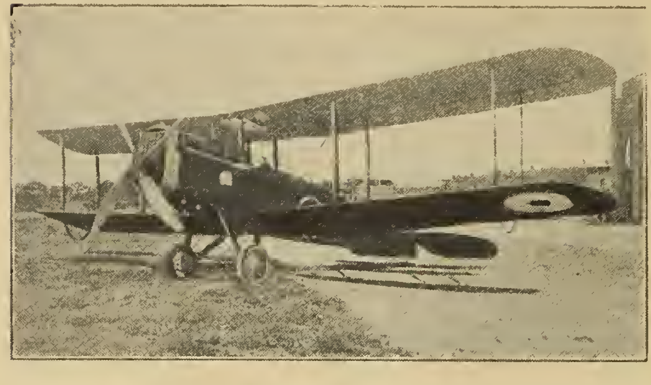


Fig. 17.—Artillery machine. De Havilland 4; Eagle VIII.

As aerial tactics developed, the *rôles* of the pilot and observer altered, and the latter practically confined himself to being a pair of eyes in the back of the pilot's head, whereas the pilot had to do all the reconnaissance, artillery spotting, etc., as well as fly the aeroplane.

Single-seater Fighter Development.—As well as doing one's own scouting, it was necessary to stop the other side doing his, or rather to stop him from taking his reports home. This meant fighting, and fighting meant guns and better performance. The early aeroplanes were soon fitted up with a Lewis gun fixed so as to fire over or at the side of the propeller disc, and actuated by a Bowden wire. This gun was at first fixed to fire upwards at a considerable angle to the line of flight, necessitating an oblique method of attack. Then later, in order to enable the aeroplane itself to be aimed directly at the objective, the gun was mounted on stands and in a line practically parallel to the propeller shaft. It was found that, by aiming the aeroplane itself rather than an independent gun, shooting was more accurate. The attachment of all this gear and weight to machines which were not designed for them was a very serious handicap, and performances were reduced 15 or 20 per cent. on speed and ceiling.

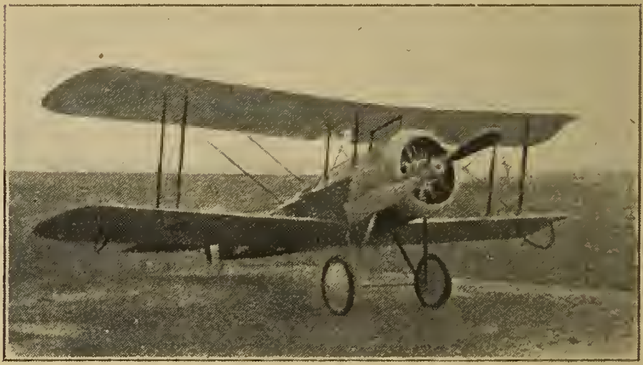


Fig. 18.—One-seater fighter. Bristol Scout.

Late in 1915 the Germans brought out a system of synchronising the trigger with the engine, so that the bullets went between the blades of the propeller. This was a great improvement, as it enabled the gun or guns to be fixed alongside the engine, within easy reach of the pilot, and offering very much less wind resistance. The Vickers gun was quickly

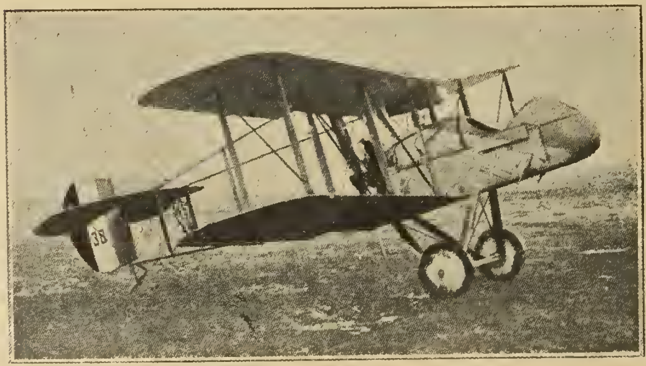


Fig. 19.—One-seater fighter. De Havilland 2.

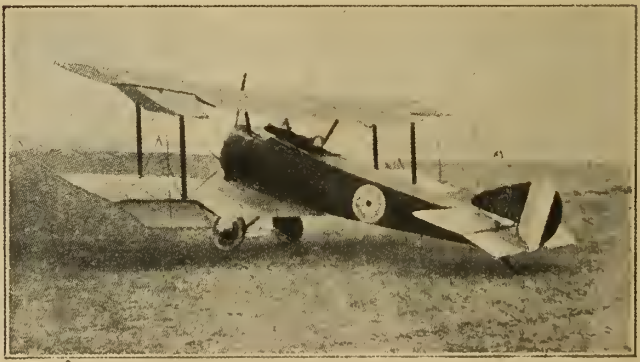


Fig. 20.—One-seater fighter. Sopwith Pup.

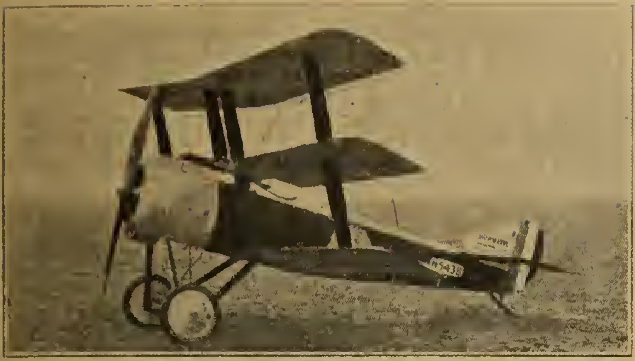


Fig. 21.—One-seater fighter. Sopwith triplane.

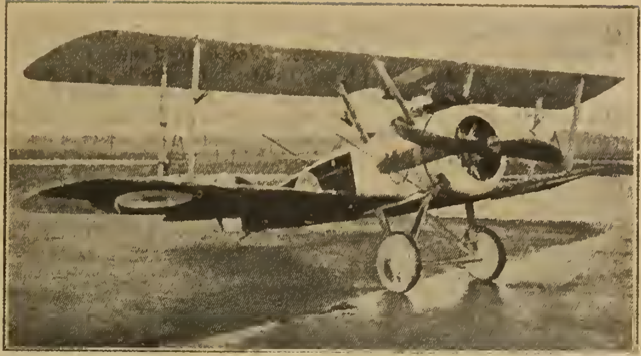


Fig. 22.—One-seater fighter. Sopwith Camel.

adapted to work in a similar manner on our Tractors, and by the late summer of 1916 our single-seated fighters were on a par with the Germans'. During this period, in addition to the Tractors with exposed Lewis guns, we had been making very considerable use of small single-seated pushers of remarkably good performance considering the difficulties of the proposition.

The characteristics of the Sopwith Pup, our first good tractor single-seater, were very light surface loading, a small but good rotary 80 h.p. French engine, and every scrap of unnecessary weight eliminated by careful design. The view, particularly overhead, was not very good, but the aeroplane was so handy fore and aft that this did not interfere very seriously with its fighting qualities. This type lasted a very considerable time before it was superseded, which, in view of the comparatively small horse-power, was remarkable. During the period in which this type was in use fighting acrobatics advanced to a marked degree, and in the next type an effort was made to increase view and manœuvrability. This was the Sopwith triplane with another French engine of 110-130 h.p., and its characteristics can be clearly seen in Fig. 21.

The loading per square foot had increased, but the loading per horse-power had decreased considerably, and the performance was better. Some of the aerodynamic disabilities of the triplane were overcome by the pronounced forward stagger and the use of a single strut. This single strut system increased the difficulties of manufacture and repair, particularly as regards trueing up. Both this aeroplane and the one before it were provided with only one synchronising gun, and the rate of fire was consequently slow.

In aerial fighting, the time in which it is possible to hold the enemy on the sights is very short, and one gun was found insufficient, apart from the considerable chance that the one gun might jam at the crucial moment.

In the next type, which was in design at the end of 1916, and came into production in 1917, we see the influence of these considerations upon the mind of the designer, who by the way was Mr. Hawker of Transatlantic fame. We have here a very simple and, though unstable, an easily controllable biplane with two guns. Enormous numbers of this type were produced in the course of the next year or two with French and English engines which increased in power up to 150 h.p. The type was nicknamed the "Camel" because of the curious hump in the *fuselage*.

(To be continued.)

COMMERCIAL AVIATION IN GERMANY

In spite of the disturbed internal conditions in Germany, a determined attempt is being made to establish aviation on a permanent commercial basis.

From reports recently received it appears that a fairly large number of passenger services have been running for some time, mostly radiating from Berlin. Routes from the capital are in operation in Weimar, Frankfurt, Leipzig, Warnemunde, Hanover, Westphalia, Hamburg and Breslau. There are also services between Weimar and Frankfurt, Hamburg and Warnemunde, Leipzig and Weimar, and Hanover and Westphalia.

The Berlin-Weimar route opened as early as February 5. The results for the period up to the end of the month showed that 120 flights took place, of which all but 18 were successfully terminated. There were no accidents. The Berlin-Hamburg route was opened on March 1, and on this service also the results were considered satisfactory. In spite of bad weather and interruptions owing to trouble in Berlin a total of 108 flights, *i.e.*, three to four per day, were accomplished, and a total load of no less than 3,737 kilogrammes were carried. The average duration of each journey was 2 hrs. 11 mins., with a record trip of 1 hr. 15 mins. This and other services were utilised for the carriage of mails, and on this route only 6·1 per cent. failed to get through owing to bad weather, and had to complete the journey by train.

All these services are operated by the Deutsche Luft Rederie, a combine of various German aeronautical firms.

Return tickets are issued and are valid for a period of 30 days. Flying kit and motor transport to and from the aerodrome are provided, and are covered by an inclusive charge, of which the following are representative :—Berlin-Hamburg : single, 450 marks ; return, 700 marks. Berlin-Breslau : single, 500 marks ; return, 750 marks. Berlin-Weimar : single, 450 marks. Serial tickets available for 10 flights on any of the routes operated by the combine are issued at 3,600 marks. These tickets are transferable, and work out at an average reduction of 20 per cent. Luggage is carried free of charge, but the total weight of passenger—who is carried at his own risk—and baggage combined must not exceed a certain limit. Mails and parcels are also carried by the company, which is working in conjunction with the Hamburg-Amerika line, through whose offices bookings may be effected.

Apparently the railway troubles have reacted favourably on aerial transport, and a considerable increase of traffic has been caused. On the Berlin-Weimar route, which appears the most popular, the number of flights from February to the end of April was 538, while between Hamburg and Berlin from March 1 to the end of April there were 262 flights.

It is also of interest to note that a further fusion of interests of the various already existing commercial aviation companies is being organised under the direction of the Sablatnig Aircraft Factory and the Luftfah G.m.b.h.

Sir John Alcock at Manchester

Sir John Alcock and Sir Arthur Whitten Brown visited Manchester on July 17 as guests of the Manchester Corporation. They were met at the Alexandra Park Aerodrome by the Lord Mayor and other members of the reception committee, and drove in an open carriage through crowds of cheering people along a 5 miles route to the town hall, where they were presented with gold medals, the gift of the city, in recognition of their Atlantic flight.

The N.E.R. Strike and Air Travel

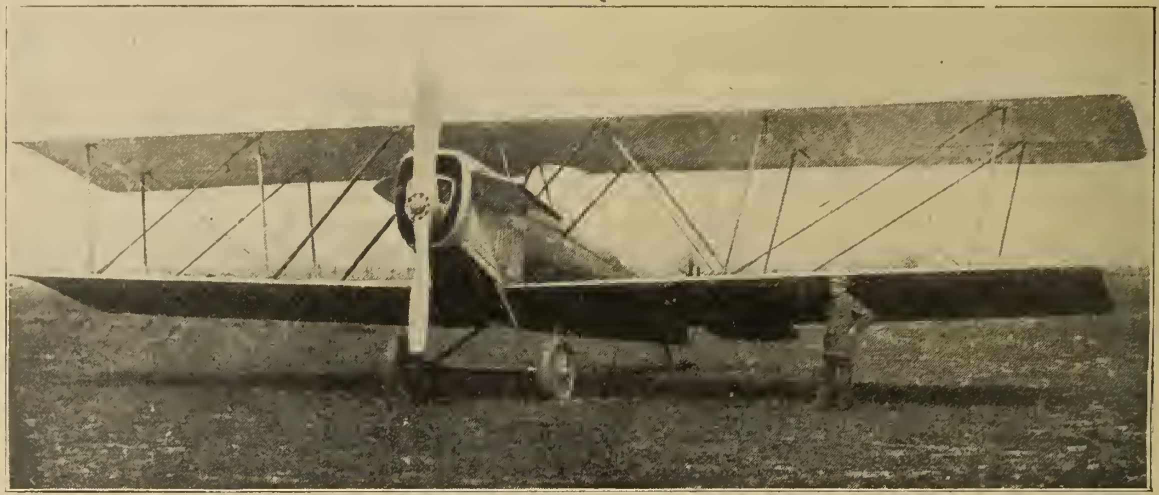
The strike on the North-Eastern Railway led to a sudden increase in the demand for aerial trips up North. One aeroplane left Leeds with two passengers and luggage for Scarborough, the fare per passenger being £7 10*s*.

FLYING FROM TURIN TO LONDON

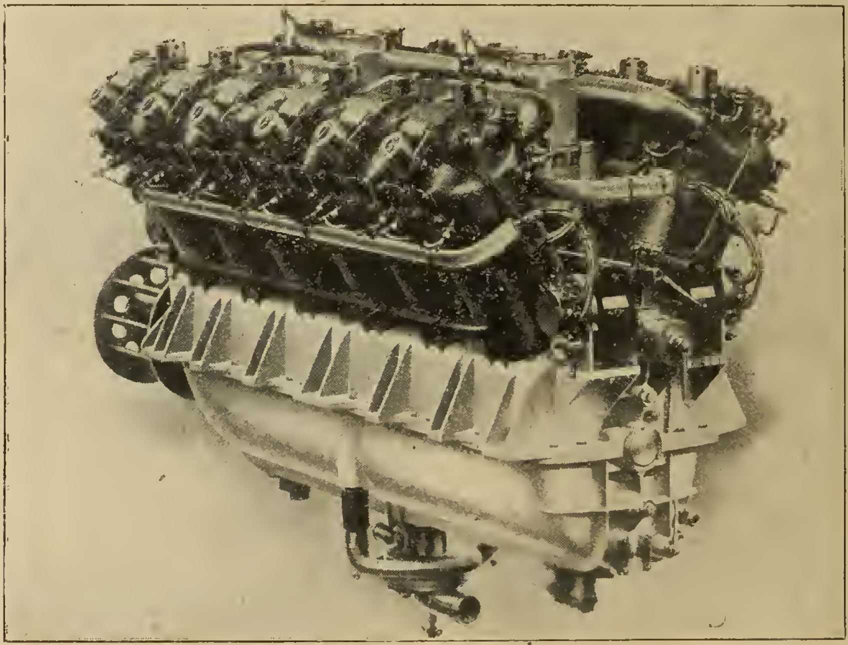
ON the afternoon of July 16 there arrived at the Kenley Aerodrome a Fiat B.R. biplane, piloted by Lieut. F. Brack Papa, accompanied by Lieut. Bonaccini, which had flown from Paris, having taken an hour and three-quarters to fly the distance of 225 miles. On the previous day it had travelled from Rome to Paris (687 miles) in a little over seven hours, despite unfavourable weather conditions. Some days before the machine had been flown from Turin to Rome, doing the 362 miles in 2 hours 15 mins. an average speed of 161 miles an hour. This beat the record for this journey, the previous best having been 2 hours 50 mins., made by Sergt. Stoppani on a Sia machine.

The B.R. Fiat biplane was designed by Engineer Rosatelli just before the close of the War, to be used as a high-speed long-distance bomber. It is of the single *fuselage* tractor type, equipped with a 700 h.p. twelve-cylindered Fiat engine (170 by 210 mm.) which is claimed to be the highest powered engine employed for air work. It has a span of 51 ft. 9 ins., a chord of 7 ft. 9 ins., overall length of 32 ft., and a total supporting surface of 775 sq. ft. The diameter of the tractor screw is 11 ft. 3 ins. The struts and wires are all streamlined. The weight of the machine empty is 2¼ tons, and the useful load 1½ tons.

Its maximum speed is 163 m.p.h., and its climbing speeds are as follows:—1,000 m. (3,280 ft.), in 3 mins. 45 secs.; 2,000 m. (6,560 ft.), in 7 mins. 30 secs.; 3,000 m. (9,842 ft.), in 12 mins. 30 secs.; 4,000 m. (13,123 ft.), in 18 mins. 16 secs.; 5,000 m. (16,400 ft.), in 27 mins.



The B.R. Fiat biplane which was flown last week from Turin to London, with stops at Rome and Paris



Lieut. Brack Papa, the pilot, who flew the B.R. Fiat machine from Turin to London, and the 12-cylindered 700 h.p. Fiat engine used in the flight

◆ ◆ ◆ ◆

British Flying Officers Captured by Bolshevists

A WIRELESS message from Bolshevist sources on July 17 claimed that a British aeroplane had been obliged to land in the direction of the Northern Dvina, in consequence of motor trouble. The three occupants were taken prisoners.

London to Brussels in Three Hours

A FOUR-ENGINED Handley-Page aeroplane, piloted by Lieut.-Col. W. S. Douglas, D.F.C., M.C., left Cricklewood Aerodrome for Brussels at 7 o'clock on Saturday morning, and made a safe landing there at 10 o'clock the same morning.

AIR TOUR AND TRAVEL IN THE NORTH

THE Avro Co.'s air lines are developing rapidly up North. Starting in May with stations at Blackpool and Southport, we learn that the company has now opened landing-grounds at Windermere (seaplanes), Morecambe, Fleetwood, Liverpool (Waterloo Sands), Rhyl and Douglas (Isle of Man). Six other stations are in course of formation which will make it possible for most people in Lancashire to travel by air to the South or West of England without the necessity for long train or motor-car journeys to Government aerodromes.

A table showing the distances saved by air travel in Lancashire is given herewith.

The chart is most instructive, as it illustrates the great saving, not only in distance, but also in time to be obtained by flying instead of travelling by train.

Business in joy-flying at Blackpool and Southport has been well maintained, the outstanding features of the week being the aerial visit of the Mayor of Blackpool, Alderman A. Parkinson, M.P., J.P., and the Rev. Mr. Little, the Vicar of Blackpool, to a meeting at Bolton, where they received a most cordial reception, and the flying of an entire wedding party, comprising bride, bridegroom, best man and 40 guests at Southport, and this in spite of clouds and mist at approximately 100 ft.

Another novelty was the flying from Southport of an Avro pilot on an experimental scout to the dinner at the Manchester Aerodrome to Sir John Alcock and Sir Arthur Brown. The pilot appeared from his machine in evening dress, and returned to Southport after the dinner, despite mist which almost enveloped the factory chimneys.

Two Avro seaplanes are now installed at Windermere, where Capt. Pixton, one of the veteran pilots of the day, is flying.

	Blackpool.	Fleetwood.	Harrogate.	Lancaster.	Leeds.	Liverpool.	Manchester.	Middlesbrough.	Morecambe.	Preston.	Southport.
Blackpool ..		**9** *1*	**89** *26*	**33** *13*	**81** *19*	**48** *20*	**49** *8*	**130** *39*	**35** *15*	**18** *3*	**33** *21*
Fleetwood ..	**9** *1*		**92** *32*	**24** *10*	**84** *23*	**51** *15*	**52** *8*	**123** *38*	**28** *16*	**21** *4*	**34** *16*
Harrogate ..	**89** *26*	**92** *32*		**70** *18*	**18** *4*	**93** *21*	**61** *14*	**50** *8*	**74** *19*	**71** *21*	**86** *21*
Lancaster ..	**33** *13*	**24** *10*	**70** *18*		**65** *11*	**51** *5*	**52** *6*	**99** *26*	**4** *1*	**22** *1*	**36** *6*
Leeds	**81** *19*	**84** *23*	**18** *4*	**65** *11*		**75** *10*	**43** *7*	**68** *13*	**69** *14*	**63** *15*	**76** *15*
Liverpool ..	**48** *20*	**51** *15*	**93** *21*	**51** *5*	**75** *10*		**32** *2*	**143** *35*	**35** *9*	**30** *3*	**20** *4*
Manchester ..	**49** *8*	**52** *8*	**61** *14*	**52** *6*	**43** *7*	**32** *2*		**114** *24*	**56** *8*	**31** *3*	**35** *1*
Middlesbrough ..	**130** *39*	**123** *38*	**50** *8*	**99** *26*	**68** *13*	**143** *35*	**111** *24*		**103** *28*	**120** *38*	**135** *38*
Morecambe ..	**35** *15*	**28** *16*	**74** *19*	**4** *1*	**69** *14*	**35** *9*	**56** *8*	**103** *28*		**29** *9*	**54** *24*
Preston	**18** *3*	**21** *4*	**71** *21*	**22** *1*	**63** *15*	**30** *3*	**31** *3*	**120** *38*	**29** *9*		**15** *1*
Southport ..	**33** *21*	**34** *16*	**86** *21*	**36** *6*	**76** *15*	**26** *4*	**35** *1*	**135** *38*	**54** *24*	**15** *1*	

Railway distance is given in **black type.**
Distance saved by air in *italics*.

◆ ◆ ◆ ◆

FORMATION OF LANCASHIRE FLYING CLUB

THE first meeting of the Lancashire Flying Club was held at the Birkdale Palace Hydro, Birkdale, Southport, on July 19, after the Avro Gymkhana.

Mr. F. C. L. Young, Lindum Lodge, Bowden, Cheshire, was elected Hon. Secretary and Treasurer. Mr. Young already possesses a machine of his own, and has offered to place it at the disposal of the Club members.

It was decided that the subscription for the first 50 members be fixed at 10 guineas without entry fee, and that the Club be run primarily for the benefit of ex-Service pilots who wish to keep up their flying.

Maj. McMinnies offered free landings and storage for members' machines at the Avro aerodromes at Windermere, Douglas, Morecambe, Fleetwood, Blackpool, Southport, Liverpool, Preston, Rhyl, etc., and this offer was accepted.

It was decided to write to the Air Ministry with a view to obtaining a gift of several machines to the club, with a view to assisting ex-Service men to keep up their flying, and it was requested that the Club machines should be fully insured against all accidents and crashes.

All communications should be addressed to the Hon. Secretary, Lancashire Flying Club, at the address given above.

◆ ◆ ◆ ◆

The R.A.F. in the Peace Procession

IN the Peace Procession on Saturday last the R.A.F. was represented by a contingent of 60 officers and 600 other ranks, together with 6 officers of the W.R.A.F. and 120 ranks. The contingent was headed by Maj.-Gen. Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O., in command, followed by Brig.-Gen. C. L. Lambe, C.B., C.M.G., D.S.O., Col. C. R. Samson, C.M.G., D.S.O., A.F.C., Brig.-Gen. C. A. M. Longcroft, C.M.G., D.S.O., A.F.C., Brig.-Gen. E. M. Maitland, C.M.G., D.S.O., Lieut.-Col. C. L. N. Newall, C.M.G., and Staff, led the representative detachments which marched in the following order :—No. 5 Squadron, No. 7 Squadron, No. 9 Squadron, No. 11 Squadron, No. 12 Squadron, No. 18 Squadron, No. 22 Squadron, No. 25 Squadron, No. 29 Squadron, No. 43 Squadron, No. 57 Squadron, No. 59 Squadron, No. 62 Squadron, No. 70 Squadron, No. 84 Squadron, No. 88 Squadron, No. 92 Squadron, No. 110 Squadron, No. 208 Squadron, Parks and Depots, Airships, South-Eastern Area, South-Western Area, Midland Area, Northern Area, 29th Group, 11th Group, Chaplains and Medical Services.

The Loss of N.S. 11

No further information has come to light regarding the catastrophe to the non-rigid airship N.S. 11, referred to briefly in our last issue, except that it has been definitely ascertained that the airship foundered 4 miles north-west of the village of Salthouse, between Wells and Sheringham.

The following message has been received at Pulham Air Station from H.M. the King :—

"His Majesty the King desires to express his deepest sympathy with the relatives of those officers and men who lost their lives in the airship N.S. 11 while employed in mine-clearing operations."

The names of officers and ratings of the lost airship are as follows :—Capt. W. K. Warneford (commander), Capt. A. S. Elliott, Flight-Sergt. O'Connor, Sergt. Lewry, Sergt. Waghorn, Air-Araftsman J. Jacques, Air-Craftsman Cameron and Air-Craftsman Connelly.

Saved by German Prisoner

THE Air Ministry announces that a British aeroplane crashed and caught fire at a Wiltshire aerodrome where some German prisoners of war were employed.

The pilot was entrapped in the burning wreckage, and was in imminent danger of being burnt to death. One of the prisoners, Pte. L. Bruckman, 99th Infantry Reserve Regt., German Army, went to the officer's assistance and effected his rescue at great personal risk to himself.

It has been decided that Pte. Bruckman shall be released forthwith from captivity, and granted a free passage to his destination. It has also been decided to present him with a sum of money and a silver watch suitably inscribed in recognition of his gallant and chivalrous act.

Cambridge Honours Flying Generals

AMONG the long list of Admirals and Generals who are to be honoured with honorary degrees by Cambridge University are Maj.-Genl. Sir John Salmond and Maj.-Genl. Sir Hugh Trenchard.

First Amsterdam Aircraft Exhibition

IN the British section of the Dutch Exhibition which is being held in Amsterdam during August, in addition to the firms mentioned in FLIGHT of July 10 as being represented, we learn there will also be exhibits by A. V. Roe and Co., Marconi's Wireless Telegraph Co., Wireless Press, Ltd., British Emaillite Co., Geo. Williams and Co., Improved Liquid Glues Co., R. S. Watling and Sons, Farringdon Propeller and Engineering Co., and several other smaller firms. Visitors will be able to appreciate British construction, as several of our machines are to give demonstrations and passenger flights over the aerodrome in front of the exhibition building.

INTERNATIONAL FLYING CONVENTION

The Air Ministry on Tuesday issued the text of the Convention relating to International Air Navigation [Cmd] agreed upon by the sub-commission dealing with aerial navigation at the Peace Conference.

The Convention has been agreed to by all the representatives, subject to certain reservations. The Convention has not been formally approved by the Supreme Council of the Peace Conference. It has, however, been agreed that it should be issued for the information of the public of the Allied and Associated States.

The following is the English text of the document, which is in English and French, both languages having equal validity :—

Chapter I.—General Principles

Article 1.—The contracting States recognise that every State has complete and exclusive sovereignty in the air space above its territory and territorial waters.

Article 2.—Each contracting State undertakes in time of peace to accord freedom of innocent passage above its territory and territorial waters as well as above the territories and territorial waters of its Colonies to the aircraft of the other contracting States, provided that the conditions established in this Convention are observed.

All regulations made by a contracting State as to the admission over its territory of the aircraft of the other contracting States shall be applied without distinction of nationality.

Article 3.—Each contracting State has the right, for military reasons or in the interest of public safety, to prohibit the aircraft of the other contracting States, under the penalties provided by its legislation and subject to no distinction being made in this respect between its private aircraft and those of the other contracting States, from flying over certain areas of its territory.

If it makes use of this right, it shall publish and notify beforehand to the other contracting States the location and extent of the prohibited areas.

Article 4.—Every aircraft which finds itself above a prohibited area shall, as soon as aware of the fact, give the signal of distress provided in Paragraph 17 of Annex D and land outside the prohibited area as near to it as possible and as soon as possible at one of the aerodromes of the State unlawfully flown over.

Chapter II.—Nationality of Aircraft

Article 5.—No contracting State shall, except by a special and temporary authorisation, permit the flight above its territory of an aircraft which does not possess the nationality of a contracting State.

Article 6.—An aircraft possesses the nationality of the State on the register of which it is entered, in accordance with the provisions of Section I (*c*) of Annex A.

Article 7.—An aircraft shall not be entered on the register of one of the contracting States unless it belongs wholly to nationals of such State.

An incorporated company cannot be the registered owner of an aircraft unless it possesses the nationality of the State in which the aircraft is registered, and unless the president or chairman of the company and at least two-thirds of the directors possess the same nationality, and unless the company fulfils all other conditions which may be prescribed by the laws of each State.

Article 8.—An aircraft cannot be validly registered in more than one State.

Article 9.—The contracting States shall every month exchange among themselves and transmit to the International Commission for Air Navigation copies of registrations and of cancellations of registration which shall have been entered on their official registers during the preceding month.

Article 10.—All aircraft engaged in international navigation shall bear their nationality and registration marks as well as the name and residence of the owner in accordance with Annex A.

Chapter III.—Certificates of Airworthiness and Competency

Article 11.—Every aircraft engaged in international navigation shall, in accordance with Annex B, be provided with a certificate of airworthiness issued or rendered valid by the State whose nationality it possesses.

Article 12.—The commanding officer, pilots, engineers, and other members of the operating crew of every aircraft shall, in accordance with Annex B, be provided with certificates of competency and licences issued or rendered valid by the State whose nationality the aircraft possesses.

Article 13.—Certificates of airworthiness and of competency and licences issued or rendered valid by the State whose nationality the aircraft possesses, in accordance with the regulations established by Annex B and Annex E and hereafter by the International Commission for Air Navigation, shall be recognised as valid by the other States.

Each State has the right to refuse to recognise for the purpose of flights within the limits of and above its own territory certificates of competency and licences granted to one of its nationals by another contracting State.

Article 14.—No wireless apparatus shall be carried without a special licence issued by the State whose nationality the aircraft possesses. Such apparatus shall not be used except by members of the crew provided with a special licence for the purpose.

Every aircraft used in public transport and capable of carrying 10 or more persons shall be equipped with sending and receiving wireless apparatus when the methods of employing such apparatus shall have been determined by the International Commission for Air Navigation.

This Commission may later extend the obligation of carrying wireless apparatus to all other classes of aircraft in the conditions and according to the methods which it may determine.

Chapter IV.—Admission to Air Navigation Above Foreign Territory

Article 15.—Every aircraft of a contracting State has the right to cross another State without landing. In this case it shall follow the route fixed by the State over which the flight takes place. However, for reasons of general security it will be obliged to land if ordered to do so by means of signals provided in Annex D.

Every aircraft which passes from one State into another shall, if the regulations of the latter State require it, land in one of the aerodromes fixed by the latter. Notification of these aerodromes shall be given by the contracting States to the International Commission for Air Navigation and by it notified to all the contracting States.

The establishment of international airways shall be subject to the consent of the States flown over.

Article 16.—Each contracting State shall have the right to reserve to its national aircraft the carriage of persons and goods for hire between two points on its own territory.

Article 17.—If a contracting State establishes restrictions of the kind permitted by Article 16, its aircraft may be subjected to the same restrictions in any other contracting State, even though the latter State does not itself impose these restrictions on other foreign aircraft.

Restrictions and reservations provided in Article 16 shall be immediately published, and shall be communicated to the International Commission for Air Navigation which shall notify them to the States interested.

Article 18.—The passage or transit of any aircraft with or without landing over or through the territory of any contracting State, including stoppages reasonably necessary for the purpose of such transit, shall not entail any seizure or detention of the aircraft by or on behalf of such State or any person therein, on the ground that the constitution or mechanism of the aircraft is an infringement of any patent, design, or model, duly granted or registered in such State. Every claim for an infringement of this kind shall be duly made in the country of origin of the aircraft.

Chapter V.—Rules to be Observed on Departure, on Landing, and when Under Way

Article 19.—Every aircraft engaged in international navigation shall be provided :—

(*a*) With a certificate of registration in accordance with Annex A.

(*b*) With a certificate of airworthiness in accordance with Annex B.

(*c*) With certificates and licences of the commanding officer, pilots, and crew in accordance with Annex E.

(*d*) If it carries passengers, with a list of their names.

(*e*) If it carries freight, with bills of lading and manifest.

(*f*) With log books in accordance with Annex C.

(*g*) If equipped with wireless, with the special licence prescribed by Article 14.

Article 20.—The log books shall be kept for two years after the last entry.

Article 21.—Upon the departure of an aircraft, the authorities of the country shall have, in all cases, the right to visit the aircraft and to verify all the documents with which it must be provided.

Article 22.—Upon the landing of an aircraft, the authorities of the country shall have, in all cases, the right to visit the aircraft and to verify all the documents with which it must be provided.

Article 23.—All persons on board an aircraft shall conform to the laws and regulations of the State visited.

In case of flight made without landing, from frontier to frontier, all persons on board shall conform to the laws and regulations of the country flown over, the purpose of which is to ensure that the passage is innocent.

Legal relations between persons on board an aircraft in flight are governed by the law of the nationality of the aircraft.

In case of crime or misdemeanour committed by one person against another on board an aircraft in flight the jurisdiction of the State flown over applies only in case the crime or misdemeanour is committed against a national of such State and is followed by a landing during the same journey upon its territory.

The State flown over has jurisdiction :—

(1) With regard to every breach of its laws for the public safety and its military and fiscal laws ;

(2) In case of a breach of its regulations concerning air navigation.

Article 24.—Aircraft of the contracting States shall be entitled to the same measures of assistance for landing, particularly in case of distress, as national aircraft.

With regard to the salvage of aircraft wrecked at sea the regulations of the several contracting States as to the salvage of ships will apply so far as practicable.

Article 25.—Every aerodrome in a contracting State, which upon payment of charges is open to public use by its national aircraft, shall likewise be open to the aircraft of all the other contracting States.

In every such aerodrome there shall be a single tariff of charges for landing and length of stay applicable alike to national and foreign aircraft.

Article 26.—Each contracting State undertakes to adopt measures to ensure that every aircraft flying above the limits of its territory, and that every aircraft under its flag, wherever it may be, shall comply with the regulations contained in Annex D. of the present Convention. It will punish all persons who do not obey these regulations.

Chapter VI.—Prohibited Transport

Article 27.—The carriage by aircraft of explosives and of arms and munitions of war is forbidden in international navigation. No foreign aircraft shall be permitted to carry such articles between any two points in the same contracting State.

Article 28.—Each State may prohibit or regulate the carriage or use of photographic apparatus. Any such regulations shall be at once notified to the International Commission for Air Navigation, which shall communicate this information to all the other contracting States.

Article 29.—As a measure of public safety, the carriage of objects other than those mentioned in Articles 27 and 28 may be subjected to restrictions by each contracting State. Any such regulations shall be at once notified to the International Commission for Air Navigation, which shall communicate this information to all the other contracting States.

Article 30.—All restrictions mentioned in Article 29 shall be applied equally to national and foreign aircraft.

Chapter VII.—State Aircraft

Article 31.—The following are deemed to be State aircraft :—(*a*) Military aircraft. (*b*) Aircraft exclusively employed in State service, such as posts, Customs, police. Every other aircraft is a private aircraft. All State aircraft other than military, Customs, and police aircraft shall be treated as private aircraft, and as such shall be subject to all the provisions of the present Convention.

Article 32.—Every aircraft commanded by a person in military service detailed for the purpose is deemed to be a military aircraft.

Article 33.—Neither the flight of a military aircraft of a contracting State over the territory of another nor its landing upon such territory shall be permitted without special authorization.

In case of such authorization the military aircraft shall enjoy in the absence of special stipulation the privileges of exterritoriality which are customarily accorded to foreign ships of war.

A military aircraft which is forced to land or which is required or compelled to land shall, by reason thereof, acquire no right to exterritoriality.

Article 34.—Agreements between State and State will determine in what cases police and customs aircraft can be authorized to cross the frontier. They shall in no case be entitled to the privileges of exterritoriality.

Chapter VIII.—International Commission for Air Navigation

Article 35.—There shall be instituted, under the name of the International Commission for Air Navigation and as part of the organization of the League of Nations, a permanent Commission composed of :—

Two representatives of each of the following States : The United States of America, France, Italy, and Japan ;

One representative of Great Britain and one of each of the British Dominions and of India ;

One representative of each of the other contracting States.

Each of the five States first-named (Great Britain, the British Dominions and India counting for this purpose as one State) shall have the least whole number of votes which, when multiplied by five, will give a product exceeding by at least one vote the total number of votes of all the other contracting States.

All the States other than the five first-named shall each have one vote.

The International Commission for Air Navigation shall determine the rules of its own procedure and the place of its permanent seat, but it shall be free to meet in such places as it may deem convenient. Its first meeting shall take place at Paris. This meeting shall be convened by the French Government, as soon as a majority of the signatory States shall have notified to it their ratification of the present Convention.

The duties of this Commission are :—

(*a*) To receive proposals from or to make proposals to any of the contracting States for the modification or amendment of the provisions of the present Convention and to notify changes adopted.

(*b*) To carry out the duties imposed upon it by the present Article and by Articles 9, 13, 14, 15, 17, 28, 29, and 38 of the present Convention.

(*c*) To amend the provisions of the technical Annexes.

(*d*) To collect and communicate to the contracting States information of every kind concerning international air navigation.

(*e*) To collect and communicate to the contracting States all information relating to wireless meteorology and medical science which may be of interest to air navigation.

(*f*) To ensure the publication of maps for air navigation in accordance with the provisions of Annex F.

(*g*) To give its opinion on questions which the States may submit for examination.

Any modification of the provisions of any one of the Annexes may be made by the International Commission for Air Naivgation when such modification shall have been approved by three-fourths of the total possible vote and shall become effective from the time when it shall have been notified by the International Commission for Air Navigation to all the contracting States.

Any proposed modification of the articles of the present Convention shall be examined by the International Commission for Air Navigation, whether it originates with one of the contracting States or with the International Commission for Air Navigation itself. No such modification shall be proposed for option by the contracting States, unless it shall have been approved by at least two-thirds of all the possible votes which could be cast if all the States were present.

All such modifications of the articles of the Convention (not of the provisions of the Annexes) must be formally adopted by the contracting States before they become effective.

The expenses of organisation and operation of the International Commission for Air Navigation shall be borne by the contracting States in proportion to the number of votes at their disposal.

The expenses occasioned by the sending of technical delegations will be borne by their respective States.

Chapter IX.—Final Provisions.

Article 36.—Each contracting State undertakes to co-operate as far as possible in international measures concerning :—

(*a*) The collection and dissemination of statistical, current, and special meteorologial information, in accordance with the provisions of Annex G.

(*b*) The publication of standard aeronautical maps, and the establishment of a uniform system of ground marks for flying, in accordance with the provisions of Annex F.

(*c*) The use of wireless in air navigation, the establishment of the necessary wireless stations, and the observation of international wireless regulations.

Article 37.—General provisions relative to customs in connection with international air navigation are the subject of a special agreement contained in Annex H to the present Convention.

Nothing in the present Convention shall be construed as preventing the contracting States from concluding, in conformity with its principles, special protocols as between State and State in respect of customs, police, posts, and other matters of common interest in connection with air navigation.

Article 38.—In the case of a disagreement of two or more States relating to the interpretation of the present Convention the question in dispute shall be determined by the Permanent Court of International Justice to be established by the League of Nations and until its establishment by arbitration.

If the parties do not agree on the choice of the arbitrators, they shall proceed as follows :—

Each of the parties shall name an arbitrator, and the two arbitrators shall meet to name a third. If the arbitrators cannot agree, the parties shall each name a third State, and the third State so named shall proceed to designate the third arbitrator, by agreement or by each proposing a name and then determining by lot the choice between the two.

In case of the disagreement of two or more contracting States relating to one of the technical regulations annexed to the present Convention, the point in dispute shall be determined by the decision of the International Commission for Air Navigation by a majority of votes.

In case the difference involves the question whether the interpretation of the Convention or that of a regulation is concerned, final decision shall be made by arbitration as provided in the first paragraph of this Article.

Article 39.—In case of war, the provisions of the present Convention do not affect the freedom of action of the contracting States either as belligerents or as neutrals.

Article 40.—The provisions of the present Convention are completed by the Annexes A-H, which have the same effect and come into force at the same time as the Convention itself.

Article 41.—The British Dominions and India are deemed to be States for the purposes of the present Convention. Protectorates, or territories administered by the League of Nations or placed under its control, are, for the purposes of the present Convention, deemed to form part of the Protecting or Mandatory States, both as regards their territory and as regards their nationals.

Article 42.—The present Convention shall come into force as between any of the contracting States as soon as such States shall have exchanged ratifications, which shall take place within one year. The ratifications shall be deposited in the archives of the Ministry of Foreign Affairs of the French Republic.

Article 43.—The States which have not taken part in the present War shall be admitted to adhere to the present Convention upon their simple declaration notified to the Ministry of Foreign Affairs of the French Republic, which shall inform the contracting States of such adherence.

Article 44.—Any State which took part in the present War but which did not take part in the negotiation of this Convention may express its desire to adhere to this Convention and may be admitted to adhere to it, if such a State is a member of the League of Nations, or until January 1, 1923, by a unanimous vote of the signatory and adhering States or, after January 1, 1923, by an affirmative vote comprising at least three-fourths of the total possible votes of the signatory and adhering States, the votes of the different States having the same weight as that provided by Article 35 of this Convention for the International Commission for Air Navigation.

The Ministry of Foreign Affairs of the French Republic shall receive requests for adherence to this Convention under the conditions provided by this article, shall communicate them to the contracting States, shall receive the votes of the contracting States, and shall announce the result of the vote.

Article 45.—The denunciation of the present Convention shall take effect with regard only to the State which shall have given notice of it. Such notice shall not be given before January 1, 1922 (nineteen hundred and twenty-two), and the denunciation shall not take effect until at least one year after the giving of notice.

Notices under this article shall be given to the Ministry of Foreign Affairs of the French Republic, who shall communicate them to the contracting States.

Adjoined to the Convention are several annexes and appendices dealing with such subjects as the marking and registration of aircraft, with airworthiness, log-books, and rules of the air. These rules follow those of navigation by sea in many respects. For example, the lights to be carried by an aeroplane are a white headlight and a white light aft, with red and green lights for port and starboard. Airships have all these lights doubled, while balloons carry a single light below the car. Heavier-than-air machines give way to balloons and airships. The sea rule also applies to motor-driven aircraft meeting end on—each turns to the right.

Regulations for granting pilots' certificates are dealt with, as are the rules for making international and local maps, the character of ground marks, collection and reporting of meteorological information, and Customs.

* * *

R. 34 Officers See the King

Brig.-Genl. E. M. Maitland and Maj. Scott had the honour of being received by the King at Buckingham Palace on July 16, when they gave His Majesty a personal account of the voyage of the R. 34 to America and back. The King heartily congratulated both officers on the success of the trip.

On the following day Genl. Maitland and Maj. Scott had the honour of being received by Queen Alexandra at Marlborough House.

King Albert's Aerial Visit to England

On July 15 the King of the Belgians paid another flying visit to England, his Airco 4a starting from Brussels and landing at Hounslow. The visit was of an unofficial character, the object being to see his son, Prince Leopold, at Eton. He was accompanied across the Channel by Commander van O. Verstraeten. The journey from Hounslow to Eton was made by motor car. A few days later King Albert returned to Belgium by the aerial way.

From Felixstowe to Denmark

A fine flight between England and Denmark was the trip of E. 5-N. 90 on July 19. At 5.30 p.m. the seaplane arrived here from Felixstowe, which she left at 9 o'clock that morning, making a successful non-stop trip, says the *Daily Telegraph* correspondent at Copenhagen. Capt. Baily was the pilot and Maj. Sittwell the observer. An official of the Foreign Office and two non-commissioned officers were also on board. The officers were heartily welcomed by Danish naval aviators. The flight was made at a height of 3,000 ft. to 6,000 ft., and a speed of 60 knots, and the route followed was along the Dutch coast, where there was rain and fog, the Kiel Canal, the islands of Laaland and Falster, and across the Sound to Copenhagen. The machine was in wireless communication with Felixstowe till her arrival off the German coast. This morning the party left on the seaplane for Helsingfors on a special mission for the British Foreign Office, carrying a heavy mail. The distance from Felixstowe to Copenhagen is about 560 miles.

Flight to Norway

The Air Ministry announces : One of the S. 5 flying boats engaged in the Scandinavian trip reached Christiansand from Dundee on Monday at 5.30 p.m., having accomplished the journey of 430 sea miles in 7½ hours. As the flight was made through thick fog and driving rain, the performance is regarded as a particularly good one.

Martinsyde Withdrawn from Transatlantic Flight

Ill-luck pursues the Martinsyde aeroplane, which again met with a mishap following a trial on July 17. It appears that the machine, after running about 300 yards, got about 120 ft. off the ground and then dived downwards. The crash seriously damaged the machine, but both the pilot, Mr. Raynham, and the navigator, Lieut. Biddlecombe, escaped injury. Subsequently it was announced that Mr. Raynham had received orders to return home, and the machine was packed up for dispatch by the steamship *Grampian*.

Air Work on Afghan Frontier

A message from Simla on July 19 states that our aeroplanes bombed hostile gatherings at Chora.

A New German Aero Engine

According to a rumour which has reached Paris via Zurich several big German works, including Krupps, of Essen, are conducting in the most profound secrecy experiments with a new aviation motor much superior to the old style.

It would appear to be a gas turbine, and to be more or less noiseless.

Giant aeroplanes capable of carrying 64 persons are said to have been built with the new motor.

THE ROYAL AIR FORCE

London Gazette, July 15

The following temporary appointments are made :—

Staff Officer, 1st Class (T.).—Maj. A. Struben, O.B.E.; June 1.

Staff Officer, 2nd Class (T.).—Capt. H. T. Humfress; June 1.

Staff Officer, 2nd Class (T.).—Capt. W. J. B. Curtis, O.B.E.; June 1.

Flying Branch

Capt. W. R. Read, M.C., A.F.C., to be actg. Maj. whilst employed as Maj. (A.); June 4.

Capt. B. E. Baker, D.S.O., M.C., A.F.C., to be graded for purposes of pay and allowances as Maj. whilst employed as Maj. (A.); May 1.

Capt. A. N. Gallehawk to be graded for purposes of pay and allowances as Maj. (A. and S.) while specially employed; May 15.

Capt. R. S. Smith to be graded for purposes of pay and allowances as Maj. whilst employed as Maj. (K.B.); May 1.

Capt. W. R. Mackenzie, D.S.C., to be Capt. (S.) from (Ad.); June 6.

Lieut. D. C. W. Sanders to be actg. Capt. whilst employed as Capt. (A.), from Oct. 3, 1918, to April 30.

Lieut. L. Balfour to be actg. Capt. whilst employed as Capt. (K.B.): May 1.

Lieuts. to be graded for purposes of pay as Capts. whilst employed as Capts. (A.) :—V. W. Burgess, A. L. Chick, A.F.C., M. V. McKeon, E. H. Russell; May 1.

Lieut. J. S. Giffard to be graded for purposes of pay and allowances as Capt. whilst employed as Capt. (K.B.), from May 1 to June 13.

Lieut. H. L. Macro, D.F.C., to be graded for purposes of pay and allowances as Capt. whilst employed as Capt. (S.); May 1.

Lieut. A. G. Lamplugh ceased to be graded for pay and allowances as Capt. (A.); June 20.

Lieuts. to be Lieuts. (A.) from (Ad.) :—E. P. Moxey; May 21. H. R. Eycott-Martin, M.C.; June 27.

Lieut. L. H. Phelps to be Lieut. (O.), from (Ad.); Jan. 21.

Sec. Lieut. C. J. Craft to be Lieut.; May 17.

Sec. Lieut. H. Wensley (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (A.); Feb. 7.

Sec. Lieut. C. O. Rigden (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (A.); Feb. 8.

H. D. E. Rolland (Lieut., Quebec R.) is granted a temp. commn. as Sec. Lieut. (O.); Nov. 6, 1918, and to be Hon. Lieut.

R. A. Coward (Sec. Lieut., E. Lan. R.) is granted a temp. commn. as Sec. Lieut. (O.); Nov. 7, 1918.

The following relinquish their commns. on ceasing to be employed :—Lieut. W. McL. Walbank (Lieut., Can. F. Art.); March 31. Lieut. J. C. F. Owen (Capt., Can. A.S.C.); April 30. Lieut. (Hon. Capt.) G. M. Brawley (Capt., Cent. Ont. R.); May 15. Lieut. C. B. Green (Lieut., Cent. Ont. R.); May 16. Sec. Lieut. (Hon. Lieut.) J. B. McKenzie (Lieut., West Ont. R.); June 1. Sec. Lieut. (Hon. Capt.) C. A. Mackintosh-Walker (Capt., Cameron Highrs.); June 12. Lieut. H. A. E. Matthews (Lieut., Dorset R.); June 20. Lieut.-Col. A. C. Barnby (Maj., R. Marines); June 21. Maj. A. H. Morton, M.C. (Capt., R.H. and R.F.A.); June 22. Sec. Lieut. (Hon. Lieut.) T. Varcoe (Lieut., R.H. and R.F.A.); June 23. Sec. Lieut. (Hon. Lieut.) G. H. Bisaillon (Lieut., Can. Forestry Corps); June 27. Lieut. T. S. Russell-Rigby (Lieut., Alberta R.); July 3. Lieut. H. R. Kincalrd, M.C. (Lieut., E. Ont. R.); July 4. Lieut. D. H. Macintyre (Lieut., Argyll and Suth. Highrs.); July 7.

(Then follow the names of 320 officers who are transfd. to the Unemployed List under various dates. We regret that owing to great pressure on our space it is impossible to reprint this portion of the List.—ED.)

Capt. G. H. Morton (Brit. Columbia R.) relinquishes his commn. on account of ill-health; July 1.

Lieut. J. A. B. Colin relinquishes his commn. on account of ill-health, and is permitted to retain his rank; June 19.

The following Lieuts. relinquish their commns. on account of ill-health contracted on active service :—G. M. Shaw (Cent. Ont. R.); March 12 (substituted for notification in *Gazette* of June 20). J. Y. Baird (Sco. Rif.); July 9. Lieut. R. S. Herring, M.C. (Lond. R.) (caused by wounds); July 17.

Lieut. R. Tyack resigns his commn.; July 16.

Lieut. P. A. H. de Metz to take rank and precedence as if his appointment as Lieut. bore date July 1, 1918.

Lieut. H. S. Symons to take rank and precedence as if his appointment as Lieut. bore date April 1.

Lieut. E. A. Clear to take rank and precedence as if his appointment as Lieut. bore date June 13.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—H. A. Lye (caused by wounds); July 4 (substituted for notification in *Gazette* of Jan. 10). W. H. Saunders (contracted on active service); July 8.

The following Sec. Lieuts. resign their commns. :—J. H. Doughty-Davies, J. Hunt; July 16.

Sec. Lieut. J. B. O'Neil is dismissed the Service by sentence of a General Court-martial; June 23.

The rank of Lieut. T. G. Murray is as now described, and not Sec. Lieut., as stated in *Gazette* of Feb. 14.

The rank of Lieut. W. L. Goddard is as now described, and not Sec. Lieut., as stated in *Gazette* of July 4.

The notification in the *Gazette* of Oct. 25, 1918, concerning 475312 Cdt. G. C. Boyer is cancelled.

The notification in the *Gazette* of March 18 concerning Sec. Lieut. S. G. Shand is cancelled.

The notification in the *Gazette* of April 25 concerning Sec. Lieut. L. S. Macdonald is cancelled.

The notification in the *Gazette* of May 23 concerning Sec. Lieut. J. A. De Gaye is cancelled.

The notification in the *Gazette* of June 13 concerning Lieut. F. E. Short is cancelled. (The notification in the *Gazette* of June 3 to stand).

Administrative Branch

Majs. to be Majs., from (S.O.) :—A. B. Winch; March 19. H. A. Moore, C.B.E., M.C.; July 1.

Lieut. (Hon. Capt.) C. H. Lewis to be actg. Maj. whilst employed as Maj; May 1.

Capt. W. G. Scott to be actg. Maj., without pay and allowances of that rank, whilst employed as Recruiting Officer; May 1.

To be graded for purposes of pay and allowances as Capts., and to be actg. Majs., without pay and allowances of that rank, whilst employed as Recruiting Officers :—Lieut. F. T. Chapman, Lieut. R. Tait, Lieut. G. B. Redgrave, Lieut. A. R. Harris, Lieut. F. V. Bell, Sec. Lieut. A. E. H. Hales; May 1.

Capts. to be Capts., from (S.O.) :—K. B. Harbord; March 15. R. S. Lindsell, O.B.E.; June 1. G. C. Corry-Smith; July 1.

Lieuts. to be actg. Capts. whilst employed as Capts. :—K. A. Meek, F. H. Sims; May 1.

Administrative Branch—continued.

Lieut. A. G. Maddock to be actg. Capt. whilst specially employed, from (T.), from Dec. 21, 1918, to April 30.

Lieuts. to be graded for purposes of pay and allowances as Capts. whilst specially employed :—A. G. Maddock (to June 13), H. B. Stutfield; May 1.

Lieuts. to be graded for purposes of pay and allowances as Capts. whilst employed as Capts. :—G. W. T. Pireira, J. J. Wilson, H. W. G. Ripley; May 1.

Lieut. (Hon. Capt.) (actg. Capt.) G. M. Smyth to be Lieut., from (S.O.), and to relinquish the actg. rank of Capt.; April 1.

Lieut. G. A. F. Hudson to be Lieut., from (S.O.); June 25.

Sec. Lieut. H. O. Warren to be Sec. Lieut., from (A.); Nov. 25, 1918 (substituted for the notification in the *Gazette* of Feb. 18).

(Then follow the names of 88 officers who are transfd. to the Unemployed List under various dates.)

The following Capts. relinquish their commns. on account of ill-health :—R. L. Kennedy (Lieut., Hrs.) (caused by wounds); July 3. J. W. W. Bridges (Coldstream Gds.) (contracted on active service); July 10.

Lieut. H. M. Tysoe to take rank and precedence as if his appointment as Lieut. bore date Nov. 12, 1918.

Sec. Lieut. F. C. Hilbert relinquishes his commn. on account of ill-health, and is permitted to retain his rank; June 11.

The following Sec. Lieuts. resign their commns. :—C. W. Garrood, A. Giles; July 16.

The notification in *Gazette* Dec. 24, 1918, concerning Sec. Lieut. G. Barfoot-Saunt is cancelled.

The notifications in *Gazette* March 14 and March 28 concerning Sec. Lieut. A. P. Manners are cancelled.

The notification in *Gazette* April 18 concerning Capt. P. Le G. Gribble is cancelled.

The notification in *Gazette* May 23 concerning Lieut. C. F. Morris is cancelled (notification in *Gazette* June 20 to remain).

Technical Branch

Majs. to be actg. Lieut.-Cols. whilst employed as Lieut.-Cols., Grade (A.) :—A. S. Morris, O.B.E., C. G. Smith, O.B.E., R. F. Stapleton-Cotton; May 1.

Capt. L. H. B. Cosway to be actg. Maj. whilst employed as Maj.; June 1.

Capt. W. W. Hall to be actg. Maj. whilst employed as Maj., Grade (A.); May 1.

Lieut. T. L. F. Burnett to be actg. Maj. whilst employed as Maj., Grade (B.); May 1.

To be graded for purposes of pay and allowances as Majs. whilst employed as Majs. (May 1) :—Capt. (Hon. Maj.) C. C. Colley (Grade A.), Lieut. R. W. Davies (Grade A.), Capt. J. C. Forsyth (Grade B).

To be actg. Capts. whilst employed as Capts., Grade (A.) :—Sec. Lieut. J. A. Atkinson, from Dec. 10, 1918, to March 8 (substituted for notification in *Gazette* May 30). Lieut. J. H. Secker; May 1.

To be actg. Capts. whilst employed as Capts., Grade (B) :—Lieut. J. R. Frankish, Lieut. E. E. Porter, to May 28, Lieut. H. G. Wood, Sec. Lieut. J. H. Lytle; May 1.

Lieuts. to be graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (A.) :—C. C. Bracebridge, C. M. Seth-Ward, to May 12, (Hon. Capt.) R. Godfrey, J. Shields, H. G. Thomas; May 1. H. A. Adams; May 13.

To be graded for purposes of pay and allowances as Capts. while employed as Capts., Grade (B.) :—Lieut. O. W. de Putron, Sec. Lieut. (actg. Lieut.) W. A. Fowler; May 1.

Lieut. A. W. Allan to be Lieut., Grade (A.), from Grade (B.); March 2.

Lieut. T. Kerr-Jones to be graded for pay and allowances as Lieut. while employed as Lieut., Grade (A.) (from April 4 to 30).

Lieut. A. Garrity to be graded for pay and allowances of Lieut. while employed as Lieut., Grade (B.); Oct. 3, 1918 (substituted for notification in *Gazette* Dec. 17, 1918).

Lieut. E. L. Pollard to be Lieut., Grade (B.), from (O.); May 22, 1918 (substituted for the notifications which appeared in *Gazettes* June 28, 1918, and Feb. 28).

Sec. Lieuts. to be Lieuts. :—F. W. Atkinson; Dec. 30, 1918 (substituted for notification in *Gazette* Jan. 3). E. G. Hellard; Feb. 16.

Sec. Lieut. C. Littlejohn to be actg. Lieut. while employed as Lieut., Grade (B.); May 1.

(Then follow the names of 78 officers who are transfd. to the Unemployed List under various dates.)

Lieut. S. T. Hosken relinquishes his commn. on account of ill-health, and is permitted to retain his rank; July 2.

Sec. Lieut. (Hon. Lieut.) A. Dingwall relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain the rank of Lieut.; July 7.

The notification in *Gazette* of June 13 concerning Lieut. G. Thomas is cancelled.

The notification in *Gazette* of May 16 concerning Lieut. J. W. McKee is cancelled.

The notification in *Gazette* of April 4 concerning Sec. Lieut. B. L. T. Latour is cancelled (notification in *Gazette* of April 1 to remain).

Medical Branch

(8 officers transfd. to Unemployed List.)

Chaplains' Branch.

(2 officers transfd. to Unemployment List.)

Memoranda

(Then follow the names of seven Overseas Cadets granted temp. commns. and 528 Cadets granted hon. commns. as Sec. Lieuts.)

Lieut.-Col. (actg. Brig.-Gen.) C. G. Hoare, C.M.G. (Maj., Ind. Army) relinquishes his commn. on ceasing to be employed; April 24.

Temp. Hon. Lieut. H. Pearse relinquishes his commn. on ceasing to be employed; June 16.

(Then follow the names of five officers who are transfd. to the Unemployed List under various dates.)

Capt. (actg. Maj.) P. Le G. Gribble relinquishes his commn. on account of ill-health, and is granted the rank of Maj.; April 19.

Capt. Hon. R. G. Lord St. Oswald (Capt., C. Gds.) resigns his commn., and is permitted to retain his rank; July 16.

Lieut. A. Graham relinquishes his commn. on account of ill-health, and is granted the rank of Capt.; July 7.

The notifications in *Gazette* of June 17 concerning the following officers are cancelled :—Capt. W. G. Scott, Lieut. F. T. Chapman, Lieut. R. Tait, Lieut. G. B. Redgrave, Lieut. A. R. Harris, Lieut. F. V. Bell, Sec. Lieut. A. E. H. Hales.

The notification in *Gazette* of June 6 concerning P.F.O. J. W. D. Archibald is cancelled.

The notification in *Gazette* of June 13 concerning Maj. R. E. Childers, D.S.C., is cancelled.

THE SERCK RADIATOR WORKS

An Interesting Inspection

On Tuesday last, July 15, the Motor Radiator Manufacturing Co. opened their works, at Warwick Road, Greet, on the outskirts of Birmingham, to a gathering of technical pressmen. The idea of the function was merely that those who had known Mr. Peter Serck throughout almost the whole history of automobilism and aviation should be able to see how vastly his plant has increased in extent and output-capacity under the stimulus of five years of War-work. Mr. Serck, Mr. Purchase and Mr. Terry divided the duties of showing the visitors round, and it is safe to say that the majority of their guests learned more about the ins-and-outs of the radiator manufacturing business in half-an-hour's stroll around this plant than could possibly have been absorbed anywhere else, or in any other manner.

From the receipt of raw material—hundreds of tons of brass, copper, aluminium, spelter, etc.—to the crating of the finished product, there was nothing omitted from the "revelation." One saw radiators ranging from the attractive little cooler of the 10 h.p. A.C. to the gigantic job fitted on the Vickers-Vimy bombing aircraft—seeing them not only as completed radiators, but in every stage of their evolution. One Serck radiator may be thought very much like another, but the least discriminating visitor could soon see surprising variations, both of type and treatment of the cooling problem.

Mr. Serck, who is a Norwegian, returned only recently from some particularly exciting intercourse with the Bolsheviki in Petrograd, knows the motoring "capitals" of every country in the world, and is—one was pleased to learn—just as well able to book radiator contracts in the United States of America as he is in the country he has now for so many years regarded as being just as much his home as is Norway. He founded the present business in Bermondsey about twelve years ago. No sooner had he got his plant running nicely in south-east London, however, than he was compelled to go to the mountain, so to speak, moving up to Parkside, Coventry, in 1910, when Mr. Purchase joined him as works manager. Three years later the business had once more outgrown the factory. Mr. Serck then bought four acres of land at Greet, and erected on it a works designed and laid-out especially for the business of radiator manufacture.

When the War came along he foresaw great difficulty in getting tubing, so with characteristic resolution put down his own tube-drawing mills, of such production-potentiality that he is not only independent of other sources of supply for his own requirements, but is also able to furnish tubing for other manufacturers.

In 1918 the Government swooped down and took over the works, so that every machine in the plant stilll bears the imprint of the Ministry of Munitions, or this, that or other Department. The works were released from control in May last, however, and the company at once added to their equipment—designing and building quite a lot of the tools themselves, by the way—so that when the factory is running at full output it will be capable of turning out at least 50,000 radiators per annum.

One does not remember a more interesting insight into production than was afforded at Greet on Tuesday last, although the geniality of Mr. Serck and his colleagues tended to make one forget that information was being absorbed. They work like niggers, at the Serck radiator plant, but they have mastered the art of being busy without being blusterous, and keeping things humming without getting lugubrious. To judge by the remarks of manufacturers like Mr. J. K. Starley, of the Rover Co., Mr. Joseph Lisle, of the Star Co., Mr. Kay, of the Sunbeam Co., and Mr. Allan, of Austin's, Serck radiators are *the* radiators. Any customer who has once tried them seems consistently to adhere to the products of "Peter the Great," and after seeing the extent and organisation of his works it is easily understood that his company's output really should be, as it is, *hors concours*.

SIDE-WINDS

A very remarkable publication is an album which has been prepared by Messrs, Ruston and Hornsby, of Lincoln, Grantham and Stockport, which illustrates some of the work done by the firm during the War years 1914-15-16-17 and 18. It opens with a brief history of the firm from its foundation, and then there are pages and pages of photographs of vehicles of all sorts, guns, bombs, aeroplanes, aero engines, etc., which have been produced by the firm for use by one or other of the three Services. The photographs have all been beautifully mounted, and the appearance of each page is considerably enhanced by the tasteful arrangement of sketches round the photographs. There are a good many photographs showing productions of the Aviation Department of Ruston and Hornsby, which, it may be remembered, built the machine flown by the late Lieut. W. L. Robinson, V.C., when he brought down the German airship at Cuffley. That this department did its bit is indicated by the fact that the 1,000th aeroplane was completed on January 4, 1918. The firm also supplied a very large number of aero engines to the flying services. The Ruston album has been most beautifully reproduced, and forms a souvenir of the War which will be valued by those who are fortunate enough to obtain one.

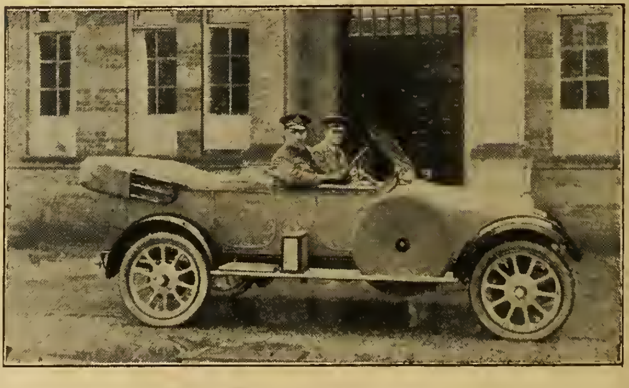
- - -

Mr. Frank Lanchester has been unanimously elected by the Council President of the S.M.M.T. in succession to Mr. Albert Brown. Mr. E. M. C. Instone and Mr. J. Maughfling have been elected Vice-Presidents. The latter had for some time been Honorary Treasurer of the Society in which office he is now succeeded by Mr. A. S. Mays-Smith. The Management Committee of the Society elected from the Council will include the Past Presidents—Mr. F. R. Sims Mr. Sidney Straker, Mr. E. Manville, Mr. S. F. Edge, and Mr. Albert Brown.

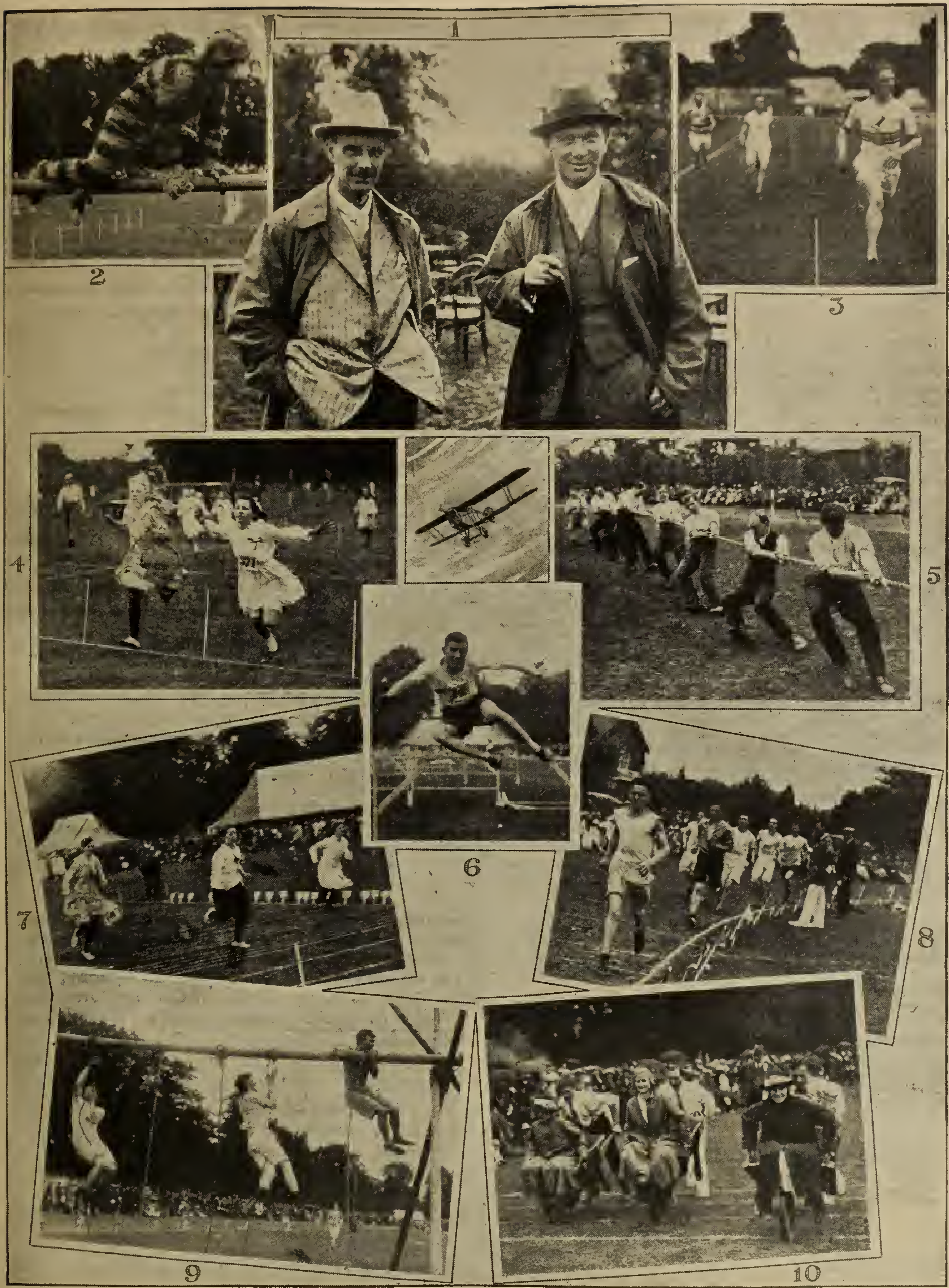
- - -

The British Lighting and Ignition Co., Ltd., who during the War have been established at 204, Tottenham Court Road, London, W. 1, have now removed their head office and works to Birmingham. The new factory, which is a very extensive one, is situated in Cheston Road, Aston, Birmingham, and will in future be known as the B.L.I.C. works. The London depôt and repair works has been established at 201, Tottenham Court Road, and magneto repairs, armature winding, etc., will be dealt with both at that address and the Birmingham factory.

For their sports, which this year were held at Guildford on Saturday last, the Martinsyde Recreation Club were not so fortunate as regards the weather as they have been in the past. The rain, however, was not so heavy as to interfere with the arrangements. The programme, as usual, was a very big one and there was always something going on from 11 a.m. to dark, as after the prizes were presented by Mrs. Martin, dancing was indulged in to the strains of the Martinsyde Orchestra. The band of the 2nd Battn. The Queen's also rendered a selection of music during the day. One sign of the changed conditions was the disappearance of many of the events for the ladies, which had been such a feature of war-time sports. Many of the events were keenly contested, notably the 100 yards open handicap, in which W. A. Hill, the Surrey A.C. champion, won by half a yard from scratch in 10 secs. The 120 yards hurdle race, won by K. L. Carruthers by a couple of yards, also provided an exciting race. A word of praise must be accorded



Our photograph shows Sir John Alcock, K.B.E., D.S.C., and Sir Arthur Whitten Brown, K.B.E., when Sir John took delivery of his new 10 h.p. Humber four-seater. The Atlantic flyers are shown outside the front entrance of the Humber works at Coventry.



"Flight" Copyright

AT THE MARTINSYDE ANNUAL SPORTS: Held at Guildford on July 19.—1. "The firm," Messrs. Martin (right) and Handasyde (left), snapped on the Guildford sports ground, where the carnival was held. 2. "Pussyfoot" entertained the crowd with his antics. 3. The 100 yards open handicap, won by W. A. Hill, the Surrey champion. 4. Girls (7 to 16 years) race, the winner being found in the little sport nearest the camera. 5. The Fitters' "A" Team pulled well in the Tug-of-War. 6. 120 yards Hurdle Race. 7. A snap just after the start of the Ladies' Race. 8. The One-Mile Closed Handicap. Half way. Won by No. 316 (Y. Davis); 346, 2nd; 408, 3rd. 9. Getting over the top in the Quarter-Mile Obstacle Race. 10. Wheelbarrow Race.

to the officials, including Messrs. H. P. Martin and G. N. Handasyde, F. H. Campkin and many others for their energetic labours during the day.

- - -

THE temporary withdrawal of the restrictions on flying to the Continent has enabled the business value of the aeroplane to be demonstrated. In one instance the managing director of a well-known firm, being summoned from Liverpool to an urgent interview in Paris, came up to London by train on the Monday night, and telephoned for an aeroplane to be ready at Hendon at 7.30 a.m. next morning to take him on by air to Paris. The machine, an Airco 9, piloted by Capt. Shaw, ascended punctually at the time stated, and, in spite of cloud and rain, reached the aerodrome at Le Bourget, near Paris, at 10 a.m., having averaged a speed of 100 miles an hour. Whereupon the aerial traveller, Mr. Pilkington, of Pilkington Brothers, motored at once into Paris. On the following day, Wednesday, having completed his business he returned again to London by air in the same machine. This successful journey was, it is interesting to note, the first in connection with the temporary withdrawal of the restrictions on flying between London and Paris.

- - -

THE Selsdon Aero and Engineering Co., Ltd., have now commenced operations at Somerton Works, Cowes, Isle of Wight. Material or supplies should be advised to the works to which they are sent, and invoices forwarded to the central buying department at Sanderstead Road, Croydon, to which all monthly statements should be rendered.

- - -

IT is the little details that count, and so "K.L.G." plugs were fitted on the "Sunbeam-Coatalen" engines of the British airship "R.34" in her victory flight across the Atlantic. Naturally they gave every possible satisfaction and largely contributed to the success of the voyage out and home.

- - -

IT is a noteworthy fact that "K.L.G." plugs were used on all British machines flying the Atlantic—first on the Sopwith (Hawker-Grieve) machine, then on the "Vickers-Vimy" (Alcock-Brown) and in the British airship "R.34." All were available; "K.L.G." were chosen!

- - -

BY reason of its peninsular formation, Denmark has always suffered many of the handicaps of isolation. The tedious sea journey to the other countries of Scandinavia or to Britain, or the inconvenient train route through Hamburg to the rest of Europe, have militated against the speediest trade relations, and to obviate these limitations extensive aerial services are now being organised. The Danish Government has taken a decided step in the direction of the speedy development of aerial navigation between Denmark and the neighbouring countries, by acquiring a considerable number of "Bristol" biplanes on behalf of the nation, and they are now on their way to Denmark. Accompanying them are a number of skilled British airmen, who are to act as instructors of the Danish pilots to be employed on the projected services.

- - -

MESSRS. CELLON, LTD., are branching out in several directions, and notably in Spain, where they have opened a branch establishment. The address is Baraquillo 17, Madrid, where they are represented by Mr. T. F. Cowan. They have already received orders from the Spanish Government for their scheme "A," scheme "B" and "red △" scheme.

- - -

ON Monday of last week a fire of no small dimensions broke out in the spraying room of Aero Coverings, Ltd., at their works in Willesden Lane. Mr. D. Hutchinson, the managing-director, was hastily summoned, and realising the gravity of the position in a moment, directed the firemen to turn their chief efforts to the store of doping material. Great credit is due to the excellent behaviour and prompt action of the members of the staff. The ground floor and a large portion of the stock were badly damaged by the water, although a considerable number of aeroplane wings were moved out of harm's way. The works were, thanks to the energies of all, practically working at normal speed within three or four days.

- - -

MESSRS. JOHN BIRCH AND CO., LTD., export engineers, of London, announce that they have undertaken the Overseas agency of William Beardmore and Co., Ltd., the well-known Glasgow engineering firm, who have during the War produced a large number of airships, aeroplanes, and aero engines, among many other "munitions." The Beardmore workshops are rapidly being converted from War to peace production of metals and machinery for distribution throughout the world. The Birch organisation, already far-reaching, is being further extended to meet these new requirements.

Aeronautical Specifications Published

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 17, 1919

10,969. W. H. WOOD. Propellers, etc. (128,310.)
11,008. BLACKBURN AEROPLANE AND MOTOR CO., H. BOOTH and J. W. COPLEY. Pulleys and other flexible connections for aircraft. (128,313.)
11,009. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Folding wings of aircraft. (128,314.)
11,096. F. SAGE AND CO. and N. A. T. N. FEARY. Fairings for struts. (128,319.)
12,849. E. E. BROWN and D. J. MOONEY. Metal construction for aircraft (128,322.)

Published July 24, 1919

157. A. BROCK. Aerial photography. (128,593.)
11,147. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Lifting-attachments for aircraft. (128,599.)
11,172. W. E. BACK. Control of flying-machines. (128,602.)
11,175. A. H. GLEDHILL. Apparatus for releasing bodies from aircraft. (128,603.)
11,182. A. TOMPKIN. Safety tank for inflammable liquids. (128,604.)
11,215. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Boats or floats. (128,605.)
11,265. A. BROCK. Aerial photography. (128,609.)
11,328. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Hydro-aeroplane hulls or floats. (128,611.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 17, 1919

3,639. G. H. THOMAS and S. W. HISCOCKS. Laminated spar. (128,329.)
8,064. A. A. HOLLE. Control of aeroplanes. (128,341.)
8,195. W. TAYLOR. Gyroscopic level indicator. (128,345.)
9,326. S. E. GRAND. Parachute device. (128,352.)
9,858. E. KITCHEN. Stabilising and speed-increasing devices. (128,367.)
10,905. PARNALL AND SONS and H. BOLAS. Cowling of rotary engines. (128,421.)
10,926 and 10,927. G. H. THOMAS and F. J. TIPPEN. Airships. (128,422 and 128,423.)
11,363. BLACKBURN AEROPLANE AND MOTOR CO., H. BOOTH and G. E. PETTY. Flying boats. (128,430.)
16,109. G. CLOWES. Portable steps for use in rigging aeroplanes. (128,481.)
17,059. W. S. CLAYTON. Incline indicators. (128,488.)
19,418. R. A. SILK. Platforms for use when adjusting compasses of aircraft. (128,495.)

Published July 24, 1919

7,812 and 7,817. F. SAGE and Co. and N. A. T. N. FEARY. Fabrics for aircraft. (128,690 and 128,691.)
10,415. L. R. ACCORNERO and A. GAYDON. Aeroplanes. (128,724.)
10,872. R. M. BEATTIE. Parachutes. (128,753.)
10,875. A. RAMAUGE. Parachutes. (128,754.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 24, 1919

9,495. A. BOERNER. I.C. engines for airships. (128,888.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages liii, liv, lv and lvi)

NOTICE TO ADVERTISERS.

IN order that "FLIGHT" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates*:—

UNITED KINGDOM.	s.	d.	ABROAD.	s.	d.
3 Months, Post Free	7	1	3 Months, Post Free	8	3
6 ,, ,,	14	1	6 ,, ,,	16	6
12 ,, ,,	28	2	12 ,, ,,	33	0

These rates are subject to any alteration found necessary under war conditions.

Should any difficulty be experienced in procuring "FLIGHT" from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 553 (No. 31, Vol. XI.) JULY 31, 1919 Weekly, Price 6d. Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.*

These rates are subject to any alteration found necessary under war conditions

CONTENTS

	PAGE
Editorial Comment:	
The New Rates of Pay	1001
The Airship Officers' Club	1001
The "Encouragement" of Civil Aviation	1002
Who Controls Airships?	1002
The Air Convention	1004
Flight—and the Men: Mr. Claude Johnson	1003
Pancaking	1003
Gosport Flying Boats	1006
The Royal Aero Club: Official Notices	1010
Some Developments in Aircraft Design	1013
Honours	1017
In Parliament	1020
Flying at Hendon	1021
British Scientific Products Exhibition	1023
U.S.A. Navy F-5-L Flying Boat	1024
Airisms from the Four Winds	1027
International Air Navigation Regulations	1029
Personals	1032
The Royal Air Force	1033
Side-Winds	1035
Correspondence	1035

EDITORIAL COMMENT

The New Rates of Pay

AT first sight the concessions made by the Treasury with regard to increased pay in the Royal Air Force and the fighting Services generally look like a timely recognition of the burdens imposed upon officers, whose pay has never been more than sufficient for their actual wants, by the rise in the cost of living. When it is examined in detail, however, the generosity of the Government is not so apparent. Under the Finance Act, 1915, officers whose total income does not exceed £300 per annum have hitherto paid income tax at the 1914 rate of about 1s. 4d. in the £. Now the Government with one hand increases the rate of pay and takes it away with the other by subjecting officers' incomes to the current rate of tax. The benefit to the officer is thus much more apparent than real, and the incidence of the increased taxation will, unfortunately, be felt most heavily by the junior ranks and by those who depend entirely upon their pay, having no supplementary means of their own. It is a niggardly, cheese-paring policy, to say the least, and we shall be surprised if it does not, now that the truth about the much-lauded "increase" in pay is realised, lead to a great deal of dissatisfaction.

It raises once more the much-discussed question of whether all pay in the fighting Services ought not to be free of income tax. There is a great deal to be said for the argument that, as taxation is mainly raised for the upkeep of the Services, it is not fair that those within those Services should be called upon to contribute towards their cost, except in so far as relates to income derived from private sources, and which has nothing to do with the officer's service as such. Naturally, the one who, having large private means, elects to serve his country in one of the fighting Services must expect to pay his share out of the income derived from his investments, but it is not too much to ask that the State should keep its hands off his Service pay. To mulct him on that is almost as logical and just as for the proprietor of a business to declare a levy on the salaries and wages of his employees for the upkeep of his premises and business. We doubt not that the whole question will be raised in Parliament by one of the Service members. It should be, since a full discussion of the matter would do no harm at all.

◆ ◆ ◆

The Airship Officers' Club

As we recorded last week, the Airship Officers' Club has come into vigorous being, and with it another body called the Airship Old Comrades' Association, the scope and intended work of which was fully set forth in the last issue of FLIGHT. On Saturday evening last the enterprise was officially launched at a dinner at the Connaught Rooms, presided over by General Maitland, the President of the Club, at which a large number of distinguished guests and past and present officers of the airship branch of the Service were present.

We regard both the foundation and objects of the

Club and the Association as being altogether admirable. During the war the airship branch was essentially the silent arm of the Air Force. Its work was not done in the limelight which fell upon the various active battle-fronts of the war, but was carried out mainly over the narrow waters where there were few to witness and none to record the always monotonous and generally hazardous anti-submarine patrols which formed the major part of its task. Even now, when the veil of the censorship has been lifted, we know little of what that work was or of how it was accomplished by the officers and men of an arm literally as well as figuratively working in the dark. All we really know is that when war broke out we were possessed of no more than two, or at most three, small airships which were quite incapable of doing effective work, and that the armistice found us, somewhat to the surprise even of those associated with aviation, in possession of a formidable fleet of lighter-than-air craft. It is true to say that this had grown from absolutely nothing. Yet so great had been the effort put into the creation of that fleet that we had left Germany far behind in types which before the war she had monopolised.

To a great extent the end of the war means that the priceless *personnel* which created and manned this great aerial Service will be scattered to the four winds. Our peace establishment will not permit of the retention in the Service of more than a mere nucleus, comparatively speaking, of the whole. It would have been a thousand pities if this fine Service should have been left to drift apart altogether after demobilisation, and if there were no other considerations to take into account we should still welcome the advent of the Airship Officers' Club and its offspring, the Airship Old Comrades' Association. But, as was pointed out by General Maitland at the dinner on Saturday last, there are other functions that can be usefully performed by these organisations. To assist past officers and ratings of the airship service to secure employment, succour those who have fallen by the wayside, to assist the dependants of those who pass from among us, and to generally foster and watch over the interests of "Old Comrades"—these are each and all most worthy objects.

One article of faith in the constitution of the Association we are glad to see. Politics and interference in matters affecting the Service are taboo. That is as it should be, since the introduction of politics spells early ruin to any organisation of the kind, while attempts from outside to interfere with the discipline and conduct of the Service are inevitably foredoomed to failure, and must in the end result in the breaking up of the body attempting such interference. Moreover, we do not want to see the methods of the trades unions introduced into the fighting Services. The Association is very wise in laying down as an absolute and unalterable rule that it will have nothing to do with the genus agitator or grievance-monger. Taken all round, both the Club and the Association have been launched under the most auspicious circumstances, and we most sincerely wish them well.

◆ ◆ ◆

The "Encouragement" of Civil Aviation

In our issue of last week we commented on the advertisement of the London and Provincial Aviation Company, announcing that owing to the peculiar methods of "encouragement" alleged to be employed by the Civil Flying Department of the Air Ministry, it has decided to go out of business. We observe that the same advertisement, or one almost precisely similar, has appeared in certain of the daily newspapers—the *Daily Mail*, for example. It seems to us that the matter has now gone too far for the authorities to ignore. There is no ambiguity about the statements made by the company. "They are compelled to cease business owing to the operations of the Department of Civil Aviation." That is a definite challenge to the Department, and, through the Department, to the Government. Either it is true or it is not. If it is not, then for the sake of its own good name and reputation it is up to the Department to refute the statement. It must do so, or be content to have the allegation accepted by default. This is no longer a matter that is confined to the knowledge of the comparatively few. So long as the announcement of the company was confined to the pages of journals intimately connected with aviation it was, in a sense, a domestic matter which the Department by ignoring might have lived down in time. We say might, because, for our own part, we did not at all intend that our comments of last week should constitute the last word on the subject, and we have faith enough in the influence of FLIGHT to believe that sooner or later we should have secured some pronouncement from the Department. But it is now a public matter. The announcement that the Department is a stumbling-block to the progress of civil aviation, instead of a help, has been read and appreciated by the million, and we do not see how the challenge can be ignored. It can only be answered by a denial of the principal statement that the company has been forced out of business by the operations of the Department. If that is not forthcoming, then we are driven to the assumption, amounting to certainty, that it is a true charge.

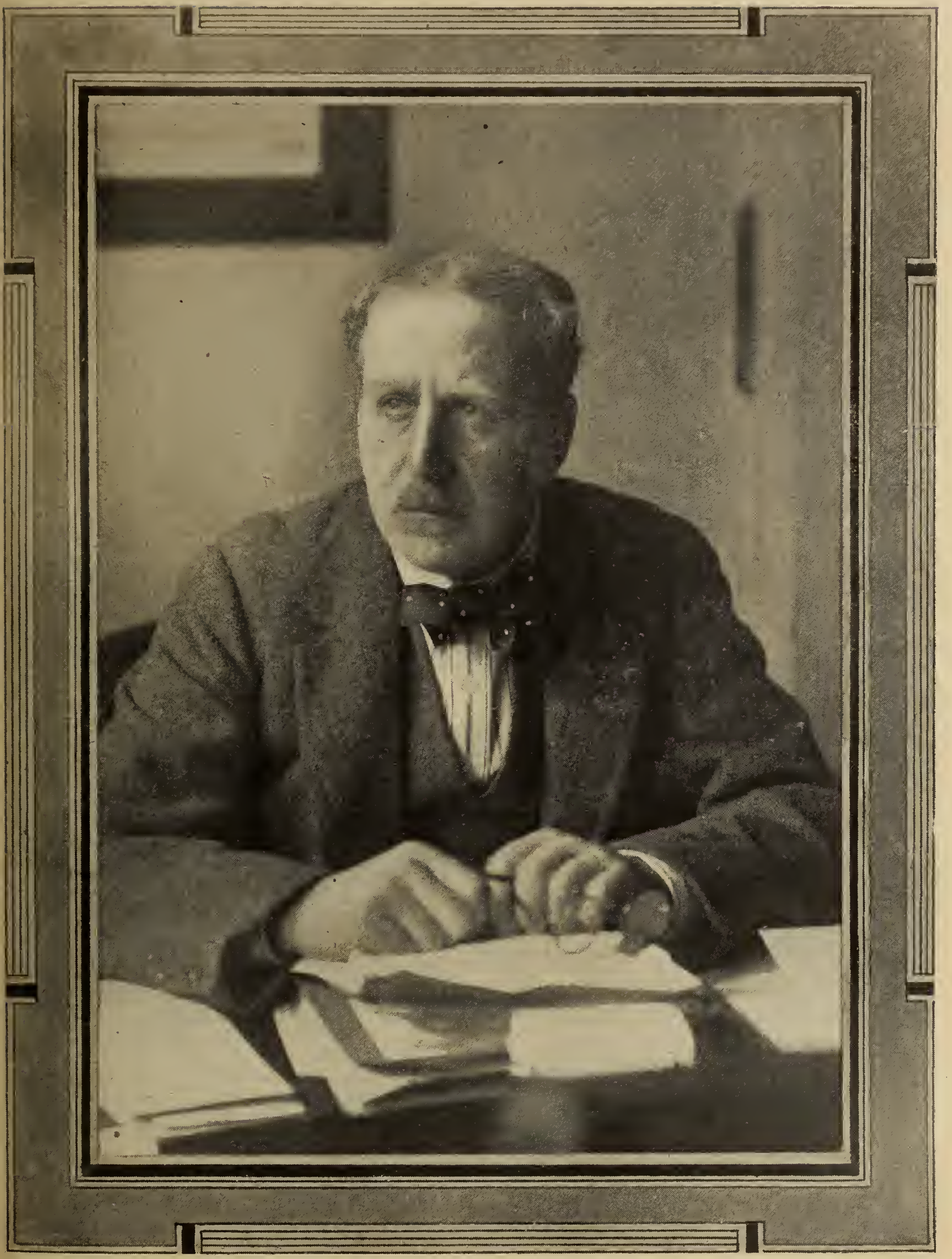
In that case the public will certainly want to know why the Department of Civil Aviation is a department of discouragement, and who and what is to blame. Further, it will have to explain the suggestion that some of the discouragement alleged against the Department is the outcome of axe-grinding on the part of some whose book will not be suited by a too-rapid development of civilian aviation schemes before they have had time to mature their own. As a matter of fact, the suggestion has in some quarters become an actual, concrete accusation. One thing is very certain, that there must be an immediate and searching inquiry into the facts of the closing down of the London and Provincial Aviation Company. If the higher authorities of the Air Ministry are not inclined to institute such an enquiry without further pressure, then that pressure must be applied through Parliament. The matter is far too serious to be allowed to rest where it is. It concerns the good faith of one of the principal Departments of State, and goes a good deal deeper than a mere question of policy.

◆ ◆ ◆

Who Controls Airships?

Is the Air Ministry responsible for the control of the whole of the Air Service, or only for that of a part? We ask this question because there really seems to be a doubt about it. We recollect that during the debate on the Address, Mr. Churchill, who, as Air Minister, ought to have known whereof he spoke, said, "The integrity, the unity, the independence of the Royal Air Force will be sedulously guarded.' If that meant anything at all, it surely meant that the

Flight—And the Men



"Flight" Copyright

Mr. CLAUDE JOHNSON, Managing Director of Rolls-Royce, Ltd.

Royal Air Force would remain one integral body, united as to its branches and independent of the control of either War Office or Admiralty. There is no other meaning that we can attach to so categorical a statement.

Yet we read that the rigid airships R.33 and R.34 have now been "handed back" to the Admiralty. The question then arises: Is the airship branch of the Service a purely naval force or is it not? Before the fusion of the R.N.A.S. and the R.F.C. the airships were completely and directly under naval administration. As soon as the R.A.F. came into being the officers and men of the airship branch were put into R.A.F. uniform, the whole of the routine at airship stations was changed from naval to quasi-military, and the whole atmosphere completely changed. "Airships" still remained under the Admiralty for "operations," but administratively they became a part of the R.A.F. It was clearly understood that as soon as possible after the armistice the airships would pass completely under the control of the Air Ministry, but that has certainly not happened yet. The correspondence between the Departments is "still proceeding," and in the meantime the airships which were graciously lent by the Admiralty to the Air Ministry for the Atlantic flight and for advertising the Victory Loan have been returned to the former.

There may be excellent reasons for the temporary retention under Admiralty control of these craft, but the position all round is so peculiar that we think it is time a definite statement of policy should be made. According to the First Lord of the Admiralty, everyone is not agreed as to the soundness of the view that there should be a single control in the Air Service. That seems to mean that the Admiralty is in disagreement with the principle, and thereby sets itself above the authority of Parliament, which, by passing the Air Force Act, has said there *shall* be but one control. Our own views on the subject are sufficiently well known, since it was FLIGHT which led the campaign in favour of a single and indivisible service, but, assuming that there are two sides to the argument, it is surely necessary that the Government should state plainly whether the views of the Admiralty, which may be sound in theory—we do not admit they are if they tend to the division of the Air Service—are to be permitted to override the authority of Parliament.

It is perfectly clear that so long as the Admiralty retains its hold on the airship branch the State-owned lighter-than-air craft will not be available for the development of the civil side of flying. The voyage of R. 34 was not made under Admiralty auspices—and would not have been—and the only way the Air Ministry could get it done was by "borrowing" the ship from the Navy. The airship shows considerable promise as a vehicle of aerial transport, and it is certainly not in accord with the requirements of civil aviation that the Admiralty should be permitted to pursue the policy of the dog in the manger.

◆ ◆ ◆

The Air Convention

The Air Ministry has issued for publication the text of the Convention relating to International Air Navigation, and this will be found printed *in extenso* in last week's issue of FLIGHT and part in the current number. The Convention has been agreed to by all the representatives of the Powers taking part in the Peace negotiations on the side of the Allies and the States at present subscribing to the League of Nations, subject to certain reservations. It has not been formally approved by the Supreme Council of the Peace Conference, but it has been agreed that it should be issued for the information of the public of the Allied and Associated States.

There is little in the Convention calling for comment, since the completed Convention differs very little from the suggested text put forward some little time ago as a basis for the international regulation of flying. It recognises that every State has complete and exclusive sovereignty in the air above its territory and its territorial waters. It agrees that every State shall accord in time of peace freedom of passage across its territories without distinction of nationality, subject to the right for military reasons to prevent aircraft from flying over certain defined areas of its territory. Except in the matter of these "General Principles" the Convention consists mainly of technical regulations governing the conduct of aerial traffic, which are quite unexceptionable, and, therefore, call for no specific comment.

◆ ◆ ◆ ◆

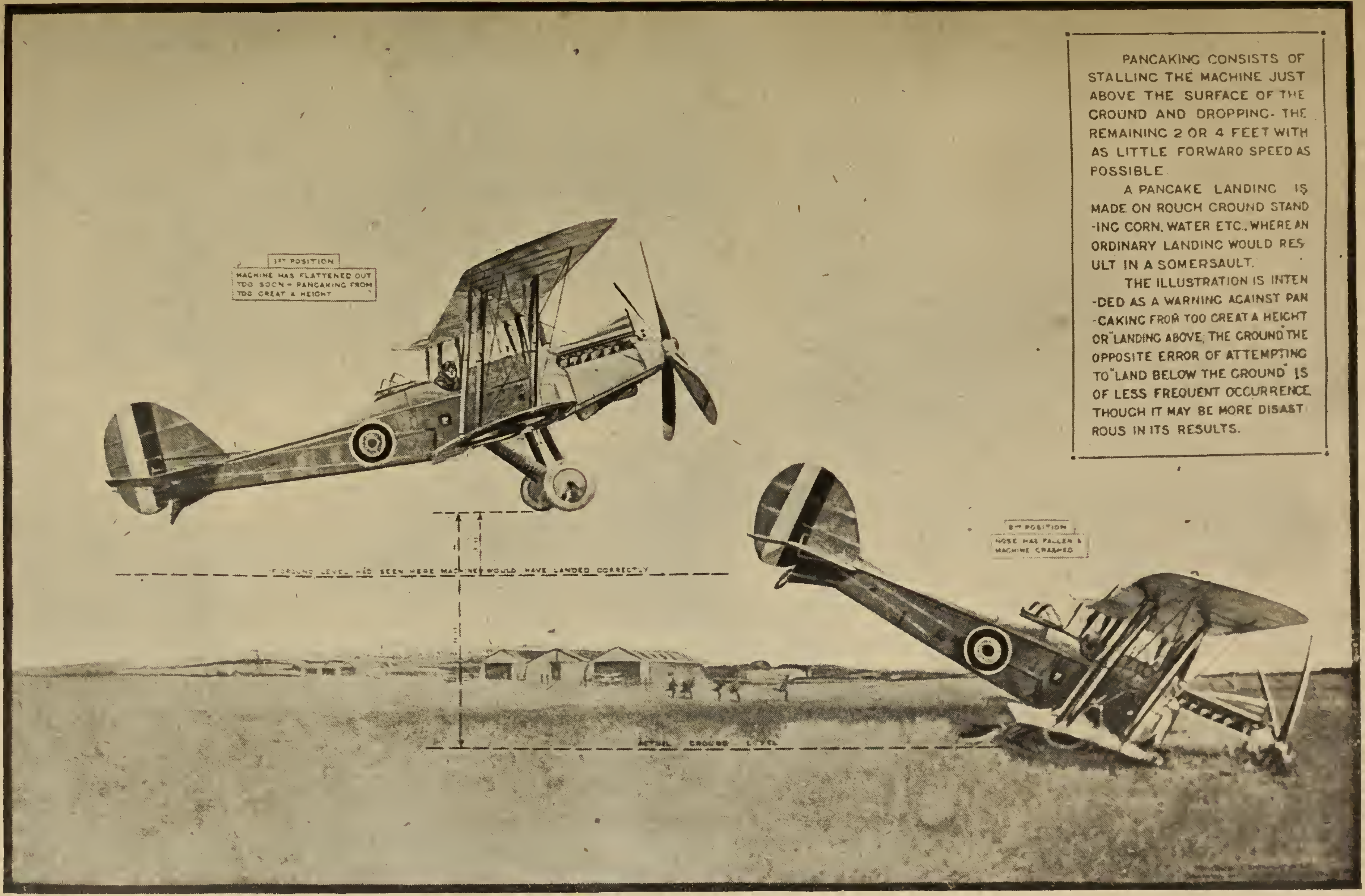
MR. CLAUDE JOHNSON

As a rule we have not broken out into biography on the publication of the portraits of prominent personalities in aviation, which have been included in "Flight—And the Men." Nor do we intend to break through the precedents on this occasion, but it is nevertheless fitting that we should refer to what is an unique record in regard to our subject of this week—Mr. Claude Johnson. At the moment when everyone connected with aviation is busy congratulating him and the firm with which he is connected on the successful crossing of the Atlantic by a machine driven by Rolls-Royce engines, it may not be generally known that Mr. Johnson was the first honorary secretary of the Aero Club of the United Kingdom, as it then was, which was founded in November of 1901. His association with the active side of aeronautics thus began very early, though it did not continue for very long. The War has brought him back into active contact with the movement, and his firm has been, as everyone knows, responsible for the production of a series of very highly successful aero-motors, which have just recently crowned that success by securing the "Blue Ribbon of the Atlantic."

◆ ◆ ◆ ◆

Air Ministry Reorganisation

THE Air Ministry announces that the Secretary of State for Air has approved a reorganisation of the Department of the Secretary to the Air Ministry, one of the objects of which is to provide more fully for the co-ordination of the work of the Department. In this reorganisation Mr. C. R. Brigstock and Mr. J. A. Webster, D.S.O., who have been transferred from the Board of Trade, have been appointed assistant secretaries


1ST POSITION
MACHINE HAS FLATTENED OUT TOO SOON – PANCAKING FROM TOO GREAT A HEIGHT
IF GROUND LEVEL HAD BEEN HERE MACHINE WOULD HAVE LANDED CORRECTLY
ACTUAL GROUND LEVEL
2ND POSITION
NOSE HAS FALLEN & MACHINE CRASHED

PANCAKING CONSISTS OF STALLING THE MACHINE JUST ABOVE THE SURFACE OF THE GROUND AND DROPPING THE REMAINING 2 OR 4 FEET WITH AS LITTLE FORWARD SPEED AS POSSIBLE.

A PANCAKE LANDING IS MADE ON ROUGH GROUND STANDING CORN, WATER ETC., WHERE AN ORDINARY LANDING WOULD RESULT IN A SOMERSAULT.

THE ILLUSTRATION IS INTENDED AS A WARNING AGAINST PANCAKING FROM TOO GREAT A HEIGHT OR "LANDING ABOVE THE GROUND." THE OPPOSITE ERROR OF ATTEMPTING TO "LAND BELOW THE GROUND" IS OF LESS FREQUENT OCCURRENCE THOUGH IT MAY BE MORE DISASTROUS IN ITS RESULTS.

Pancaking. (*Drawing published by the Air Technical Services for use at the R.A.F. Schools.*)

THE GOSPORT FLYING-BOATS

WE are able to publish this week drawings and specifications of six different types of flying-boats laid down by the Gosport Aircraft Co., of Gosport and Southampton. This firm has specialised in flying-boats for some time past, and has delivered many to the British Government. The six flying-boats referred to have been designed to meet a variation in requirements for future commercial aviation that appears to cover pretty well all the different purposes to which a flying-boat could be put. They range from a large 10-seater of over 100 ft span to a very small single-seater of only 23 ft. span, as may be seen from the following specifications:—

The Gosport "Fire Fighter"
720 h.p. 10-Seater Flying-Boat

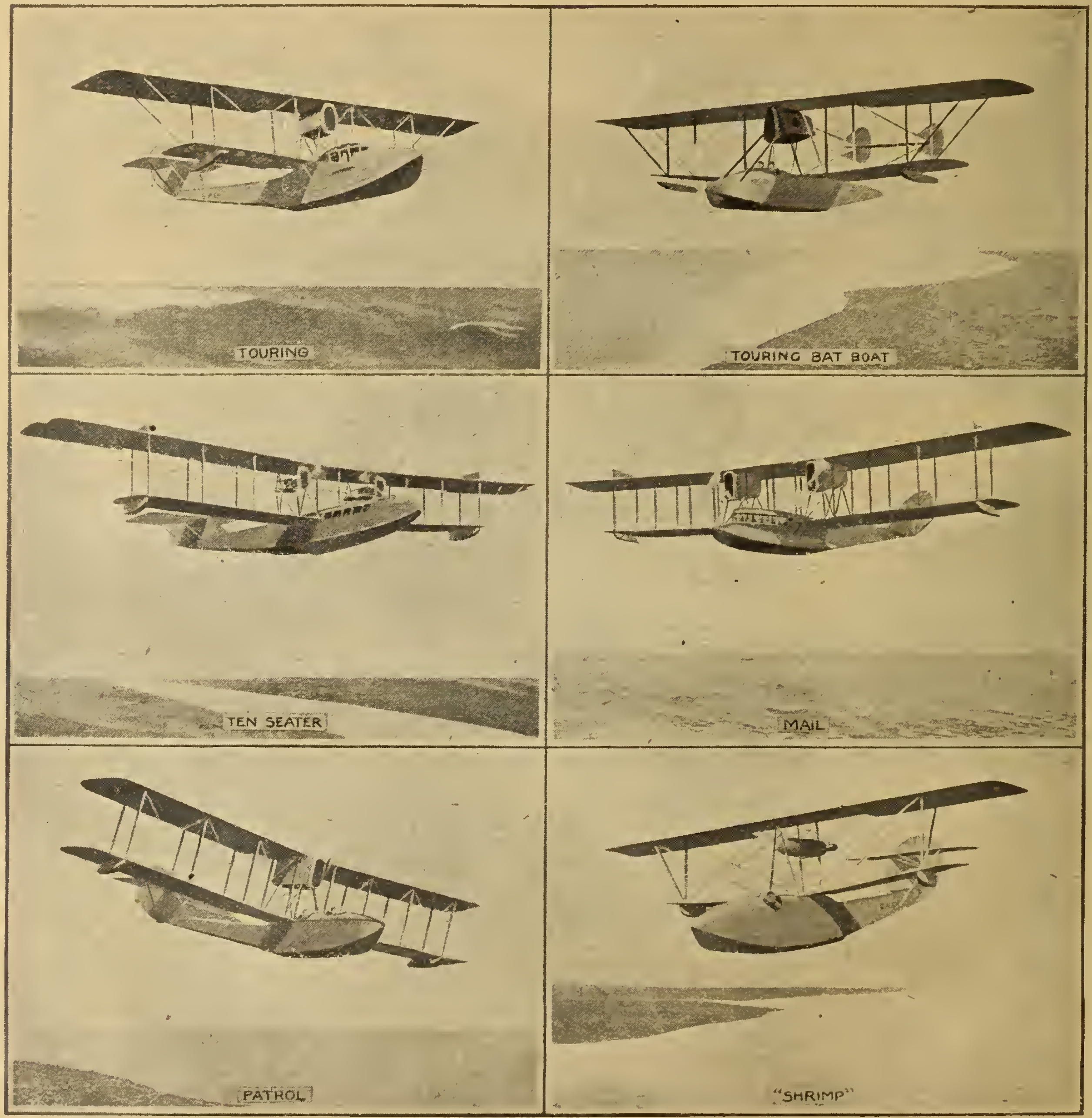
This large boat was designed with a view to carrying men and material in the quickest possible manner to the scene of a forest fire or other emergency, which may arise in such countries as Canada where large lakes and rivers abound, surrounded in many instances by forest or heavily wooded country.

This type, however, can readily be adapted for long-distance passenger or goods traffic, and is designed to withstand continuous rough and heavy service.

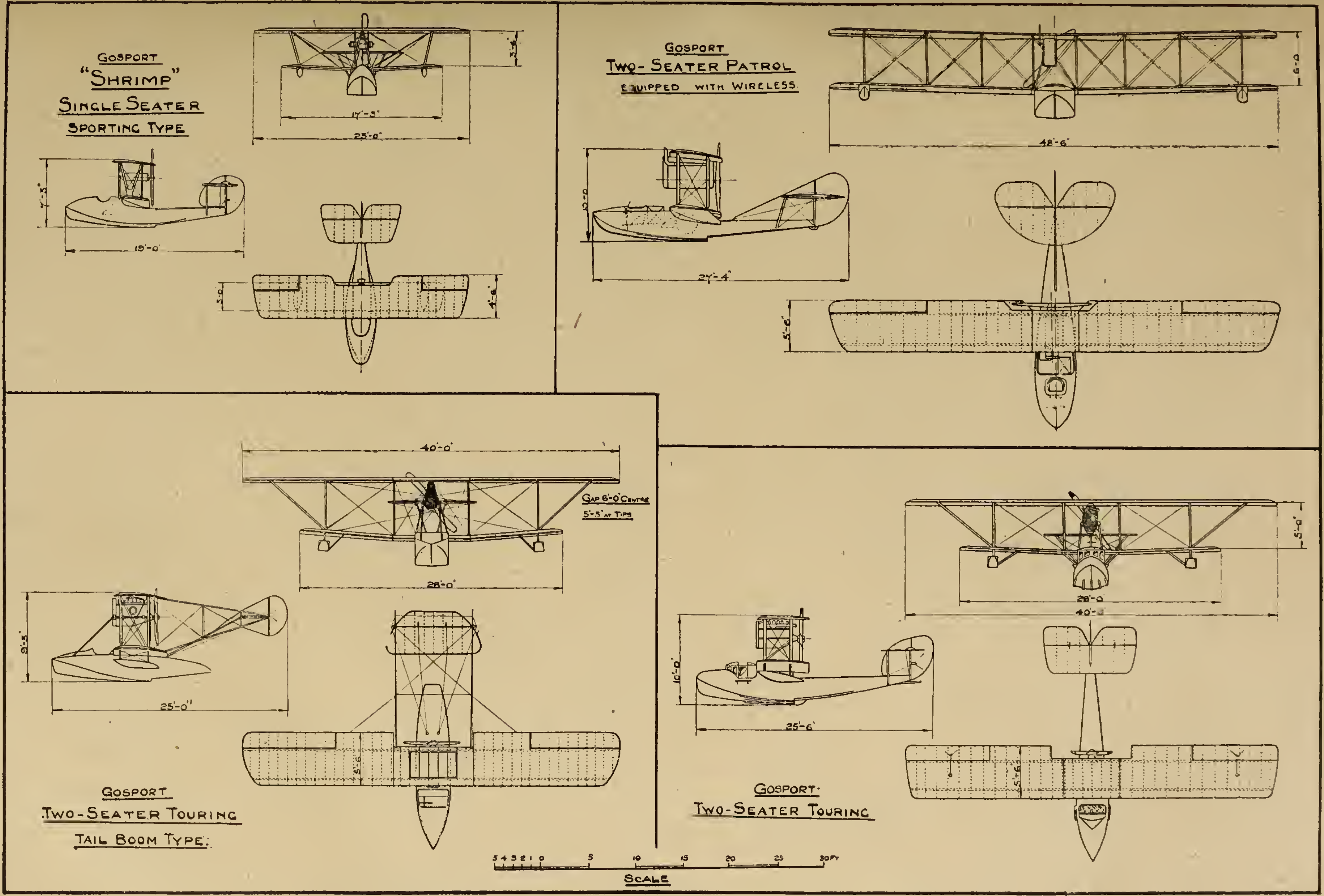
Balanced controls are fitted throughout, enabling the boat to be easily handled and controlled, even in bad weather.

Tanks are provided capable of holding sufficient fuel for a non-stop flight of approximately 400 miles.

Span (top)	103 ft.
„ (bottom)	73 ft.
Length	49 ft.
Chord	8 ft.
Gap	9 ft.
Area of main planes	1,380 sq. ft.
Weight fully loaded	12,500 lbs.
Useful load (fuel, crew of 10, gear or supplies, and wireless)	3,600 lbs.
Petrol capacity	190 galls.
Oil capacity	15 galls.
Two 360 h.p. Rolls-Royce (other types fitted if desired)	



THE GOSPORT FLYING-BOAT: Views of the six different types in flight.



THE GOSPORT FLYING-BOATS: Plans, side and front elevations to scale.

Petrol consumption per hour (full power)	46 galls.
Oil consumption per hour (full power)	2 galls.
Duration at full power	4 hours.
Duration at cruising speed	6½ hrs. at 65 m.p.h.
Top speed fully loaded	89 m.p.h.
Landing speed fully loaded	42 m.p.h.
Ceiling with full load	14,000 ft.

The Gosport "Mail" Boat

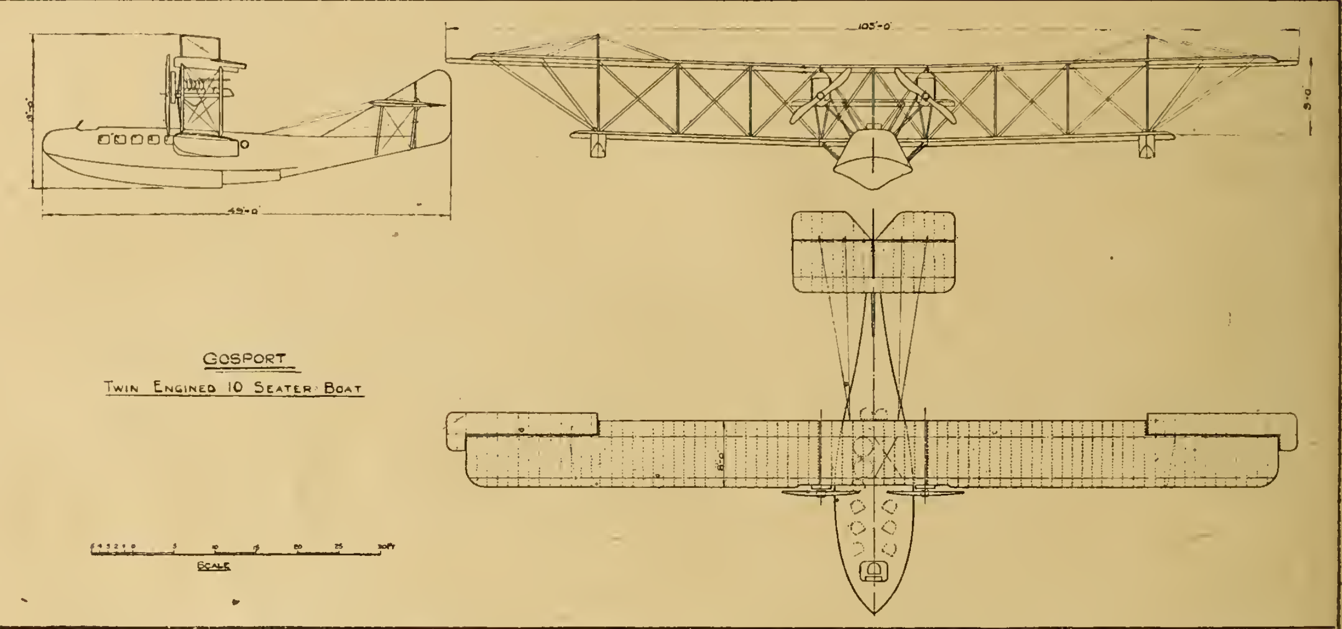
Six-Passenger Boat

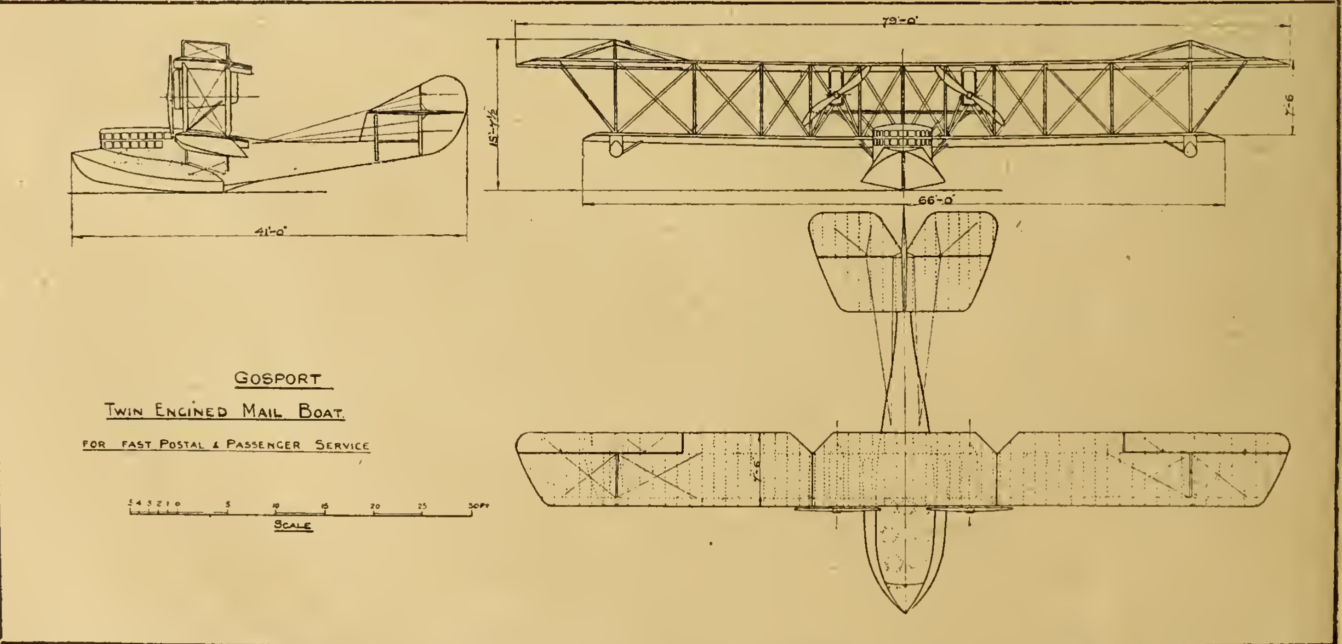
This type has been evolved with the main object of fulfilling the exacting requirements of a long-distance, passenger, mail, and goods-carrying boat. Special attention has been directed towards the comfort and safety of the pilot and passengers. The seating accommodation is particularly spacious and comfortable. The handling of the boat is rendered easy even at low speeds by the ample area of the control surfaces. The wings of this machine are made to fold back.

Span (top)	79 ft.
,, (bottom)	66 ft.
Length	41 ft.
Chord	7 ft. 6 ins.
Gap	7 ft. 6 ins.
Area of main planes	1,000 sq. ft.
Weight fully loaded	6,400 lbs.
Useful load (fuel, mail, and six passengers)	2,000 lbs.
Petrol capacity	92 galls.
Oil capacity	15 galls.
Crew	Pilot and mechanic.

Two 280 h.p. Rolls-Royce (other types fitted if desired)

Petrol consumption per hour (full power)	37 galls.
Oil consumption per hour (full power)	1½ galls.
Duration at full power	2½ hours.
Duration at cruising speed	5 hrs. at 70 m.p.h.
Top speed fully loaded	100 m.p.h.
Landing speed fully loaded	45 m.p.h.
Ceiling with full load	15,000 ft.




79'-0"
15'-7½"
7'-6
66'-0"
41'-0"
GOSPORT
TWIN ENGINED MAIL BOAT.
FOR FAST POSTAL & PASSENGER SERVICE
5 4 3 2 1 0 5 10 15 20 25 30FT
SCALE

THE GOSPORT FLYING BOATS: Plans, side and front elevations to scale

"Gosport" Patrol Boat
280 h.p. Two-Seater, with Wireless Outfit

This boat has been designed to fulfil the requirements of the Colonies for a fast patrol or police boat, and will be found to possess the qualities of a first-class Service scout. It is equipped with a wireless transmitting and receiving set.

The pilot and wireless operator have an uninterrupted view. Fuel tankage is provided for a six hours' patrol at cruising speed, and from a stationary start this type will climb 100 ft. in about 350 yards.

Span	48 ft. 6 ins.
Length	27 ft. 4 ins.
Chord	5 ft. 6 ins.
Gap	6 ft.
Area of main planes	520 sq. ft.
Weight fully loaded	2,820 lbs.
Useful load	880 lbs.
Petrol capacity	50 galls.
Oil capacity	6 galls.
280 h.p. Rolls-Royce (other types fitted if desired).	
Petrol consumption per hour (full power)	18½ galls.
Oil consumption per hour (full power)	¾ gall.
Duration at full power	2¾ hours.
Duration at cruising speed	6¼ hrs. at 60 m.p.h.
Top speed fully loaded	91 m.p.h.
Landing speed fully loaded	42 m.p.h.
Ceiling with full load	22,000 ft.

The Gosport Two-Seater Touring Boat
(Tail Boom Type)

This boat has been designed upon lines that have found favour in America. It will appeal to the sportsman pilot who prefers the "Tail Boom" or "Bat-Boat" type of aeroplane. The hull is arranged for pilot and passengers seated side by side, and dual control may be fitted, if required, for instruction. The climb is well over 500 ft. a minute and the machine is capable of attaining a height of about 14,000 ft.

Span (top)	40 ft.
,, (bottom)	28 ft.
Length	25 ft.
Chord	5 ft. 6 ins.
Gap	5 ft. 3 ins. to 6 ft.
Area of main planes	340 sq. ft.
Weight fully loaded	2,000 lbs.
Useful load (pilot, passenger, fuel, and luggage)	650 lbs.
Petrol capacity	33 galls.
Oil capacity	3 galls.
160 h.p. Beardmore. (other types fitted if desired)	
Petrol consumption per hour (full power)	13 galls.
Oil consumption per hour (full power)	5½ pints.
Duration at full power	2½ hours.
Duration at cruising speed	3½ hrs. at 60 m.p.h.
Top speed fully loaded	75 m.p.h.
Landing speed fully loaded	35 m.p.h.
Ceiling with full load	14,000 ft.

The Gosport "Popular" Type
160 h.p. Two-Seater Touring Boat

This boat, which is capable of a non-stop journey of 240 miles, has been designed with special regard to the comfort of the occupants, who are sheltered from the wind in a luxuriously-appointed cabin, which can be electrically heated and lighted if desired, and is fitted with windows of non-splinterable glass.

The motor is strongly mounted on steel struts, and is enclosed in a sheet metal cowl specially designed to give easy access to the carburettors, magnetos, and overhead gear. The planes can be made to fold, thus enabling the boat to be housed in a small shed. This boat, fitted with dual control, can be adapted for "School" purposes.

Span (top)	40 ft.
,, (bottom)	28 ft.
Length	25 ft. 6 ins.
Chord	5 ft. 6 ins.
Gap	5 ft.
Area of main planes	340 sq. ft.
Weight fully loaded	2,000 lbs.
Useful load	650 lbs.
Petrol capacity	33 galls.
Oil capacity	3 galls.
160 h.p. Beardmore (other types fitted if desired).	
Petrol consumption per hour (full power)	13 galls.
Oil consumption per hour (full power)	5½ pints.
Duration at full power	2½ hours.
Duration at cruising speed	3½ hrs. at 65 m.p.h.
Top speed fully loaded	80 m.p.h.
Landing speed fully loaded	35 m.p.h.
Ceiling with full load	14,000 ft.

The Gosport "Shrimp"
50 h.p. Single-Seater

This diminutive boat will appeal to either the sportsman or business man who wishes to act as his own pilot. It is an ideal boat for the man residing on an island or up river, and it has the combined advantages of low initial cost and economical flying expenses. The engine is an air-cooled two-cylinder horizontally-opposed unit of 50 h.p., and only requires little more attention than any high-powered motorcycle or light car unit. The boat has a low landing speed, is stable, and most simple to fly, which factors are naturally most important for confined river or lake work. The trueing up of the boat generally is a very easy operation owing to the simple design.

Span (top)	23 ft.
,, (bottom)	17 ft. 3 ins.
Length	19 ft.
Chord (top)	4 ft. 6 ins.
,, (bottom)	3 ft.
Gap	3 ft. 6 ins.
Weight fully loaded	750 lbs.
Area of main planes	140 sq. ft.
Useful load (pilot, fuel and luggage)	270 lbs.
Petrol capacity	10 galls.
Oil capacity	2 galls.
45-50 h.p. A.B.C.	
Petrol consumption per hour (full power)	3 galls.
Oil consumption per hour (full power)	¼ gall.
Duration at full power	3¼ hours.
Duration at cruising speed	5 hrs. at 55 m.p.h.
Top speed fully loaded	65 m.p.h.
Landing speed fully loaded	35 m.p.h.
Ceiling with full load	10,000 ft.

◆ ◆ ◆ ◆

The Airship Officers Club.

Success in every way attended the first dinner of the Airship Officers Club, at the Connaught Rooms last Saturday night, when a very representative number of Officers joined hands, many after a long spell of absence. As one described it, it was a very cheery show, and in spite of the ruling of the Chairman, Brig.-Gen. Maitland, that there were to be no speeches, almost everyone took a turn at saying things.

Particularly amusing was Col. Hensley, who represented the U.S. on R. 34's return journey. Altogether the function was a delightful send off for the Club, and its associate body the Airship Old Comrades Association.

Amongst the Officers present besides the Chairman, were :—Maj.-Gen. Seely, Maj.-Gen. Sykes, Maj.-Gen. Swinton, Brig.-Gen. Groves, Brig.-Gen. Masterman, Commodore Murray Sueter, Capt. Bosanquet, R.N., Col. Hensley, U.S.N., Col. Mackworth, Lt.-Col. Dunville, Lt.-Col. Fletcher, Lt.-Col. Cunningham, Lt.-Colonel F. L. M. Boothby, Commander Sable, Italian Navy, Maj. Scott and other officers of R 34.

Airship Disaster at Chicago

While a small dirigible was being tested over Chicago on July 21 the envelope caught fire and the wreck fell from a height of 500 ft., crashing through the glass roof of a bank. Of the five occupants of the airship two landed safely by parachute, and the others were killed through their parachutes catching fire. The petrol tanks burst, causing a great fire in the bank, and in the panic which ensued eight clerks were burnt to death and 27 severely injured.

According to one account, the envelope of the airship, which was 162 ft. in length, buckled and broke in half.

No Dirigibles Over Cities in U.S.?

Prompted by the recent airship disaster at Chicago, a Bill has been introduced into the American House of Representatives prescribing definite aerial lines and prohibiting dirigibles containing inflammable gases from flying over cities.

French Looking to the Argentine

The first party of a French Air Mission to the Argentine has left France. It is headed by Commandant Précardin, and its object is to open up a French aeronautical industry in Argentina by giving exhibitions with French machines.

The mission is taking a large number of machines, including two Farman F. 41 for tuition purposes, several Farman F. 50's, Breguets and Spads and Tellier and Lambert seaplanes. Some of the F. 50's and Breguet machines are limousines.

THE ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS

FLYING SERVICES FUND COMMITTEE

A Meeting of the Flying Services Fund Committee was held on Monday, July 28, 1919, when there were present:—Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., in the Chair, Mr. Chester Fox and Mr. Harold E. Perrin, Secretary.

Grants and Allowances.—The following Grants and Allowances were made:—

(110) A Grant of £10 to an Ex-2nd Class Air-Mechanic in the Royal Flying Corps who had been incapacitated on active service.

(127) An allowance of £4 a month for six months to the mother of a Petty Officer in the Royal Naval Air Service who had been killed on active service.

(224) An allowance of £2 a month for six months to the mother of a 2nd Lieutenant in the Royal Air Force who had been killed on active service.

(225) A Grant of £8 and an allowance of £2 a month for six months to the widow of a Sergeant-Major in the Royal Air Force who had died on active service.

(234) An allowance of £1 a month for twelve months to the widow of a Sergeant in the Royal Air Force who had died on active service.

(235) An allowance of £2 a month for six months to the widow of a Leading Aircraftsman in the Royal Air Force who had died on active service.

(236) An allowance of £4 a month for six months to the widow of a 1st Class Air-Mechanic in the Royal Air Force who had died on active service.

(237) An allowance of £2 a month for six months to the widow of a Flight-Sergeant in the Royal Air Force who had died on active service.

(238) An allowance of £1 a month for six months to the mother of a Private in the Royal Air Force who had died on active service.

(239) An allowance of £2 a month for six months to the widow of a Corporal in the Royal Air Force who had died on active service.

Col. R. H. More, C.M.G.—Letter was read from Col. R. H. More, C.M.G., dated July 25, 1919, resigning from the Committee. His resignation was received with much regret, and the Secretary was instructed to write and thank him for his services on the Committee.

Royal Garden Party

The Members of the Flying Services Fund Committee were honoured with invitations to Their Majesties Afternoon Party at Buckingham Palace on Friday, July 25, 1919, and the following were present:—Col. R. H. More, C.M.G., Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., Mr. Chester Fox, Mr. H. E. Perrin and Mr. B. Stevenson.

Jacques Schneider International Race

The race for the Jacques Schneider International Trophy will be held on Wednesday, September 10, 1919, at Bournemouth. The course will be over a circuit of about 30 miles, starting from Bournemouth, and taking in Swanage and Christchurch.

Messrs. S. E. Saunders, Ltd., the well-known yacht and aircraft builders, of Cowes, Isle of Wight, have kindly placed their new erecting shops and slipways at the disposal of the Club for the accommodation of the competing machines.

Machines representing the British Empire must be ready not later than September 1, 1919.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and reserves to itself the right to hold eliminating trials.

Entries are to be made to the Royal Aero Club, 3, Clifford Street, London, W. 1, not later than July 31, 1919. Each entry must be accompanied by the entry fee of £20.

Presentations to the Club

The following books have been presented by the publishers to the Club Library:—

"The Year Book of Wireless Telegraphy and Telephony, 1919." (Published by the Wireless Press, Ltd.)

"Practical Aviation," including Construction and Operation, by J. Andrew White. (Published by the Wireless Press, Ltd.).

"Les Moteurs a Explosion dans l'Aviation," by A. Masméjean and E. Béréhare. (Published by H. Dunod et E. Pinat.)

"Résumé des Connaissances Scientifiques utiles aux Aviateurs et Mécaniciens de l'Aéronautique," by Ed. Marcotte and E. Béréhare. (Published by H. Dunod et E. Pinat.)

"The Wonder Book of Aircraft." Edited by Harry Golding. (Published by Ward, Lock and Co., Ltd.)

THE FLYING SERVICES FUND

(Registered under the War Charities Act, 1916)

Administered by the Royal Aero Club

For the benefit of *Officers, Non-Commissioned Officers and Men* of the Royal Air Force who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

Honorary Treasurer:

The Right Hon. Lord Kinnaird.

Committee:

H.R.H. Prince Albert, K.G. (*Chairman*).
Mr. Chester Fox.
Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F.
Lieut.-Col. C. E. Maude, R.A.F.

Secretary:

H. E. Perrin.

Bankers:

Messrs. Barclays Bank, Ltd., 4, Pall Mall East,
London, S.W. 1.

Subscriptions:

	£	s.	d.
Total subscriptions received to July 5, 1919 ..	15,066	4	9
Collected at Church of England Parade Services at Headquarters, South-Western Area, Royal Air Force, Salisbury	6	11	4
Lieut. H. A. Turrill, R.A.S.C.	2	2	0
Proceeds of Exhibition of Models by Stanley Bell	3	1	0
Total, July 29, 1919	15,077	19	1

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

ROYAL AERO CLUB AND R 34

Although official Service recognition could not publicly be vouchsafed to the officers and crew of R 34 for their epoch-making journey across the Atlantic and back, the Royal Aero Club were happily able, at Princes' Restaurant, on Wednesday of last week, to entertain Brig.-Gen. E. M. Maitland, C.M.G., D.S.O., Maj. G. H. Scott, and the crew of the airship. The Duke of Atholl, the Chairman of the Club, presided, and amongst the notable guests present at this very big gathering were the American Ambassador, Maj.-Gen. Seely, Maj.-Gen. Sir Hugh Trenchard, Maj. J. E. M. Pritchard (R 34), Maj. G. G. H. Cook (R 34), Mr. H. White Smith (Chairman of the Society of British Aircraft), Lord Hugh Cecil, M.P., Capt. G. S. Greenland (R 34), Brig.-Gen. J. M. Steel, Capt. G. Harris (R 34), Brig.-Gen. E. A. D. Masterman, Mr. A. Mortimer Singer, Lieut. H. F. Luck (R 34), Sir Campbell Stuart, Lieut.-Col. Alec Ogilvie, Lieut. R. D. Durrant (R 34), Lieut. J. D. Shotter (R 34), Lieut.-Col. F. L. M. Boothby, Mr. F. Handley Page, Lieut.-Col. W. M. Hensley (U.S. Army), Lieut.-Col. F. K. McClean, Mr. R. D. Blumenfeld, Comdr. Fable, Mr. G. Holt Thomas, Lieut.-Col. C. de W. Crookshank, Brig.-Gen. Huggins, Gen. Brancker, Gen. Festing, Mr. Patrick Y. Alexander, Lieut.-Comdr. H. E. Perrin, Gen. Ellington, Count Torby, Lieut.-Col. Bristow, Lieut.-Col. Hubbard, Comdr. Ramsey, Lieut.-Col. Delacombe.

Prince Albert sent a letter in which he stated that nothing but a public engagement would have prevented him being present. He congratulated Brig.-Gen. Maitland and the crew on their splendid performance.

Sir Rosslyn Wemyss wrote saying that an engagement had taken him out of London. He also congratulated Brig.-Gen. Maitland and the crew of R 34 on their achievements.

Mr. Churchill (Secretary of State for War) and Mr. Walter Long (First Lord of the Admiralty) sent letters regretting inability to be present.

Proposing "The King," the Chairman said he was sure that no one was more proud of the performance of R 34 than the head of the British community.

The Duke of Atholl then proposed "Brig.-Gen. Maitland, Maj. Scott and the Crew of R 34." Thanks to the Air Ministry, the Chairman said, there was no stagnation in the flying world, such as was thought would be the case before the War. That Ministry had been of great use ever since it came into existence. It had done extraordinarily well, and it was far from being unpopular. Obviously no private concern could have developed flying in the way it had been developed by a Government department. The Club being the head of Aerial Sport, no better body could be found to organise a banquet of welcome to those who had carried out the adventure of R 34, as if there was anything more sporting than this feat he was not aware of it. Through the wireless communication they knew every movement of the airship, and the public excitement was kept at a tremendous pitch. "Your joys were our joys," continued the Chairman; "your sorrows were our sorrows, and when things were thought to be going wrong you had the prayers and the sympathy of both sides of the Atlantic." We always hoped for the best, and we were most grateful to the American cruisers that went out to help the airship. The achievement of R 34 would ever stand out in history as one of the greatest feats of skill, daring, and endurance that had ever been performed. The War had given the Air Force its chance, and made it what it was. When Zeppelins visited this country and our airmen saw women and children being massacred, they put their shoulders to the wheel, and showed that by working together in a spirit of comradeship there was nothing this nation could not do if it tried. They ought to be able to prevent war in the future. Had Lord Kitchener a few aeroplanes at Khartoum or Omdurman we should not have had to trudge many weary miles over sands, but we would have settled the whole of the trouble in two or three hours. They had to thank R 34 for bringing America closer to us. If anything was going to keep up the spirit of friendship and brotherhood between England and America, and make them remember the lessons of the trenches, he was certain it was the voyage of R 34. On behalf of the Royal Aero Club he congratulated the officers and the crew on their splendid feat, also the designers and builders of the ship, from the drawing office to the workshop.

In supporting the toast, the American Ambassador said he felt that he was addressing the most distinguished company that had ever visited the United States. Their place in history was secure and fixed as only a place could be fixed for those who, for the first time, did something great in the history of mankind. They had crossed the Atlantic, and doubled their tracks and returned to the country from which they came. In all the rolling years that could never be done for the first time again. Language failed him, as it would fail anybody, adequately to express the admiration they felt at the gallantry of the men who undertook the feat; nor did he believe that any could appreciate the new era in science that was now opened in front of them. For centuries men had waited to fly across the sea, yet now the Atlantic had been crossed three times in three months, and recrossed for the first time. He had read in a recent article a quotation written by Horace Walpole, who said:—"Three more balloons have gone up in the last week, and now at last we have an aerial navy, so what matters the loss of the command to America of the sea?" Just why the writer thought the British were losing command of the sea he did not know, but if they lost it they promptly recovered it. That was written 150 years ago, when a great feat was performed and three air balloons had ascended; but a century and a half passed before aerial traffic came into general use. The Atlantic had been crossed, but the Pacific remained. He confidently expected that somebody would one day leave London and never alight again until he had flown round the earth. If the engine were fast enough and the speed great enough a man would leave London on a Wednesday and get home on Tuesday in the same week. That might be the secret of perpetual youth.

He could not but think of the Zeppelin and contrast the use the Germans made of it, and the use Britain had made of it. The Germans used it to carry disease, destruction, and death among a peaceful population of non-combatants; a message of destruction to quiet, slumbering homes. Great Britain had used it to send across the sea a message of amity and goodwill and friendship among the nations. That message went home to the hearts of the American people, and he spoke advisedly in their name when he said in all earnestness that it did mark the drawing together of these people and mark the diminution of the space that divided them. It also symbolised the wonderful approach of their thoughts and sentiments that the four years of conflict had brought. It must unite people so close in heart and sentiment, and that union would afford to the world the best hope and prospect of enduring peace and happiness. The one complaint he made about the achievement was that they did not tarry longer, but when the experiment was repeated he promised them at all times a cordial and friendly reception.

Maj.-Gen. Seely, also supporting the toast, said that the voyage across the Atlantic and back was a glorious achieve-

"Flight" Copyright

R 34 OFFICERS AND CREW AT THE ROYAL AERO CLUB BANQUET: Brig.-Gen. Maitland and Maj. G. H. Scott are in the centre, supported by Maj. Pritchard, Maj. Cook, Capt. Greenland, Capt. Harris, Lieut. Shotter, Lieut. Luck, and Lieut. Durrant.

ment. Many had asked, Was the voyage of R 34 worth while? From a scientific standpoint the voyage, he claimed, was worth while a hundred times over. They had learned a most valuable lesson, especially from a meteorological point of view. Such a voyage would often be done again. The peculiarity about an airship was that the bigger it got the simpler the voyage became. It was true we were on the threshold of a new era. They knew they could get into the north-east trades wind in going from the Eastern to the Western hemispheres, and that they could go up to 8,000 ft. or 10,000 ft. and find a favourable south-westerly wind to bring them back again.

The other day, in the course of his duty, he flew to Ireland and called upon Messrs. Harland and Wolff, the well-known shipbuilders, who showed him a model of a ship which they built at the beginning of the War, and inset on the same board was a model of a vessel on almost identical lines that they had built fifty years ago which was just one-fiftieth the size. That advance in the navigation of the sea might also be the advance that would be made in the navigation of the air in the fifty years that lay before us. They had learnt that the stout hearts and the good comradeship of the men of our race were as good as ever they had been. When he asked one of the officers of R 34 what he should say on that occasion, he replied, "Crack up the crew. They are the finest fellows I have ever seen either on the sea or in the air." On behalf of the Government he congratulated the officers and crew on their splendid achievement. They were proud of what these men had done. They rejoiced that the crew had been able to bring us closer still to America, and, above all, they were proud to meet them safe and sound after an arduous and most successful voyage.

Sir Hugh Trenchard, who also spoke to the toast, said the aviators had helped to keep the reputation of British airmen first among those of the world. There must have been the most cordial co-operation and confidence between all ranks to enable them to accomplish what they did. With such effort that reputation would remain first, both in the fighting service and, he sincerely hoped, in the paths of peace. This voyage was the keystone of the arch on which the future development of aircraft for peaceful work depended. The officers and crew of R 34 had worthily upheld and added to the best traditions of this country, and set an example and created a tradition for the new Royal Air Force.

Mr. H. White Smith, Chairman of the Society of British Aircraft Constructors, in congratulating the guests, said the Atlantic trip of the R 34 would contribute greatly to the development of the future airship. He pictured how the future generation would look back 100 years hence and wonder at our present crude productions. We were not yet at the height of construction, because the R 34 was similar in character to the Zeppelin which was shot down in 1916, and very much of the same type as the German airships at the present time. There was great room and need for the development not only of aircraft but also of the engines. We must strive to keep ahead. The R 34 had been to America, and he could not but believe that the Americans, having seen her, would not be satisfied till they had produced something better. All these voyages of aeroplanes and airship across the seas filled a place in the scheme of development of aviation.

Brig.-Gen. Maitland, in reply, said their flight was carried out under service conditions. He was merely a passenger in the ship. The entire responsibility for the executive work rested on Maj. Scott and his gallant crew. Maj. Scott displayed very great skill in airmanship, and nothing worried him. The Air Ministry had three objectives in sending them on the voyage. First, they were to collect scientific data of use for commercial purposes in the air, to get information about the uncharted air over the Atlantic and the ever-changing weather conditions. The second objective was to demonstrate a rigid airship for future commercial possibilities, and the third objective was to pay a visit to Newfoundland, Canada, and the United States. They had learned a great deal about electrical storms and the way they affected airships. Although they knew very little about them they were not afraid of them, but the Research Department of the Air Ministry were now going to concentrate on those problems and try and find out all about them. In rough weather the ship behaved extraordinarily well, and there was no feeling of anxiety as to what would happen to her, thanks to the excellent work of the design staff of the Admiralty, and the makers of the engines. An airship liked travelling in fog unlike heavier-than-air machines, because it made the journey easier.

As to meteorology, they certainly learnt a great deal of that, and it was the most important study of the immediate future. Curiously enough, they saw very little of the Atlantic. Before they started they expected to see very little else, but the sea was blotted out by the fog or low-lying clouds. By wireless they were in touch with East Fortune for a distance of 1,100 miles, and they were always in touch either with England, the Azores, or the New World. They heard—quite unofficially—the result of the Willard-Dempsey fight in the Atlantic, and were glad to hear it, while from the Marconi chart they knew exactly where the big liners were, though they could not see them. They only saw a few trawlers off the coast of Ireland, a sailing vessel near America, two large unfriendly icebergs, and a fascinating icefield. In flying over Nova Scotia at a height of 800 ft. they could easily detect the types of the trees and appreciate the quality of the soil, and that suggested to him that the airship might prove to be of considerable use in connection with forestry and surveying work. They also discovered a complete cure for sea-sickness, for the motion was very slow and deliberate, and in the nature of a slight pitch. He predicted that that would prove of importance in future, and would cause people to select the airship in preference to the surface ship for oversea voyages. He had a letter from Mr. Rudyard Kipling, in one of whose stories a night packet of the future was described as crossing the Atlantic, and it was curious that in that story Mr. Kipling should have chosen Trinity Bay as one of his termini. Trinity Bay was the first place of land they saw during the fog in Newfoundland. With regard to the commercial future of the airship, he was a great optimist. This was a fine opportunity for British enterprise to show a lead and see that Great Britain did not lose anything. The rôle of the airship was long-distance oversea flying, and long-distance non-stop overland flying. The rôle of the aeroplane and seaplane would not conflict with the rôle of the airship, and in commercial development the three would work together and be necessary the one to the other.

Maj. G. H. Scott, in responding, gave a *résumé* of their experiences during the voyage; he said it was a most fascinating experience to fly over a new country, particularly if it was unexplored. The effect of a thunderstorm on the airship was to throw it about, but not so violently as, in his opinion, would frighten ordinary passengers. Maj. Scott paid a generous tribute to the hospitality of the Americans at the landing, and to the splendid help they gave in mooring the ship. The voyage home was very easy, and practically without incident. With regard to the navigation of the ship by Maj. Cook, it was extraordinary. When they reached Ireland they were only about five miles from the place they had marked out. The work of the whole crew was beyond praise, and he was backed up perfectly by the officers.

Maj. Cook, R 34 navigation and log recorder, who also spoke, gave some details of his methods of navigation, and referred to the essential instruments besides the compass.

Capt. G. Adam thought the upper air at present was like an unexplored land. The phenomena were very startling, and quite a lot of exploring work would have to be carried out before the upper air navigation could be considered safe.

Gen. Brancker proposed the toast of "The Chairman," and the very successful evening closed.

British Flying Boats in Norway

ON July 20 the two British flying boats, which left Felixstowe some days previously for Norway, set out from Dundee at 10.30 a.m. After flying about 300 miles east they suddenly ran into dense fog; one boat, N 4044, piloted by Maj. Galpin and Capt. Scott, went down below the fog bank and safely reached the Norwegian coast; the other machine went above the fog and returned to Dundee. Maj. Galpin on the following day continued his trip to Christiansand, and on July 22 flew along the south-east coast of Norway to Christiania. On July 24 Queen Maud, a Lady-in-Waiting, and Mr. E. Ovey, Charge d'Affaires, went for a flight over the city. Negotiations are said to be going on between the Norsk Luftfartrederi and a British aviation company with a view to opening up aerial communication between Great Britain and Norway this year or early next year.

British Seaplane Over Baltic

THE British seaplane E5-N 90, which flew from Felixstowe to Copenhagen on July 19 crossed the Baltic to Reval on the following day, and at 6 p.m. on July 21 safely arrived at Helsingfors, the destination of the Foreign Office official, who was a passenger.

SOME DEVELOPMENTS IN AIRCRAFT DESIGN AND APPLICATION DURING THE WAR

By the Right Hon. LORD WEIR OF EASTWOOD, P.C., Honorary Fellow of the N.E. Coast Institution of Engineers and Shipbuilders.

(*Continued from page* 991)

The next type on our list is the S.E. 5 designed at the Royal Aircraft Establishment, Farnborough. This is really a direct descendant of the B.E. 2a with which we started. It was a very long time coming into general use, principally owing to delays with the engine, a 200 h.p. water-cooled French Hispano. Opinion was by no means unanimous as to the fighting value of this aeroplane compared with the Camel, and each type had its school of adherents. The S.E. 5 had a better performance, particularly at a height, was stable and manœuvrable, very easy to fly, and had better visibility due to the pilot being farther back. On the other hand, it was much more difficult to produce, and the engine and its accessories gave a great deal of trouble both at home and in the field.

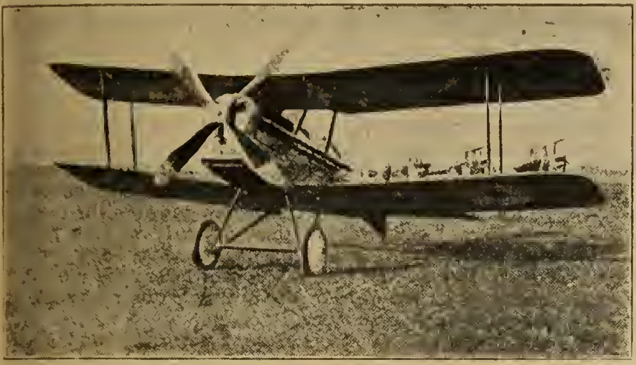


Fig. 23.—One-seater fighter. S.E. 5.

By this time we had reached a point where the performance of our aeroplanes was very considerably in advance of that of the Germans, who were cramped by their non-elastic engine policy.

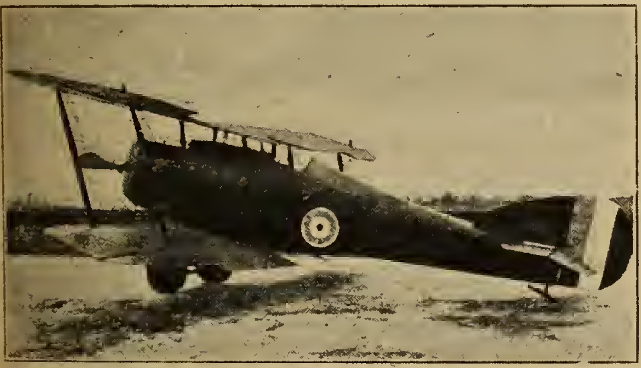


Fig. 25.—One-seater fighter. Martinsyde F. 3.

The next type to come into general service was the Sopwith Snipe. The engine here was a 200 h.p. B.R. 2 of British design. It would appear that this size of air-cooled rotary engine has reached, it if has not in fact surpassed, the maximum size for efficiency. The performance was rather disappointing, and must be attributed to the enormous engine diameter and air resistance. Several competitive aeroplanes from different makers were tested simultaneously with this one, and the results were practically all the same. You will notice that the control surfaces are balanced. In this way the necessary manœuvrability was maintained, although the weight of the aeroplane had reached rather a high figure. The actual selection of this type was largely governed by the engine position which entailed the placing of orders on a production scale before trials of the actual engine and aeroplane were carried out.

Finally we come to the Martinsyde F. 4, which, although in production, was never used at the front previous to the signing of the Armistice. This had another water-cooled engine—275 h.p. Rolls-Royce of high efficiency. Both aeroplane and engine were very good, and although the former was heavy and somewhat large, it was wonderfully manœuvrable. The performance reached was very high—over 130 miles an hour at 15,000 ft. with a climb to that height in 12 mins.

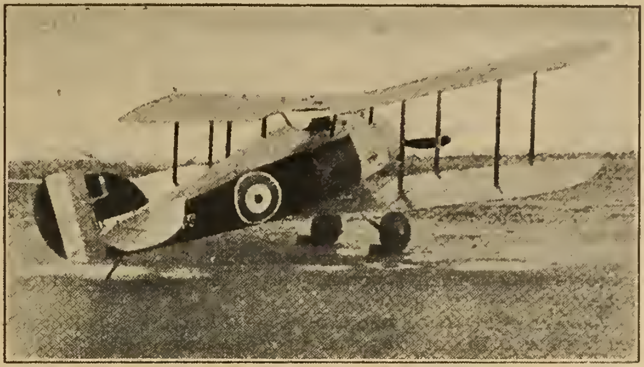


Fig. 24.—One-seater fighter. Sopwith Snipe.

The increase in speed and climb from period to period is shown on Fig. 54.

Two-seated Fighters.—Apart from the particularly interesting case of the single-seaters, there developed from the use of the original reconnaissance type a demand for, and a supply of, two-seated fighting aeroplanes, which could do their reconnaissance work and defend themselves, if attacked. As the best method of defence has always been, and will be, to attack, these machines, which were in principle defensive, became very effective in the offensive. Our two-seated pusher fighters, such as the Vickers or the F.E. 2's, gave a very good account of themselves, until the time came when their poor performance, as compared with the tractors, put them out of date.

The first really good two-seated tractor was the 1½ Strutter, so called by the Sopwith Co. because of its peculiar wing strut system. This aeroplane was, and still is, one of the most efficient ever designed, and for its engine power (130 h.p. Clerget) it has never been surpassed. In it the pilot was placed as close up against the engine as possible with a very fine view ahead and downwards. The gunner was now put behind him with a rotatable Lewis gun turret. He had a very good view downwards and all round the rear. This arrangement, which is, in principle, still standard, gave a very manœuvrable aeroplane owing to the concentration of the weights; and on account of its high performance the type became a very effective offensive weapon.

Early in 1917 there appeared another two-seated fighter where the qualities enumerated above were still further

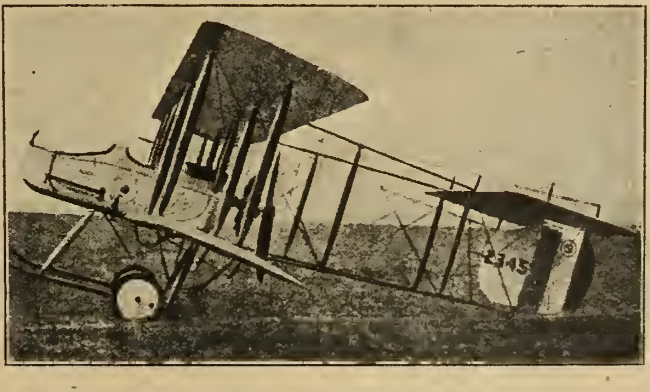


Fig. 26.—Two-seater fighter. Vickers gun-bus.

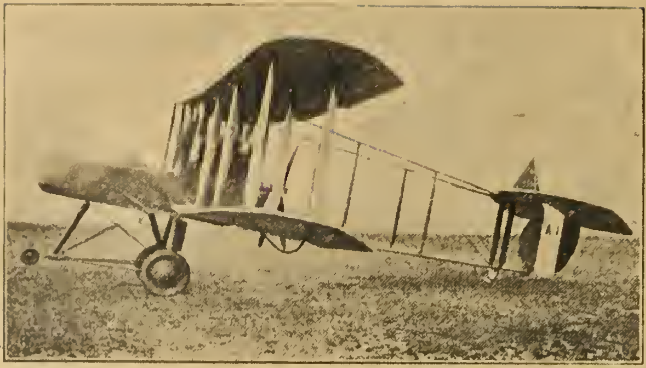


Fig. 27.—Two-seater fighter. F.E. 2b.

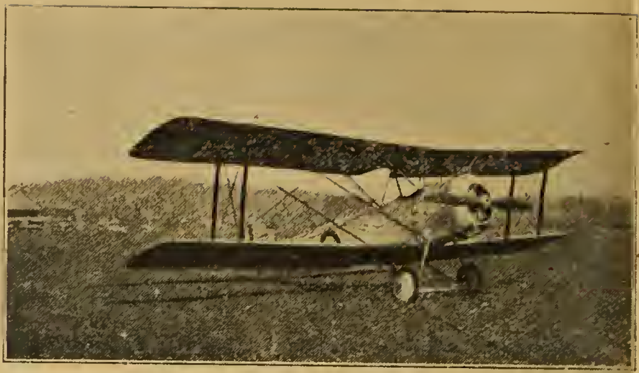


Fig. 28.—Two-seater fighter. Sopwith 1½ strutter.

developed. This was Capt. Barnwell's Bristol Fighter with a Rolls-Royce Falcon engine. Both aeroplane and engine were exceedingly good. The view for the pilot was improved by putting him farther back and higher, so that he could see over the top plane, and being closer to his gunner, they could communicate better. Close communication in this sort of fighter is a very vital matter, and probably this type did more to establish our superiority over the enemy than any other.

Bombers.—Reverting to our original B.E. 2A's, from which we have seen the development into one-seated fighters and two-seated fighters, we can trace also the development of the bomber. This was the type of aeroplane first used for bombing purposes, as soon as bombing, as a useful and military function, was appreciated. There were sporadic efforts at bomb dropping by 80 Gnome Avros, but when it developed into organised attacks with numbers of aeroplanes, the original reconnaissance type was used. As soon as the real requirements of this work were understood specially designed aeroplanes appeared. In the early types the bombs were fitted in all kinds of ingenious but crude ways, with pieces of string and cutting knives, etc., and the attacks were made by diving to a low height and planting the bombs by the pilot's judgment. Although great efforts were made in the training of bomb droppers and in the perfection of sighting and releasing apparatus, etc., accuracy from a height was never really obtained, and experiments conducted towards the end of last year, proved conclusively that the only way to hit any isolated object with certainty, was to dive to a low height before letting go the bombs. Nevertheless the moral effect of bombing is immense in disturbing industrial work and the manufacture of munitions.

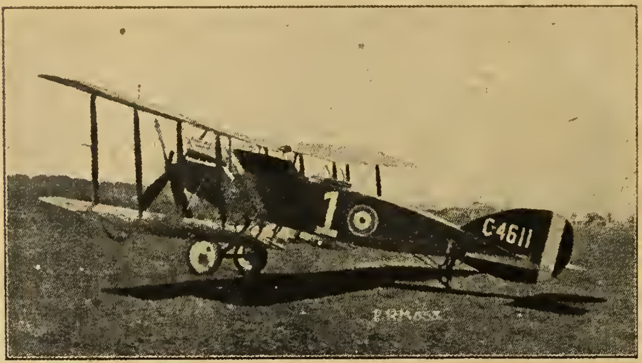


Fig. 29.—Two-seater fighter. Bristol Rolls-Royce.

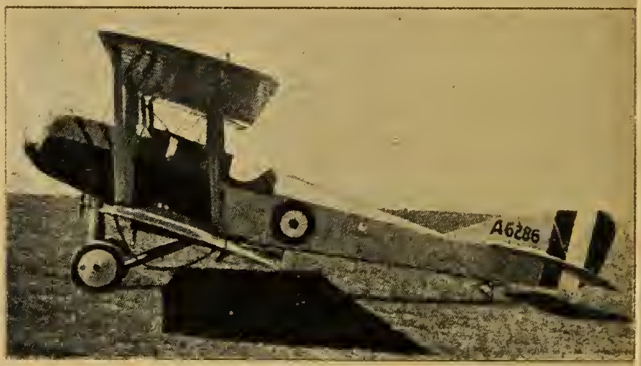


Fig. 30.—Day bomber. Martinsyde 160 h.p.

With the introduction of the B.E. 2c, systematic bombing of the enemy's positions was carried out, but this aeroplane was capable of making comparatively short raids only, and when loaded with bombs could not carry an observer. With its moderate speed it was rather an easy prey for enemy scouts under such circumstances.

The Martinsyde single-seater bomber with the 120 and later the 160 Beardmore engine was a distinct advance as regards range, while its greater speed made it a much better fighter.

As bombing developed, a subdivision of types into definite branches took place. These were day bombers, short distance

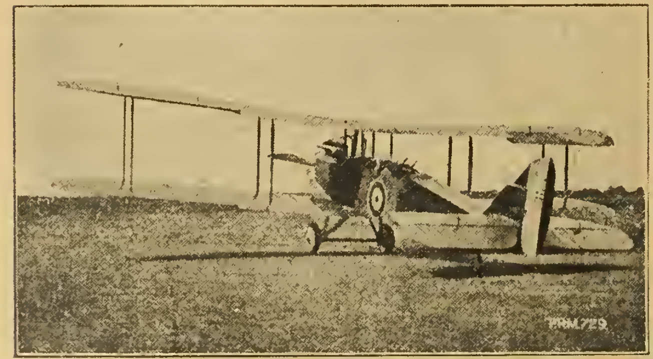


Fig. 31. —Day bomber. De Havilland 9.

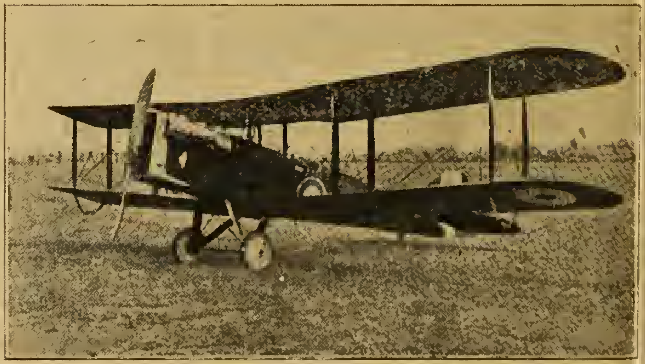


Fig. 32.—Day bomber. De Havilland 9a.

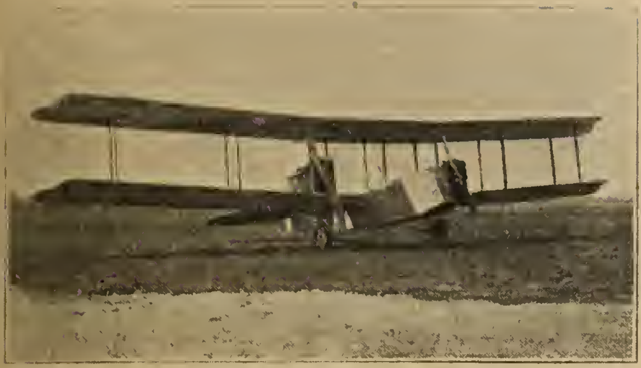


Fig. 33.—Day bomber. De Havilland 10a.

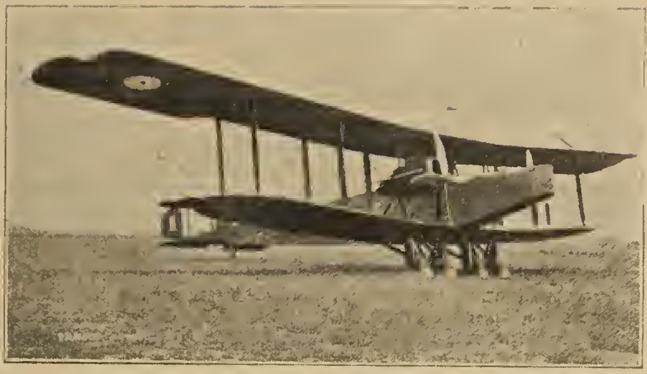


Fig. 34.—Night bomber. Handley Page 0/400.

and long distance; and night bombers, short and long distance. From an aerodynamic point of view the design of a high speed, long range weight-carrying aeroplane is an exceedingly difficult problem, but it can be fairly stated that our designers, particularly Capt. De Havilland of the Aircraft Manufacturing Co., found the solution in advance of those of other countries. His aeroplanes eventually had wing surfaces of high efficiency and of high superficial loading, combined with structures of great cleanliness and low air resistance, and with the most powerful engines available at the time. Owing to their low weight per horse-power his machines could get off easily though at a high speed, and were very fast in the air. On returning home, after the fuel was consumed and the bombs dropped, they could land easily enough, but if by chance they had to land with full load on board, the pilot's difficulties were considerable.

Just as the original B.E. 2, was first used for bombing by day, similarly it was the first type to be largely employed for bombing by night, for which function it was very fairly suited, up to the limit of its capacity, as it was very easy to fly and to land. The weight-carrying capacity was, however not great, as the engine was only 70 to 100 h.p. When the bigger engines became available this bombing work was taken over by the F.E. 2 pushers which were good weight carriers and had a better view for bomb sighting.

The above remarks apply more to the military flying corps than to the naval service, which made use of any aeroplanes they could get hold of, particularly French ones, such as Caudrons and Farmans. Later they used the Sopwith 1½ Strutters, and finally Handley Pages. This latter type was the first really effective design of night bomber, and came into use early in 1917. Its general features are so well known that it is unnecessary for me to enlarge upon them. When in the autumn of 1917 a big programme of bombers was laid down this was the type decided upon. The Vickers-Vimy was a later machine of the same general type embodying more recent experience.

At the end of 1917 it was considered to be worth an attempt to make a very long range bomber, to attack Berlin itself, from a base in England. The actual point to point distance is about 450 miles and a minimum range of 1,100 miles was decided upon. As the aeroplane would have to fly by day, as well as during the night, it was essential to provide a very complete gun defence system. This meant a crew of seven,

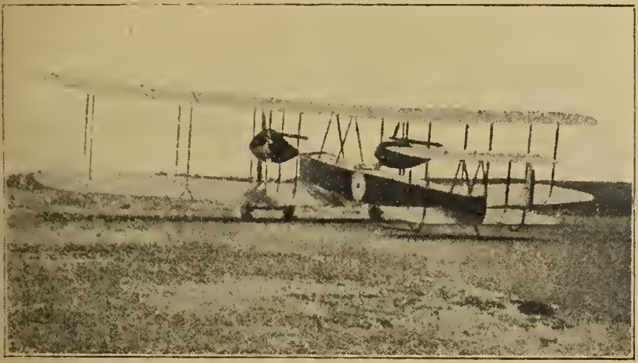


Fig. 35.—Night bomber. Vickers Vimy.

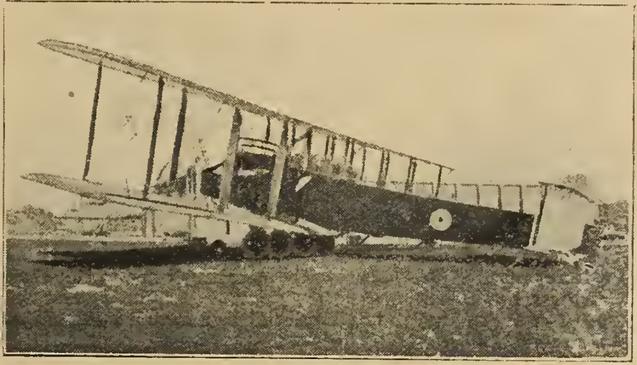


Fig. 36.—Night bomber. Handley Page V/1500.

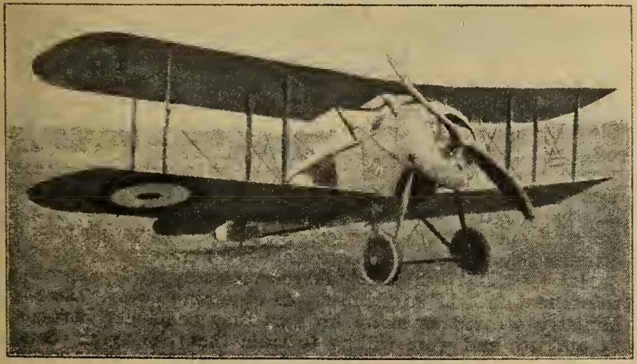


Fig. 37.—Ground fighter. Sopwith Salamander.

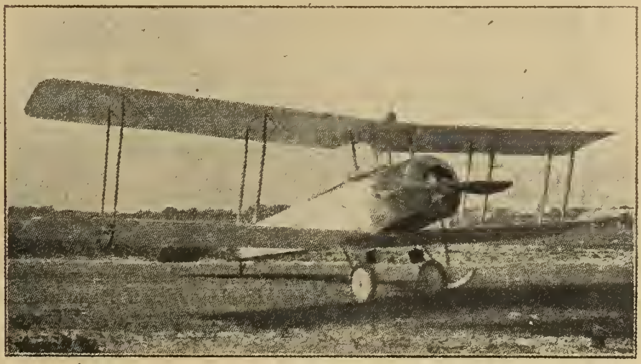


Fig. 38.—Training machine. Avro.

with many guns and much ammunition apart from wireless telegraphy apparatus and bombs. It was clear that it would be necessary to employ a very large aeroplane with powerful motors. The 350 Eagle Rolls being the biggest and best geared engine available it was decided to employ four, using a system of tandem propellers, which theoretical investigation showed to be reasonably efficient. The main lines of the design were quickly arrived at, and arrangements made for the building of a few experimental aeroplanes, by a large firm of shipbuilders in Ireland. In order to get a straight run on the design and to avoid interruption, Mr. Handley Page, the designer, went over to Ireland with a large proportion of his design staff, and after six months very hard work, the first of the batch came over to Cricklewood, to be erected and tested. Many difficulties, particularly connected with the control, were encountered and surmounted, and on November 8, three days before the Armistice was signed, two of these aeroplanes were standing ready and fully equipped to start for Berlin.

Ground Fighters.

Armoured Aeroplanes.—In the very early days of the War the aeroplane had little to fear from enemy action provided it crossed the lines at any height above about 3,000 ft., so as to be out of range of ordinary rifle fire from the ground. The introduction of the special anti-aircraft gun, however, very quickly altered this state of affairs, and the aeroplane was driven higher as the accuracy of fire improved; until at the end of the War there was no immunity from danger from A.A. fire at a height of 20,000 ft.

For a long time it was considered that the risk of a low flying aeroplane being hit by rifle or machine gun fire from the ground was so great that we should not be justified in using our pilots and aeroplanes in this way. The remarkable escapes experienced from time to time by pilots forced to return across the lines at very low altitudes, however, encouraged the idea that the risks of low flying had been a good deal exaggerated, and a most effective mode of attacking the enemy was gradually developed. The first important success in this direction was, I believe, achieved by Lieut.-Col. Bishop, V.C., who attacked an enemy aerodrome soon after daybreak. After riddling the officers' and men's quarters with bullets from his machine guns, he turned his attention to the German aeroplanes which had been brought out to attack him. He put two or three out of action on the ground, brought down three in succession as they got into the air, and then returned safely to his own aerodrome. Thereafter this method of attack developed very rapidly, and it proved of the greatest value later on, not only in breaking up the dense infantry formations advancing to attack us after March 21, 1918, but in demoralising the retreating enemy when we subsequently advanced. A system of co-operation between our low flying aeroplanes and the infantry was also evolved, and this proved of the greatest value in keeping the infantry and the headquarters behind in touch with what was going on in front. The aeroplanes used were the single-seater fighter—especially the light, manœuvrable Camel—for attacking ground targets from very low altitudes; and the standard artillery machine for the infantry co-operation from rather greater altitudes.

Our casualties in these operations were naturally heavy, and the problem of providing a suitable armoured aeroplane arose. As a result the Sopwith "Salamander" was designed, and was just about to make its appearance in the field at the time of the Armistice. This was a single-seater fighter with B.R. 2 engine, equipped with two Vickers guns and a very large amount of ammunition for attacking ground targets, while it carried nearly 650 lb. of armour-plates so arranged as to give the pilot and all vital parts of the aeroplane adequate protection from German armour-piercing bullets fired from the shortest ranges. In spite of this heavy load it had a speed of 125 m.p.h., and was sufficiently manœuvrable for the pilot to make the attack by diving at the target, thus getting the advantage of firing in the direction of flight. Had the War lasted a few months longer this aeroplane would probably have done most effective work in hastening the German retreat.

An armoured two-seater for infantry co-operation was also designed and produced, but like the Salamander it was too late to come into actual service.

(*To be concluded.*)

◆ ◆ ◆ ◆

The Air Ministry and the "Daily Express" Prize

THE Editor of the *Daily Express* has received from Maj.-Gen. Sir F. H. Sykes, Controller-General of Civil Aviation, a letter in which he says: "The generous offer of the *Daily Express* has come at a most opportune moment, and will be of very great value in stimulating and encouraging British aircraft industries.

"I am most happy, therefore, to assure you of the whole-hearted support of the Air Ministry in general and my own department in particular, and I trust that we shall have the early satisfaction of acknowledging success."

Maj.-Gen. Sykes has also offered a number of very helpful suggestions, and has promised to nominate an advisory member of the committee which is being formed to define in detail the conditions of the competition.

This nominee of the Air Ministry will have at his command all technical and meteorological data available. The Committee will also include two members nominated by the Royal Aero Club, one nominated by the Society of British Aircraft Constructors, and one nominated by the Royal Aeronautical Society.

Ways and Means to Encourage Commercial Aviation

THE *Daily Express* understands that a committee composed of members of the Air Ministry and two representatives of the aircraft industry—Mr. H. White-Smith, chairman of the Society of British Aircraft Constructors, and Mr. Cary, of the Sopwith Aviation Co., Ltd.—under the presidency of Maj.-Gen. Seely, Under-Secretary of State for Air, is now investigating ways and means to encourage the production, of the best type of commercial aeroplane. Reliability, safety and practical utility are determining factors in these deliberations.

It is understood that considerable State subsidies for commercial flying will be recommended and taken up.

Infringement of Air Navigation Regulations

THE Air Ministry makes the following announcement:—

It is notified that though the Air Navigation Regulations have been in force since May 1, and it is felt that pilots and others have now had ample opportunity of acquainting themselves with the Regulations, numerous instances of their infringement are still being reported.

The regulations were made with a view to securing the public safety, and, in future, proceedings will be taken when they are contravened.

The public are requested to co-operate with the Air Ministry in this matter by forwarding to the Secretary (C.G.C.A.), Air Ministry, London, particulars of alleged offences, including, if possible, the registration number or mark of the machine in question.

The most common instances of infringement are:—

1. Dropping leaflets and other advertising matter. (For the purposes of the Victory Loan Campaign the Secretary of State for Air waived the provision in the Regulations against the dropping of leaflets from aircraft; but the exemption has now been withdrawn.)
2. Taking up and landing passengers as a regular proceeding at places which have not been licensed as aerodromes.
3. Low flying (*a*) Over towns; (*b*) To the danger of the public elsewhere.
4. Neglecting to obliterate military markings when a machine has ceased to be a military machine.
5. Obscuring registration marks by means of advertisements or otherwise.

The St. Pancras Cadet Corps

THE good work done by the aircraft school organised in connection with the St. Pancras Cadet Corps is attracting international notice. Gen. Corvisart, the French Military Attaché, Commandant Sable, the French Air Attaché, and his Aide-de-camp, visited the school on Saturday, and were received by Maj.-Gen. Philip Game, Director of Training and Organisation, Air Ministry, Col. T. Gerrard, Major Moore, and Sir Willoughby Dickinson. Sir Willoughby Dickinson said that, although the aircraft school was only in the nature of an experiment, they were certainly justified in believing that it would be attended with big results. There must be thousands of boys longing to get up into the clouds, but before they could achieve that ambition they must learn aeroplane construction and master the science of aircraft.

Maj.-Gen. Game said he could see a friendly rivalry between the school and the Air Ministry in obtaining boys. The Air Ministry wanted as many boys as they could get between 15 and 16, and were willing to train them for three years. It would, therefore, be an enormous help if the school could assist the Air Ministry in this direction by instructing boys in aircraft.

HONOURS

It was announced in a supplement to the *London Gazette* on July 15 that the King has been pleased to approve of the following awards of the Distinguished Flying Cross, conferred by the General Officer Commanding the British Army in Mesopotamia :—

Distinguished Flying Cross

Capt. J. S. Beatty, 72nd Squadron.—During the operations near Sheroat, October 24 to 30, 1918, he rendered gallant service in harassing the enemy by machine-gun fire from very low altitudes, being vigorously fired upon the whole time. Capt. Beatty has always been conspicuous for gallantry and devotion to duty. On April 21, 1918, he destroyed one enemy machine and brought down another out of control.

Lieut. S. Bull, 30th Squadron.—Whilst engaged in bombing and machine-gunning hostile tribesmen at Khun, near Bushire, on March 6, 1919, he saw that a brother officer had been shot down. Hoping that he might be alive, he attempted to land on absolutely unsafe ground at very close range fire from the enemy, but after touching the ground 12 yards from the crashed machine he saw at once that no hope could be entertained that the occupant was alive, by reason of the condition of the wreck, and he was accordingly compelled to abandon further action. The attempt at rescue involved much risk, as had he actually landed it is improbable that he would have been able to take off again, apart from the attention which the tribesmen would have given him at that time.

Capt. F. Nuttall, M.C., 30th Squadron. A gallant flight leader who has rendered valuable services in carrying out the most arduous duties in action, and has commanded his flight with great skill under exceptionally difficult conditions. On April 27, 1918, near Kirkuk, whilst engaged in attacking enemy troops from a low altitude, he was shot down, wounded.

Lieut. M. S. Mackay, 72nd Squadron, and Lieut. R. P. Pope, 72nd Squadron (E. Surr. R.).—During the operations at Baku between August 25 and September 13, 1918, they flew continuously over the enemy's positions, bombing and machine-gunning from low altitudes with great effect, in the face of very vigorous fire from the enemy throughout the whole period.

FOREIGN DECORATIONS.

The King has granted unrestricted permission for the wearing of the following decorations, conferred on the officers and other ranks indicated for valuable services rendered in connection with the war :—

Conferred by the President of the United States

American Distinguished Service Medal

Maj.-Gen. Sir H. M. Trenchard, K.C.B., D.S.O. (R. Sc. Fus.) ; Maj.-Gen. Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O. (R. Lanc. R.) ; Maj.-Gen. Sir F. H. Sykes, K.C.B., C.M.G. (15th Hussars) ; Lieut.-Col. P. H. L. Playfair, M.C. (R.A.) ; Maj. (A./Lieut.-Col.) E. R. Peal, O.B.E., D.S.C. ; Maj. D. V. J. Blake (Aust. F. Corps) ; the Rt. Hon. Lord Weir of Eastwood, P.C., late Secretary of State for the Royal Air Force.

Conferred by the President of the French Republic

Croix d'Officier, Legion d'Honneur

Maj. (A./Lieut.-Col.) E. R. Peal, O.B.E., D.S.C. ; Lieut.-Col. (A./Brig.-Gen.) J. G. Weir, C.M.G., C.B.E. (R.A., T.F.).

Croix de Chevalier, Legion d'Honneur

Capt. (A./Maj.) R. Addenbrooke-Prout, O.B.E., M.C. ; Maj. F. C. Baker, D.F.C., A.F.C. (D.C.L.I.), 102nd Sqdn. ; Lieut.-Col. A. V. Bettington, C.M.G.; Maj. B. L. Huskisson, D.S.C. ; Maj. G. H. Loxley ; Lieut. (A./Capt.) D. R. MacLaren, D.S.O., M.C., D.F.C. (46th Sqdn.) ; Lieut.-Col. H. A. Van Ryneveld, D.S.O., M.C.

Croix de Guerre avec Palme (French)

Lieut. (A./Capt.) W. G. Albu (N. Russia) ; Lieut. (A./Capt.) O. M. Baldwin, D.F.C., 9th Brig., France ; Lieut. A. M. Bannatyne, 206th Sqdn., France ; Lieut. (A./Capt.) G. L. Graham, D.F.C., 9th Brig., France ; Lieut. (A./Capt.) W. B. Green, D.F.C., 9th Brig., France ; Maj. S. G. Hodges, M.C., A.F.C. (Wilts.), Salonika ; Col. A./Brig.-Gen.) R. E. T. Hogg, C.M.G., C.I.E. (I.A.), France ; Maj. (A./Lieut.-Col.) A. V. Holt, D.S.O. (Roy. Hs.), France ; Maj. B. L. Huskisson, D.S.C., France ; Sec. Lieut. (Obsr.) J. McDonnell, Russia ; Lieut. (A./Capt.) D. R. MacLaren, D.S.O., M.C., D.F.C., France ; Lieut. H. A. Miller, North Russia ; Sec. Lieut. H. J. Miles, 100th Sqdn., France ; Lieut.-Col. R. P. Mills, M.C., A.F.C. (Roy. F's.), France ; Sec. Lieut. (Obsr.) N. D. Nunan, North Russia ; Capt. R. A. Preeston, France ; Sec. Lieut. E. C. M. Reid, North Russia ; Lieut. (A./Capt.) E. J. Salter, 9th Brig. France ; Lieut. H. W. Tait, D.F.C., 11th Bal. Sec., France ; Sec. Lieut. F. F. Tattam, North Russia ; Capt. H. W. Woollett, D.S.O., M.C. (Linc. R.), France ; 64052 A./M. 2 V. R. Bates, 16th Bal. Sec., France ; 2249 S./Mech. H. W. Bush, 98th Sqdn., France ; 23964 A.M.I. W. Lambert, 11th Bal. Sec., France ; 140801 Sgt./Mech. E. R. MacDonald, 98th Sqdn., France ; 15399 Sgt. S. B. Percival (Manc. R.), attd. 27th Sqdn., France (killed Aug. 14, 1918) ; 25013 Sgt. L. C. Ovens, 103rd Sqdn., France ; 224398 Pte. C. H. Taylor, 97th Sqdn., France.

The Medaille d'Honneur

41300 A./M.2 G. K. Balls, 56th Sqdn. (en bronze) ; 42624 A./M.1 A. Cook, 31st Bal. Sec. (en bronze) ; 44463 A./M.3 C. Dickenson, 100th Sqdn. (en bronze) ; 1888 Ch. M./M. F. L. Dorber, 2nd A.S.D. (en vermeil) ; 1749 Ch. Mech. F. Francis, 3rd R.L.P. (en argent) ; 5888 Ch. Mech. C. M. Hayden, 100th Sqdn. (en argent) ; 3959 A./M.1 L. E. Hodges, 12th Sqdn. (en bronze) ; 8989 Ch. M./M. W. P. McElwee, 1 A./D. (en argent) 18305 Flt.-Clk. T. H. Phelps, 2A./D. (en argent) ; 13769 A./M.1 E. L. Porter, 10th Sqdn. (en bronze) 24255 A./M.1 J. Saltzberg, 1A.S.D. (en bronze) ; 37581 A./M.3 W. S. Taylor, 55th Sqdn. (en bronze) ; 26570 Cpl. F. Timms, 2A./D. (en bronze) ; 23000 Clk./1 H. J. Walters, 1A.D./ (en bronze).

Awarded the Medaille Militaire

202763 Sgt. P. J. Adkins, D.S.M., D.F.M. (Woolacombe) ; 406711 Sgt. A. S. Allan, M.M., Perth ; 313629 Sgt./Mec. L. G. S. Boshier (Reading) ; 104285 A./M.2 T. Ferguson, Glasgow ; 313774 A./C.1 R. A. Hollingsbee, (Stifford, Essex) ; 407061 Sgt. G. Howard (Bradford-on-Avon) ; 10865 Cpl./Mech. S. H. Howling, Peterborough ; 26670 Cpl. (A./Sgt./Mec.) T. J. Hyde, (Portadown) ; 207607 Sgt./Mec. C. J. E. J. Jones, Cardiff ; 76185 A./M.1 T. McDermott (Wakefield).

Conferred by the King of the Belgians

Croix de Commandeur de L'Ordre de Leopold

Maj.-Gen. Sir W. S. Brancker, K.C.B., A.F.C. (R.A.), Retired List ; Maj.-Gen. Sir F. H. Sykes, K.C.B., C.M.G. (15th Hrs.).

Croix d'Officier de L'Ordre de Leopold avec Croix de Guerre

Lieut.-Col. H. A. V. Ryneveld, D.S.O., M.C.

Croix de Chevalier de l'Ordre de Leopold, et Croix de Guerre avec Palme

Capt. (A./Maj.) C. G. Beatson (Midd'x R.) ; Capt. (A./Maj.) J. A. Cochrane, M.C. (5th R. Sc. F.) ; Maj. (A./Lieut.-Col.) J. A. Cunningham, D.S.O., D.F.C. (R.A.), Retired List ; Lieut.-Col. H. M. Meyler, D.S.O., M.C. (Bord. R.).

Croix de Chevalier de l'Ordre de la Couronne, et Croix de Guerre avec Palme

Lieut.-Col. A. S. Barratt, C.M.G., M.C. (R.A.) ; Maj. G. Henderson (C.I. Horse) ; Maj. R. E. Saul, D.F.C., 4th Sqdn. ; Lieut. F. Whitehead, late 5th Sqdn. (Lanc. Yeo.).

Croix de Guerre (Belgian)

Lieut. A. H. A. Alban, D.F.C., 53rd Sqdn. (R.F.A.) ; Lieut. H. A. Allback, 36th Bal. Sec. ; Lieut. (A./Capt.) C. P. Allen, 204th Sqdn. ; Lieut. E. O. Amm, D.F.C., 29th Sqdn. ; Maj. A. R. Arnold, D.S.C., D.F.C., 79th Sqdn. ; Capt. R. N. G. Atkinson, M.C., D.F.C., 206th Sqdn. ; Lieut. C. T. Aulph, 10th Sqdn. ; Capt. G. W. Biles, D.F.C., 202nd Sqdn. ; Capt. (A./Maj.) G. H. Bowman, D.S.O., M.C., D.F.C. (3rd R. War.), 41st Sqdn. ; Lieut. N. K. Brooks, 32nd Bal. Sec. (R.F.A., S.R.) ; Sec. Lieut. H. D. Buchanan, 108th Sqdn. ; Sec. Lieut. C. H. Bullen, 10th Sqdn. ; Capt. L. A. K. Butt, 2nd Bde. (S. Staffs. R.) ; Capt. (A./Maj.) K. L. Caldwell, M.C., D.F.C., 74th Sqdn. ; Sec. Lieut. R. O. Campbell, 65th Sqdn. ; Maj. G. V. Carey, 2nd Wing (Rif. Bde.) ; Sec. Lieut. (Hon. Capt.) W. A. Carrothers, D.F.C., 206th Sqdn. (Can. Inf.) ; Sec. Lieut. (A./Capt.) H. G. Clappison, 204th Sqdn. ; Sec. Lieut. C. A. Crichton, 70th Sqdn. ; Capt. S. L. Dashwood, M.B.E., 2nd Bde. ; Lieut. C. Davies, 23rd Ball. Sec. ; Sec. Lieut. D. W. Davies, 217th Sqdn. ; Sec. Lieut. E. G. Davies, D.F.C., 29th Sqdn. ; Maj. C. H. Dixon, M.C., D.F.C., 29th Sqdn. (York. L.I.) ; Lieut. L. L. Falck, 36th Bal. Sec. ; Sec. Lieut. S. E. Foreman, 7th Sqdn. ; Sec. Lieut. A. J. Garside, D.F.C., 206th Sqdn. ; Lieut. (A./Capt.) J. S. Giffard, 5th Bal. Co. ; Lieut. (A./Capt.) F. W. Gillett, D.F.C., 74th Sqdn. ; Capt. A. W. F. Glenny, M.C., D.F.C. (R.A.S.C.) ; Maj. G. W. M. Green, D.S.O., M.C., 70th Sqdn. ; Sec. Lieut. F. S. Gordon, D.F.C., 74th Sqdn. ; Capt. H. W. Guy, 11th Wing ; Capt. D. S. W. Hambley, 11th Aircraft Park ; Lieut. (A./Capt.) T. S. Harrison, D.F.C., 29th Sqdn. ; Sec. Lieut. (Hon. Lieut.) J. B. Heppel, 206th Sqdn. ; Sec. Lieut. (A./Capt.) O. A. P. Heron, D.F.C., 70th Sqdn. ; Lieut. J. Hetherington, 214th Sqdn. ; Lieut. G. S. Hodson, A.F.C., 213th Sqdn. ; Lieut. (A./Capt.) M. L. Horn, 2nd Bde. ; Lieut. C. H. Jenkinson, 9th Bal. Sec. ; Lieut. G. R. Judge, 217th Sqdn. ; Lieut. E. B. Keele, 39th Bal. Sec. ; Lieut. (A./Capt.) A. C. Kiddie, D.F.C., 74th Sqdn. ; Lieut. (A./Capt.) C. H. R. Lagesse, D.F.C., 29th Sqdn. ; Lieut. (A./Capt.) W. J. Mackenzie, D.F.C., 213th Sqdn. ; Capt. (A./Maj.) C. T. MacLaren, O.B.E., 206th Sqdn. ; Sec. Lieut. H. McLean, D.F.C., 206th Sqdn. ; Lieut. M. P. MacLeod, D.F.C., 41st Sqdn. ; Maj. C. G. Martyn, 2nd Aircraft Park (1st Mon. R.) ; Lieut. G. Mawer, 204th Sqdn. ; Lieut. A. R. Morrison, 15th Bal. Sec. ; Maj. K. D. P. Murray, M.C., 10th Sqdn. ; Lieut. M. Nichol, 214th Sqdn. ; Lieut. J. J. W. Nicholson, D.F.C., 202nd Sqdn. ; Lieut. F. St. J. North, 23rd Sqdn., Bal. Sec. ; Maj. E. W. Norton, D.S.C., 204th Sqdn. ; Sec. Lieut. (Hon. Lieut.) C. M. W. Park, 2nd Res. Lorry Park ; Maj. S. J. Payne, 5th Aircraft Park ; Lieut. C. W. Payton, 210th Sqdn. ; Lieut. (A./Capt.) F. Pratt, 38th Sqdn. ; Lieut. (A./Capt.) C. G. Ross, D.F.C., 29th Sqdn. ; Capt. (A./Maj.) F. T. Ryan, M.C., 2nd Wing (R.G.A.) ; Sec. Lieut. M. G. Ryan, 10th Sqdn. ; Lieut. W. W. Saunders, 7th Sqdn. ; Lieut. R. H. Schroeder, late 4th Sqdn. (Can. Inf.) ; Lieut. R. A. Skelton, 25th Bal. Sec. (R.G.A., S.R.) ; Capt. (A./Maj.) J. B. Solomon, M.C., 82nd Sqdn. ; Capt. D. S. Stevenson, M.B., M.B.E., 217th Sqdn. ; Maj. (A./Lieut.-Col.) B. E. Sutton, D.S.O., O.B.E., M.C., 7th Sqdn. (West. and Cumbld. Yeo.) ; Lieut. E. G. L. Ward, 4th Sqdn. ; Sec. Lieut. H. R. Watterson, 38th Bal. Sec. ; Lieut. (A./Capt.) I. Welby, M.C., D.F.C., 7th Sqdn. ; Lieut. G. A. Welsh, 210th Sqdn. ; Lieut. E. H. Wilford, 2nd Bal. Sec. ; Capt. E. A. E. Wood, 2nd Bde. ; Sec. Lieut. H. C. Wood, D.F.C., 48th Sqdn. ; Lieut. F. Coolley, D.F.C., 79th Sqdn. ; 214412 Sgt.-Mech. G. Betteridge, D.F.M., 206th Sqdn. ; 52748 Cpl.-Mech. F. H. C. Bishop, 38th Bal. Sec. ; 13489 A.M./1 D. A. Bissett, 4th Sqdn. ; 223740 Sgt.-Mech. J. Chapman, D.F.M., 206th Sqdn. ; 23702 A.M./1 W. M. Cutts, 7th Bal. Co. ; 24059 A.M./1 W. Dick, 17th Bal. Co. ; 34165 Sgt.-Clk. J. Elliott, 11th Wing ; 4447 Sgt.-Mech. N. Lynn, 4th Sqdn. ; 93272 Sgt.-Mech. G. I. Packman, D.F.M., 206th Sqdn. ; 6260 Sgt.-Mech. J. E. Walsh, 4th Sqdn.

Croix de Chevalier de l'Ordre de Leopold II., avec Croix de Guerre

100083 Sgt.-Mech. N. Hunt, 48th Sqdn. ; 175 Sgt.-Maj. C. E. Martin, 74th Sqdn. ; 4201 Chf. Mech. B. W. Wilson, 5th Sqdn.

Decoration Militaire avec Croix de Guerre

8886 Ch. Mtr. Mech. J. F. Biggs, 65th Sqdn. ; 8715 1st C. Pte. C. H. Bird, 2nd Bde. ; 24154 Cpl. H. A. Horne, 39th Bal. Sec. ; 18875 1st C. Pte. E. Nancekievill, 2nd Bde. ; 15342 Cpl.-Mech. G. Smith, 25th Bal. Sec. ; 110761 Sgt.-Mech. R. L. G. White, 48th Sqdn. ; 134872 Cpl. H. Wildman, 2nd Wing.

Conferred by the King of Italy.

Cavaliere of the Order of the Crown of Italy

S. Lieut. V. Lowe.

Silver Medal for Military Valour

Capt. (A./Maj.) A. B. Shearer, Capt. H. F. Delarue, D.F.C., Capt. H. L. Nunn, D.S.C., D.F.C.

Bronze Medal for Military Valour

Lieut. S. J. Chamberlain, D.F.C., Sec. Lieut. J. McDonald, D.F.C.

The Croce di Guerra

Lieut. A. C. Getly, Capt. (A./Maj.) A. B. Shearer.

Awarded the Libyan Medal

For services rendered in conjunction with the Italian Forces at Misurata : Capt. S. E. Ball, D.F.C. ; Lieut. L. de V. Chisman ; Lieut. (A./Capt.) C. Chrimes ; Sec. Lieut. J. A. Munn ; Capt. R. J. F. Sulivan ; 208273 ; Sgt. K. E. Dawson (Eastbourne) ; 232635 A./M.1 G. F. Florant (Fulham, S.W.) ; 204444 Sgt. H. W. Groombridge (Notting Hill, W.) ; 210629 A./M.1 F. R. Heckford (Ongar, Essex) ; 234864 A./M.1 P. Kelly (Glasgow) ; 208592 Sgt. A. F. Millier (Forest Gate, S.E.) ; 211578 A./M.1 H. Singleton (Garstang).

Conferred by the King of the Hellenes.

Greek Medal of Military Merit

Sec. Lieut. J. W. Hoskings, M.B.E., Capt. H. G. Harrison, Sec. Lieut. G. J. Stroud, M.B.E.

Cross of Officer, Royal Hellenic Order of the Redeemer

Maj. F. W. Gamwell, Maj. J. Weston.

Chevalier of the Royal Order, George I

Lieut. S. W. Briggs, Lieut. T. F. Clarke, Lieut. R. W. Kerr, Lieut. C. H. A. Willett.

Conferred by the King of Rumania

Star of Rumania (Officier)

Maj. J. P. C. Cooper, O.B.E., M.C., 10th Bde.

Star of Roumania (Chevalier)

Lieut. (A./Capt.) C. C. A. Pelham, France; Sec. Lieut. (Hon. Capt.) (A./Capt.) H. W. Stockdale, D.F.C., 101st Sqdn.

Crown of Roumania (Chevalier)

Lieut. F. H. Knobel, 10th (A.) Wing, 40th Sqdn.

Order of Michael the Brave, 3rd Class

Lieut. J. A. Parkinson, 201st Sqdn.; Lieut. L. H. Ray, 91st (A.) Wing, 19th Sqdn.

Croix de Virtute Militara, 2nd Class

222516 Sgt. C. H. O. Allwork, 10th (A.) Wing, 98th Sqdn.; 27932 A./M., 1st Class, H. A. Lockington, 5th Balloon Wing; 77988 A./M., 1st Class, J. Melia, 19th Bal. Sec.; Aus./740 Ch. Master Mech. A. Taylor, 3rd Sqdn., Aust. Flying Corps, France.

Medaille Barbatie si Credinta, 1st Class

2547 Ch. M./Mech. W. E. Bennett, 84th Sqdn.; 49532 S./Maj. G. Dixon, France; 200599 S./Maj. S. P. Finch, 10th (A.) Wing, 203rd Sqdn.; 16667 Ldg. A./C. F. Murphy, 5th Balloon Wing.

Medaille Barbatie si Credinta, 2nd Class

115891 Sgt. W. M. Brims, France; 124479 A./C., 1st Class, A. H. Searle, 5th Balloon Wing.

Medaille Barbatie si Credinta, 3rd Class

5 S./Maj. W. E. Moore, 9th Sqdn.; 42833 A./M., 1st Class, A. E. Seed, 1st Balloon Wing; 18011 1st A./M. A. S. Wilson, France.

Conferred by the Sultan of Egypt

The Order of the Nile, 3rd Class

Lieut.-Col. (A./Brig.-Gen.) P. L. W. Herbert, C.M.G., C.B.E. (Notts and Derby R.); Lieut.-Col. C. E. Risk, D.S.O., (R.M.L.I.).

The Order of the Nile, 4th Class

Capt. (A./Maj.) F. G. Brown, O.B.E.; Capt. W. H. Dolphin; Maj. W. D. Long, O.B.E.; Maj. (A./Lieut.-Col.) S. S. Nevill, O.B.E.

Conferred by the Emperor of Japan.

4th Class, Order of the Rising Sun

Capt. (A./Maj.) G. de L. Wooldridge, O.B.E.

NOTE.—The "Acting Ranks" indicated against names in this *Gazette* have been relinquished in the great majority of cases since the commencement of the printing, and in many cases the officers and other ranks have been demobilized.

Corrections.

The following are the correct descriptions of officers whose names appeared in the *Gazettes* indicated, in connection with the grant of decorations or Mentions in Dispatches:—

Lieut.-Col. Sir H. Fowler, K.B.E. (*Gazette* No. 31297, April 15; Maj. W. D. Long, O.B.E. (*Gazette* No. 31098, Jan. 1); Capt. L. E. Lander, M.B.E. (*Gazette* No. 31098, Jan. 1); Capt. J. H. Cooke, M.B.E., M.B. (R.A.M.C., Egypt) (*Gazette* No. 31098, Jan. 1); Lieut. -Col. N. J. Roche, O.B.E. (*Gazette* No. 31378, June 3); Sec. Lieut. (A./Maj.) A. R. Fulton, M.B.E. (*Gazette* No. 31378, June 3); Capt. W. Hayward, M.B.E., No. 4 Group (*Gazette* No. 31378, June 3); Capt. (A./Maj.) P. P. C. Penherthy (Shrops L.I.) (this officer's name appeared in the list of awards of the fifth grade of the Military Division, British Empire Order, in the *London Gazette* of June 3 (No. 31378), instead of in the list of appointments to the fourth grade (O.B.E.), and the correction is hereby authorised); Lieut.-Col. W. S. Fetherstonhaugh, Can. For. Corps, attd. to the R.A.F., France (the announcement of the award of the 4th grade, British Empire Order, in *Gazette* No. 31378 of June 3 is cancelled, this officer having been awarded a higher grade); Col. the Rev. R. E. V. Hanson, O.B.E., Dep. Chapl.-in-Chief, R.A.F. (the announcement published in *Gazette* No. 31378 June 3 (award of O.B.E.), is cancelled, this reward having been also published in *Gazette* No. 31377 of same date); Lieut. C. W. Seymour-Hall (mentioned in Dispatches, *Gazette* No. 31378, June 3); No. 91975 Sgt.-Obsr. L. H. Rowe, D.F.M. (*Gazette* No. 31378, June 3); Lieut. (A./Capt.) G. B. Irving, D.F.C., 19th Sqdn., R.A.F., attd. 10th (Army) Wing, France (D.F. Cross gazetted Aug. 3, 1918) (deceased).

Capt. C. B. Belt, M.B.E., M.C., D.C.M. (S. Staff. R.) (*Gazette* 31378, June 3); Deputy Adm. Mrs. F. Day, M.B.E. (W.R.A.F.), (*Gazette* 31378, June 3); Maj. (A./Lieut.-Col.) A. Levick, O.B.E. (former service in C. Gds.) (*Gazette* No. 31378, June 3); Capt. W. J. Cooper, M.B.E., Aust. F. Corps, Recording Offr., France (*Gazette* No. 31378, June 3); Lieut. P. A. McBain, M.B.E., Aust. F. Corps, Palestine (*Gazette* No. 31378, June 3); Lieut. (A./Capt.) D. W. Grinnell-Milne, D.F.C. (R. Fus.), 56th Sqdn., France (*Gazette* No. 31378, June 3, Bar to D.F. Cross); No. 8398 Sgt.-Maj. G. Gillman, 53rd Sqdn., France (the announcement of award of Meritorious Service Medal in *Gazette* No. 31098, Jan. 1, is cancelled, this award having been already published in *Gazette* No. 30722, June 3, 1918); No. Aus./124 Flight-Clk. J. H. Rogers, Aust. F. Corps, awarded the Meritorious Service Medal in *Gazette* No. 30624, April 11, 1918, for services in connection with the capture of Jerusalem; the second announcement of this reward, which appeared in *Gazette* No. 31378, June 3, is accordingly cancelled; Maj. H. G. Atkinson, O.B.E., R.A.F., awarded the O.B.E. in *Gazette* No. 31099, Jan. 1; the second announcement in *Gazette* No. 31098 of the same date is accordingly cancelled.

The Military Medal

War Office, July 15.

The King has approved of the award of the Military Medal for bravery in the field to the following warrant officer, non-commissioned officers, and men, R.A.F., for services in France, except where otherwise stated:—

9991 Cpl. L. Briffault, 41st Sqdn.; 35291 Flt.-Sgt. A. Carey, 15th Bal. Co.; 23271 Sgt. A. Clark, 11th Bal. Sec.; 31415 Cpl. W. Clayton, 4th Sqdn.; 47099 A.M./2 F. E. Cursley, 149th Sqdn.; 24982 Cpl. C. J. F. Gihson, 8th K.B. Sec.; 10098 Cpl. G. L. Goodger, 59th Sqdn.; 37515 L.A.C., P. E. Groves, 65th Sqdn.; 10618 Cpl. E. J. Iredale, No. 1 Aircraft Depot; 13677 Ch. Mech. P. Junor, 15th Bal. Sec.; 7740 L.A.C./A./L./Cpl. R. King, 15th Wing; 96727 A.M./2 C. S. Lacey, attd. 199th S. By., R.G.A.; 129247 A.C./2 B. H. Patman, 45th Balloon Sec.; 36344 Flt.-Sgt. P. F. Renwick, 14th Bal. Co.; 13345 L.A.C./A./Cpl. H. Saunders, 7th Sqdn.; 11081 Sgt. R. Sutherland, 7th Sqdn.; 20827 A.C. 1 H. P. White, 1st K.B. Sec.; 134872 Cpl. H. S. Wildman, 7th Sqdn.; 53074 A.M./2 J. Wood, 41st Sqdn.; 54048 A.C./2 H. W. Young, 14th Bal. Sec.; 404221 A.M./2 G. I. Traccy, Wireless Sec. (Mesopotamia).

NOTE.—Officers and other ranks of the R.A.F. whose names have appeared in the *London Gazette* as having been awarded Foreign Decorations, but who have not received them, are requested to inform the Secretary of the Air Ministry on October 1, 1919, should the decorations not be received meanwhile. The designation of the Decoration and the date of the *Gazette* in which the announcement appeared should be specified.

It was announced in a supplement to the *London Gazette* of July 15 that the King has been pleased to approve of the award of the following honour and decorations to the undermentioned officers:—

Distinguished Service Order

Comdr. F. R. Wrottesley, R.N.—For distinguished services in command of No. 14 Kite Balloon Section in Mesopotamia from August, 1916, to February, 1917.

Distinguished Service Cross

Lieut. D. R. Verey, R.N.V.R. (now Capt. R.A.F.).—For distinguished services with No. 14 Balloon Section in Mesopotamia from August, 1916, to February, 1917.

Flt. Sub-Lieut. M. Lyon, R.N.A.S. (now Capt., R.A.F.).—For distinguished services with No. 14 Kite Balloon Section in Mesopotamia, from August, 1916, to Feb., 1917.

O.B.E. (Military Division)

Flt. Lieut. A. W. Cassy, R.N.A.S. (now Capt., R.A.F.).—For valuable services with No. 14 Kite Balloon Section in Mesopotamia from August, 1916, to February, 1917.

Mentioned in Despatches

INCLUDED in the list of names brought to the notice of the Secretary of State for War by Field-Marshal Sir Douglas Haig, K.T., G.C.B., O.M., G.C.V.O., K.C.I.E., late Commander-in-Chief, the British Armies in France, of those, who served under his command during the period Sept. 16, 1918, to March 15, 1919, whose distinguished and gallant services and devotion to duty he considered deserving of special mention, were the following:—

Royal Air Force

Commands and Staff

Charlton, Col. (A./Brig.-Genl.) L. E. O., C.B., C.M.G., D.S.O. (Lan. Fus.).
Ellerton, Capt. (A./Maj.) A. S., O.B.E.
Festing, Col. (A./Brig.-Genl.) F. L., C.B., C.M.G. (North'd. Fus.).
Holt, Lieut.-Col. F. V., C.M.G., D.S.O. (O. and B. L.I.).
Ludlow-Hewitt, Lieut.-Col. (A./Brig.-Genl.) E. R., C.M.G., D.S.O., M.C. (R.I. Rifles).
Pitcher, Maj. and Bt. Lieut.-Col. (A./Brig.-Genl.) D. le G., C.M.G., C.B.E., D.S.O. (39th Horse, I.A.).

Adam, Sec. Lieut. A. M., 211th Sqdn.; Albert, Sec. Lieut. G.; Amor, Lieut. (A./Capt.) S. L., M.B.E., H.Q. 10th Bde.; Anderson, Capt. (A./Maj.) W. H., D.F.C., 3rd Sqdn., Aust. F.C.

Baird, Lieut. J., 88th Sqdn.; Baker, Sec. Lieut. F.; Baker, Capt. G. B. A., M.C., 53rd Sqdn., 2nd Bde. (R. Berks. R.); Banks, Lieut. (A./Capt.) C. C., M.C., D.F.C., 43rd Sqdn., 2nd Bde. (R.W. Fus.); Baron, Lieut. H. K., 2nd Sqdn.; Barratt, Lieut.-Col. A. S., C.M.G., M.C. (R.A.); Barrett, Lieut. A. G., 3rd Sqdn., Aust. F.C.; Barton, Lieut. T. H., 140th Sqdn., 2nd Bde.; Batcheldor, Lieut. W. (3/2nd Sco. Horse Yeo. (T.F.); Beaumont, Lieut. E. E., 2nd Aircraft Park, 2nd Bde.; Bedwell, Maj. (A./Lieut.-Col.) J. R., M.C., 1st Balloon Wing (R.G.A.); Beeston, Lieut. (A./Capt.) H. C., 101st Sqdn. (6th Bn., Essex R. (T.F.); Bell, Lieut. (A./Capt.) C. W. D., 101st Sqdn (10th Hrs.); Bell, Lieut. J. R., 3rd Sqdn., Aust. F.C.; Bellamy, Lieut. (A./Capt.) H. G.; Bingham, Lieut. (A./Capt.) J. R.; Birkett, Lieut. W. S., 31st Balloon Sec.; Bissonnett, Lieut. C. A., 24th Sqdn.; Blackman, Sec. Lieut. and Hon. Capt. R. D., 10th Sqdn., 2nd Bde. (R.A.S.C.); Blair, Lieut. A.; Bowring, Lieut. (A./Capt.) W., M.B.E. (Sco. Rif.); Breen, Capt. J. J., H.Q. 10th Bde. (R. Ir. Regt.); Brindle, Lieut. P., 24th Sqdn.; Briscoe, Capt. (A./Maj.) E. J., O.B.E.; Brown, Sec. Lieut. (A./Capt.) R. F., 13th Sqdn.; Buchanan, Sec. Lieut. H. D., 108th Sqdn., 2nd Bde.; Bull, Sec. Lieut. C. H.; Burdett, Lieut.-Col. A. B., D.S.O., H.Q. 12th Wing; Burnay, Lieut. P. S., 3rd Sqdn.; Burt, Capt. W. L., M.B.E. (Essex R.); Bush, Sec. Lieut. H. W.; Butters, Sec. Lieut. G.

Caheldu, Lieut. (A./Capt.) A. H., H.Q. 2nd Wing, 2nd Bde.; Cairnes, Capt. (A./Lieut.-Col.) T. A. E., D.S.O., 22nd Wing (7th D. Gds.); Carter, Capt. A. W., D.S.C., 210th Sqdn.; Casey, Capt. C. I., M.C., H.Q. 11th Wing, 2nd Bde.; Chadwick, 2nd Lieut. C. H., 10th Sqdn., 2nd Bde.; Chamier. Lieut.-Col. J. A., C.M.G., O.B.E., D.S.O. (Ind. Army); Champagne, Sec. Lieut. E. O., 80th Sqdn.; Chapman, Lieut. H. E., 7th Sqdn., 2nd Bde.; Child, Capt. (A./Lieut.-Col.) A. J., O.B.E., M.C. (Lond. R.); Clare, Capt. S., M.B.E.; Clark, Maj. (A./Lieut.-Col.) A. J., O.B.E. (Lond. R.); Clarke, Maj. A. C., 60th Sqdn.; Clarke, Sec. Lieut. L. F.; Clemence, Sec. Lieut. S. H., 7th Sqdn., 2nd Bde.; Cochrane, Capt. (A./Maj.) J. A., M.C., 8th Balloon Coy., 2nd Bde.; Collins, Capt. (A./Maj.) E. E., Aust. F.C.; Colman, Lieut. L. H., 3rd Sqdn.; Common, Lieut. J. S., 206th Sqdn., 2nd Bde.; Compston, Capt. (A./Maj.) R. J. O., D.S.C., D.F.C.; Coots, Sec. Lieut. J. G., 84th Sqdn.; Copeland, Sec. Lieut. (A./Lieut.) H. T. H., H.Q. 22nd Wing; Corbitt, Sec. Lieut. (A./Capt.) A. J.; Cosway, Capt. (A./Maj.) L. H. B., O.B.E.; Crane, Lieut. F. D.; Crane, Lieut. K. H., 149th Sqdn., 2nd Bde.; Cray, Sec. Lieut. A. H., 70th Sqdn., 2nd Bde.; Crossman, Lieut. T. H., 2nd Sqdn.; Cullen, 2nd Lieut. C. E., 59th Sqdn.; Curtis, Lieut. G. A.

Dance, Lieut. (A./Capt.) F., M.B.E.; Darwin, Capt. (A./Maj.) C. J. W., D.S.O., 87th Sqdn. (C. Gds.); Dean, Maj. H. G., A.F.C. (Y. and L. Regt.); De Poix, Capt. (A./Maj.) R. B. C. M. T., O.B.E. (Norf. R.); Dcremo, Sec. Lieut. J. C., D.F.C., 15th Sqdn.; Dickinson, Sec. Lieut. (A./Lieut.) F. A. (R.F.A.); Donald, Capt. R., M.B.E.; Done, Sec. Lieut. (A./Lieut.) J. S.; Driver, Lieut. E. T., 53rd Sqdn., 2nd Bde.; Drover, Lieut. (A./Capt.) D.; Dudley-Smith, Sec. Lieut. S. F., 13th Sqdn.; Duke, Sec. Lieut. R. M.; Dye, Lieut. (A./Capt.) A. H. (S.A. Native Lab. Corps); Dymant, Lieut. (A./Capt.) F. C. U., 15th Sqdn.

Edwards, Lieut. (A./Capt.) A. H.; English, Lieut. A. A., M.C., 101st Sqdn.; Evans, Capt. (A./Maj.) W. S., O.B.E., 3rd Bde. (Welsh R.); Everton, Lieut. (A./Capt.) W. B.

Faithfull, Maj. (A./Lieut.-Col.) G. F. H., O.B.E., 3rd Balloon Wing (Ind. Army); Fell, Lieut.-Col. L. F. R., O.B.E., D.S.O.; Fell, Sec. Lieut. R., 2nd Aircraft Park, 2nd Bde.; FitzGerald, Sec. Lieut. J. H., 8th Sqdn.; Fitzgerald, Lieut. M. B., M.B.E.; Fitzherbert, Lieut. (A./Capt.) H. B.; Ford, Capt. (A./Maj.) H. G., O.B.E.; Forsyth, Sec. Lieut. (A./Capt.) M., 9th Sqdn.; Foster, Lieut. (A./Capt.) R. M., D.F.C. (R. Fus.); Frost, Capt. O. H., M.B.E., M.C. (Mdx. R.); Frankish, Lieut. (A./Capt.) J. R. M.B.E., H.Q. 2nd Bde.; Fry, Capt. A. A., M.B.E., H.Q., 12th Wing; Fryer, Sec. Lieut. D. J., 45th Sqdn.; Fussell, Sec. Lieut. (A./Lieut.) R. G., 4th Aircraft Park.

Gauld, Lieut. G. W. G., 74th Sqdn., 2nd Bde.; Godden, Capt. (A./Maj.) G. L., O.B.E.; Golding, Lieut. (A./Capt.) G. F., M.B.E., 3rd Bde.; Goldsmith, Lieut. (A./Capt.) St. B., M.C., H.Q., 3rd Bde.; Gcoding, Lieut. C. R., 7th Sqdn., and Bde.; Gossage, Lieut.-Col. E. L., D.S.O., M.C. (R.A.); Graham, Sec. Lieut. J., D.F.C., 7th Sqdn., 2nd Bde. (6th Res. Regt. of Cav.); Grandi, Sec. Lieut. W. Z., 2nd Sqdn.; Grant, Sec. Lieut. W. W. W.; Greenwood, Maj. B. P., 149th Sqdn., 2nd Bde.; Groves, Sec. Lieut. C., 79th Sqdn., 2nd Bde.; Gyles, Lieut. W. W., 210th Sqdn.

Haldimand, Lieut. P. McK., 149th Sqdn., 2nd Bde.; Hall, Capt. (A./Maj.) W. W., O.B.E.. Hallawell, Lieut. C., 103rd Sqdn.; Harding, Lieut. F. L., 57th Sqdn.; Harnett, Capt. (A./Maj.) E. St. C., O.B.E., H.Q., 2nd Bde. (formerly R. Highrs.); Harper, Sec. Lieut. H. G., 35th Sqdn.; Harrison, Sec. Lieut. (A./Lieut.) A. H.; Harrison, Lieut. (A. Capt.) T. S., D.F.C., 29th Sqdn., 2nd Bde.; Hayward, Lieut. and Hon. Capt. W. C., D.C.M.; Hazell, Capt. T. F., D.S.O., M.C., D.F.C., 24th Sqdn.; Hchden, Lieut.-Col. S. A., O.B.E.; Heintzman, Sec. Lieut. and Hon. Lieut. H. C., 35th Sqdn.; Heppell, Sec. Lieut. and Hon. Lieut. J. B., 206th Sqdn., 2nd Bde.; Hewitt, Sec. Lieut. and Hon. Lieut. E. N., 9th Sqdn.; Hewitt, Lieut. (A./Capt.) H. S.; Hill, Maj. G. D. (7th Hrs.); Hollis, Sec. Lieut. and Hon. Lieut. (A./Lieut,) D. L.; Holloway, Sec. Lieut. R. G.; Horlock, Sec. Lieut. and Hon. Lieut. A. G. (2/5th Bn., E. Kent. R. (T.F.); Horn, Capt. S. B., M.C., 85th Sqdn.; Horton, Sec. Lieut. (A./Lieut.) W. G.; Hoy, Lieut. (A./Capt.) E. C., D.F.C., 29th Sqdn., 2nd Bde.; Hudson, Lieut.-Col. H. C. H., M.V.O. (11th Hrs.); Hunter, Maj. H. J. F., M.C., 42nd Sqdn.; Hutchinson, Sec. Lieut. H., 7th Sqdn., 2nd Bde.; Huxley, Capt. (A./Maj.) W. S., M.C., 12th Balloon Coy.; Hynes, Lieut.-Col. G. B., D.S.O. (R.G.A.).

Ibbotson, Lieut. A., 59th Sqdn.; Ingpen, Capt. (A./Maj.) D. L.; Isitt, Lieut. F. H., 80th Sqdn.

James, Lieut. (A./Capt.) M. R., D.F.C., 45th Sqdn.; Jenkins, Sec. Lieut. T. P., 7th (Res.) Lorry Park, 2nd Bde.; Jillings, Capt. (A./Maj.) D. S., M.C. (W. York. R.); Johnson, Lieut. A. H., 13th Balloon Coy.; Johnson, Sec. Lieut. and Hon. Lieut. C. G., 2nd Sqdn. (5th Bn., Rly. Troops, Can. Forces); Jones, Capt. A. W., 53rd Sqdn., 2nd Bde. (5th Bn., N. Lan. R. (T.F.); Jones, Lieut. S., 149th Sqdn., 2nd Bde.; Jones, Sec. Lieut. W. T. (S.W. Bord.); Jupp, Maj. W. D. L., O.B.E.

Kavanagh, Capt. H. R., M.B.E., H.Q., 2nd Bde. (2nd Bn., R. Irish Fus.); Keele, Lieut. E. B., 13th Balloon Sec., 2nd Bde.; Keely, Lieut. (A,/Capt.) R. P. (7th Bn., Lond. R.); Keith, Sec. Lieut. and Hon. Lieut. C.; King, Capt. R., D.S.O., D.F.C., 4th Sqdn., Aust. F.C.; Kitson, Lieut. G. G.; Knatchbull-Hugessen, Lieut. (A./Maj.) The Hon. M. H. R., M.C. (R.A.); Knight, Sec. Lieut. (A./Lieut.) J. M., M.B.E.; Knox, Capt. E. G., M.B.E., 5th Bde., Aust. F.C.; Knox, Sec. Lieut. and Hon. Maj. A. H. W. S. (N. Lan. R.).

Ladd, Lieut. and Hon. Capt. (A./Capt.) L. S., 79th Sqdn., 2nd Bde.; Lagesse, Lieut. (A. Capt.) C. H. R., D.F.C., 29th Sqdn., 2nd Bde.; Lale, Lieut. (T./Capt.) H. P., D.F.C.; Lamb, Lieut. S. E. C., 11th Balloon Coy.; Langridge, Lieut. and Hon. Capt. E. J., M.B.E. (N. Staff. R.); Law, Sec. Lieut. and Hon. Lieut. (A./Lieut.) R. A., H.Q., 15th Wing; Lawrence, Lieut. C. J. L., 21st Sqdn.; Lawson, Capt. H., M.B.E., 46th Sqdn.; Leurmond, Lieut. G. V., 20th Sqdn.; Le Blanc Smith, Capt. (A./Maj.) M., D.F.C. 73rd Sqdn.; Lee, Sec. Lieut. W., 102nd Sqdn.; Lee-Barber, Lieut. G. W.; Lewis, Lieut. A. T.; Linford, Lieut. R. D., 149th Sqdn., 2nd Bde.; Littlejohn, Sec. Lieut. C., M.M., H.Q., 13th Wing; Loder, Lieut. L. F., 2nd Sqdn., Aust. F.C.; Lord, Capt. C. G., M.C., H.Q., 81st Wing; Lough, Lieut. (A./Capt.) E. T.; Lovemore, Lieut. R. B., D.S.O., 29th Sqdn.

Macdonald, Lieut. (A./Capt.) C. B. R., 85th Sqdn. (R.E.); Mackay, Capt. D. R. G., D.F.C.; MacLaren, Lieut. (A./Capt.) D. R., D.S.O., M.C., D.F.C., 46th Sqdn.; Maclean, Lieut.-Col. C. T., D.S.O., M.C. (R. Scots); Maybury, Capt. (A./Maj.) H. P., O.B.E.; McBean, Lieut. R. E. L.; McClaughry, Capt. E. J., D.S.O., D.F.C., 4th Sqdn., Aust. F.C.; McClaughry, Maj. W. A., D.S.O., M.C., D.F.C., 4th Sqdn., Aust. F.C.; McDonald, 2nd Lieut. (A./Capt.) J. S., 208th Sqdn., 2nd Bde. (5th Bn., Sco. Rif.) (T.F.); McDougall, 2nd Lieut. N. M., 59th Sqdn.; MeKenzie, Sec. Lieut. M. A., M.C., 20th Sqdn. (R.S. Fus.); Mellor, Sec. Lieut. J.; Miles, Maj. C. C., M.C., 43rd Sqdn., 2nd Bde.; Miller, Lieut. G. W., 9th Sqdn.; Miller-Tait, Sec. Lieut. R.; Mills, Sec. Lieut. A. S. H., 21st Sqdn.; Morris, Lieut. (A./Maj.) H. S., M.B.E., 5th Bde. (C. Gds. (S.R.)); Morrison, Capt. A., 11th Sqdn.

Neame, Maj. A. L. C., O.B.E. (R.E.); Nesbitt, Lieut. A. N.; Nesbitt, Lieut. (A./Capt.) T. H., M.B.E., H.Q., 15th Wing; Nethersole, Maj. M. H. B., D.S.O., 103rd Sqdn.; Nevatt, Capt. (A./Maj.) C. G., O.B.E.; Newton-Clare, Capt. W. S., M.B.E.; Northcote, Sec. Lieut. T. F., 84th Sqdn.

Oliver, Lieut. C. K., 87th Sqdn.

Packham, Lieut. A. T., 20th Sqdn. (9th Bn., N. Staff. R.); Palmer, Maj. A. F.; Palmer, Sec. Lieut. H. H., 211th Sqdn; Palmer, Lieut. (A./Capt.) J., 24th Sqdn.; Parr, Maj. A. W. C. V.; Payne, Lieut. (A. Capt.) L. A., M.C., 48th Sqdn., 2nd Bde.; Petch, Lieut. (A./Capt.) F., H.Q., 5th Bde.; Penny, Lieut. M. G., 206th Sqdn., 2nd Bde. (R.G.A.); Philcox, Lieut. (A. Capt.) W. S., 92nd Sqdn.; Phillips, Lieut. (A./Maj.) W. E.; Pizey, Lieut. R. D. G., D.F.C., 15th Sqdn.; Poole, Sec. Lieut. and Hon. Lieut. (A./Lieut.) C. J., H.Q., 11th Wing, 2nd Bde.; Porteous, Capt. (A./Maj.) H. B.; Porter, Lieut. (A./Capt.) E. E., M.B.E., D.C.M., 4th Aircraft Park (Shrops. L.I.); Prendergast, Lieut. (A./Capt.) D'A. J., 18th Balloon Coy.; Probets, Sec. Lieut. (A./Capt.) C. W.; Purdey, Lieut. (A./Capt.) T. D. S., H.Q., 80th Wing; Purefoy, Lieut. J. B., 12th Sqdn.; Pyper, Lieut. (A./Capt.) H. C. (Lan. Fus.).

Ramsay, Sec. Lieut. R., 206th Sqdn., 2nd Bde.; Rayner, Lieut. (A./Capt.) J. W., 60th Sqdn.; Riddell, Lieut. P. C. O. (Wilts. R.); Robb, Sec. Lieut. A. R., 8th Sqdn.; Roberts, Lieut. S. H., 14th Balloon Coy.; Robinson, Sec. Lieut. and Hon. Lieut. W. P. A., M.C. (R.F.A.); Rodwell, Maj. J. T., O.B.E., 9th Sqdn.; Rogers, Sec. Lieut. (A./Capt.) B.; Rook, Lieut. B. H., 206th Sqdn., 2nd Bde.; Ross, Lieut. (A./Capt.) A. J. M., M.B.E.; Ross, Lieut. (A./Capt.) C. G., D.F.C., 29th Sqdn., 2nd Bde.; Royse, Lieut. R. T.; Russell, Capt. C. E. S., 149th Sqdn., 2nd Bde.; Russell, Maj. J. C., D.S.O. (R.E., T.F.); Russell, Sec. Lieut. J. D., 206th Sqdn., 2nd Bde.; Ryan, Lieut. and Hon. Capt. M. K. (Alberta R., Can. Forces).

St. John, Capt. R. G., D.S.C., 206th Sqdn., 2nd Bde.; Sawyer, Lieut. H. G.; Sehl, Lieut. F. T. S., 201st Sqdn.; Shelswell, Sec. Lieut. C. O., 206th Sqdn., 2nd Bde.; Shields, Lieut. (A./Capt.) W. E., D.F.C., 41st Sqdn., 2nd Bde.; Simpson, Sec. Lieut. (A./Lieut.) A. H.; Small, Lieut.-Col. R. G. D. (Leins. R.); Smith, Capt. A. C.; Smith, Maj. F. W.; Smith, Capt. (A./Maj.) W. E., O.B.E.; Snowden, Sec. Lieut. W. C., 211th Sqdn.; South, Lieut. W. B.; Spencer, Lieut. R. A., 59th Sqdn.; Stansfield, Capt. (A./Maj.) H., M.B.E.; Stapleton-Cotton, Maj. (A./Lieut.-Col.) R. F.; Stevens, Capt. (A./Maj.) G., O.B.E.; Stevenson, Capt. (A./Maj.) D. F., D.S.O., M.C., 35th Sqdn. (Notts. Hrs. (T.F.)); Stewart, Sec. Lieut. and Hon. Lieut. D. W. (W. Ontario R., Can. Forces); Stone, Lieut. C. O., 2nd Sqdn., Aust. F. C.; Stradling, Capt. (A./Maj.) A. H., O.B.E. (5th Bn., Gord. Highrs. (T.F.)); Strange, Lieut.-Col. L. A., D.S.O., M.C., D.F.C., H.Q., 80th Wing (Dorset R.); Stringer, Maj. (A./Lieut.-Col.) C. H., H.Q., 8th Balloon Wing; Swan, Sec. Lieut. (A./Lieut.) R., M.B.E., 3rd Aircraft Park; Swoffer, Lieut. (A./Capt.) F. A., M.B.E., H.Q., 5th Bde. (7th Bn., Mdx. R. (T.F.)); Sydenham, Sec. Lieut. T.

Taplin, Lieut. B.; Taylor, Sec. Lieut. E. J., 23rd Sqdn.; Taylor, Sec. Lieut. J. H.; Thomas, Sec. Lieut. C. E., 23rd Sqdn.; Thomas, Lieut. F. A., 35th Sqdn.; Thomas, Lieut. G. F.; Toogood, Lieut. C. F., 12th Sqdn.; Trafford, Lieut. (A./Capt.) C. E. J., M.C. (1st. Bn., S. Gds.); Trites, Sec. Lieut. S. B., 8th Sqdn.; Trout, Sec. Lieut. (A./ Capt.) R. R.; Tuck, Sec. Lieut. R.; Turner, Capt. N.

Vigers, Lieut. (A./Capt.) A. W., M.C., D.F.C., 87th Sqdn.

Warnford Davis, Sec. Lieut. (A./Lieut.) D.; Watney, Sec. Lieut. and Hon. Lieut. M. A., 21st Sqdn. (R.A.S.C.); Watson, Lieut. (A./Capt.) A. M., M.B.E. (Shrops. L.I.); Watson, Sec. Lieut. R. A.; Watson, Lieut. W. C.; Webb, Lieut. (A./Capt.) J. S.; Williams, Lieut. (A./Capt.) G. A., M.B.E., 3rd Bde.; Wilson, Lieut. (A./Capt.) A. McC., M.B.E., 5th Balloon Wing (H.L.I.); Winch, Sec. Lieut. C. A., 149th Sqdn., 2nd Bde. (R. Bde.); Worswick, Maj. T., O.B.E.

Amey, 628 S.M. R. W., 2nd Sqdn.; Andrews, 16470 Ldg. Aircraftman W., 1st Bde.; Ashton, 44970 1st Aircraftman S. E., 11th Balloon Coy.; Auld, 20609 Flt. Sergt. A., 48th Sqdn.; Avens, 8160 Flt. Sergt. B., H.Q., 3rd Bde.

Bachshall, 6996 1st Clk. J., H.Q., 11th Wing, 2nd Bde.; Ball, 204013 Flt. Sergt. H. J.; Barker, 22298 Cpl. Clk. F. J. J., 1st Bde.; Barnard, 21478 Cpl. W. C. P.; Barnes, 26021 Ldg. Aircraftman C. L.; Barns, 2326 Ldg. Aircraftman P. R., 3rd Bde.; Beattie, 1078 Flt. Sergt. H. H., 2nd Sqdn., Aust. F. C.; Beecroft, 83044 1st Aircraftman R.; Bell, 15763 Flt. Sergt. W., 49th Sqdn.; Bethell, 348 S.M. H. E.; Biddle, 26428 Cpl. Mech. B. C., 70th Sqdn., 2nd Bde.; Billing, 232 S.M. B., 20th Sqdn. (died); Blackwell, 51670 Sergt. G. W., 12th Balloon Sec.; Blanchard, 33945 Ldg. Aircraftman P., 3rd Aircraft Park; Bletcher, 48618 Ldg. Aircraftman (A./Cpl.) E. E., H.Q., 2nd Bde.; Bonner, 5913 Chief Mech. F. E., 29th Sqdn., 2nd Bde.; Booker, 24716 1st Aircraftman H. H.; Boorman, 4495 Cpl. P. T., H.Q., 2nd Wing, 2nd Bde.; Bound, 1471 Flt. Sergt. F., 48th Sqdn.; Branch, 20049 Sergt. E. R.; Bray, 3990 Sergt. E. G., 6th Sqdn.; Broadley, 402673 S.M. A. E., D.C.M., 7th Sqdn., 2nd Bde.; Brookes, 53844 Ldg. Aircraftman J., H.Q., 13th Wing; Brown, 16308 Flt. Sergt. T. W. A., 2nd Aircraft Park, 2nd Bde.; Bunting, 29624 Sergt. (A./Flt. Sergt.) R. S.; Burdge, 18222 Master Mech. F. J., H.Q., 11th Wing; Butler, 37658 Sergt. T. E.

Campbell 25327 1st Aircraftman B. T., H.Q., 2nd Bde.; Carter, 2768 Sergt. G.; Cheffings, 34167 Sergt. R. E., 3rd Aircraft Park; Clark, 76986 Ldg. Aircraftman (A./Cpl.) E. S.; Clark, 59839 Cpl. H., H.Q., 13th Wing; Clary, 23005 Flt. Sergt. J. A., 48th Sqdn.; Clay, 1870 Flt. Sergt. S., 149th sqdn. (now 207th Sqdn.); Close, 29178 Flt. Sergt. H. D., H.Q., 5th Bde. (now 208th Sqdn.); Cobner, 24115 2nd Aircraftman E. J.; Cockayne, 13804 Cpl. A., 2nd Sqdn.; Cocks, 121103 Ldg. Aircraftman R., H.Q., 2nd Wing; Connor, 21277 Sergt. J., 5th Balloon Wing; Copplestone, 1484 S.M. A. J., 1st Sqdn.; Cottam, 26360 Cpl. W. A., H.Q., 11th Wing; Couduricr, 18376 Sergt. Clk. L.; Cox, 2302 S.M. A. R., 56th Sqdn.; Crisp, 18744 Flt. Sergt. J. C.; Crokam, 28365 1st Aircraftman A. J. S., H.Q., 3rd Bde.; Cullen, 7075 Ldg. Aircraftman (A./Cpl.) S. T., 13th Sqdn.; Culley, 59924 Cpl. F., H.Q., 2nd Wing.

Dakeyne, 1064 Cpl. W., 3rd Balloon Wing; Dandy, 6629 Sergt. W. R.; Darling, 11041 Ldg. Aircraftman H. S., H.Q., 15th Wing; Davies, 26748 1st Aircraftman (A./Cpl.) F. L., H.Q., 5th Bde.; Denby, 26274 Flt. Sergt. S. G.; Dickin, 37840 Cpl. (A./Sergt.) F., H.Q., 9th Bde.; Didcote, 16466 Ldg. Aircraftman A. G., H.Q., 15th Wing; Dixon, 49532 S.M. G.; Dixon, 4695 Flt. Sergt. J.; Dolding, 19705 Flt. Sergt. A. R., 53rd Sqdn. (now 18th Sqdn.); Dorey, 221723 2nd Aircraftman C. E., 2nd Bde.; Drake, 35100 Sergt. J. M., 7th Sqdn.

Dupree, 402960 Ldg. Aircraftman A. G., 3rd (Res.) Lorry Park.

Eland, 114785 Sergt. J. W., Aero. Service Unit; Elcoate, 22323 Sergt. H., 13th Sqdn.; Ellis, 14141 Flt. Sergt. W. A., 103rd Sqdn.; Evans, 221471 Ldg. Aircraftman T. H. E.

Fenwick, 10242 Sergt. R. W., 16th Sqdn.; Field, 27212 1st Aircraftman A. H., 59th Sqdn.; Figg, 19797 Chief Mech. A., 29th Sqdn., 2nd Bde.; Finch, 200599 S.M. S. P., 3rd Sqdn.; Fry, 4488 Flt. Sergt. J., 2nd Sqdn.; Fuller, 224021 Sergt. (A./Flt. Sergt.) A. N., 208th Sqdn.

Giles, 50232 Ldg. Aircraftman A., 4th Aircraft Park; Good, 17376 Flt. Sergt. J. A., 85th Sqdn. (now 80th Wing); Gray, 17367 Flt. Sergt. F. H.; Gurney, 13440 Cpl. C. V.; Guthrie, 2355 S.M. S. J., 59th Sqdn.

Hackett, 139633 1st Aircraftman D., 2nd Aircraft Park; Haines, 6200 Sergt. G. T., 24th Sqdn. (now 92nd Sqdn.); Hallchurch, 8345 S.M. T. W., 102nd Sqdn.; Hanson, 9324 Cpl. A. W., 3rd Bde.; Harding, 17344 Ldg. Aircraftman E. H., H.Q., 13th Wing; Hastie, 134699 Sergt. H.; Hawes, 2921 Flt. Sergt. W. M.; Hearne, 85107 Ldg. Aircraftman H. A., 5th Balloon Wing; Heathfield, 48516 Sergt. R. C., 35th Sqdn.; Hedges, 10104 S.M. A. H. 62nd Sqdn.; Hemming, 6972 Ldg. Aircraftman J. W., 35th Sqdn.; Hennah, 15947 Ldg. Aircraftman (A./Cpl.) J. C., H.Q., 12th Wing; Hick, 114383 Ldg. Aircraftman (A./Cpl.) T.; Hinbury, 16804 Flt. Sergt. J. W., 7th (Res.) Lorry Park, 2nd Bde. Hockley, 29924 Sergt. (A./Flit. Sergt.) W. A., 4th Aircraft Park; Hodges, 11847 Chief Master Mech. L. G., 70th Sqdn., 2nd Bde.; Hornibrook, 1500 Flt. Sergt. F.; Howie, 25916 Sergt. J.; Hurd, 3639 Flt. Sergt. C. F., 5th Sqdn.

Inch, 17394 Ldg. Aircraftman G., 7th Sqdn.; Inglis, 6771 S.M. J.

Jewry, 12409B Ldg. Aircraftman (A./Cpl.) J. R., 5th Balloon Wing; Jones, 2439 Sergt. T., 48th Sqdn.

Kennedy, 22342 Cpl. E., H.Q., 3rd Bde.; Kimber, 4770 Ldg. Aircraftman G., 7th Sqdn.; King, 134804 Flt. Sergt. W.; Kinnear, 403172 1st Aircraftman G.; Knapp, 1470 Flt. Sergt. J. J., 3rd Sqdn., Aust. F.C.; Knight, 3120 Flt. Sergt. F. G., 8th Sqdn.; Knowles, 2045 Chief Mech. J. W., 41st Sqdn., 2nd Bde.; Krauterkraft, 40768 Ldg. Aircraftman (A./Cpl.) L., 1st Bde.

Lambert, 16928 S.M. A. H., H.Q., 2nd Wing; Lamerton, 15092 Flt. Sergt. H., 35th Sqdn. (now (4th Wing); Lang, 69386 Ldg. Aircraftman C. S., H.Q., 9th Bde.; Langley, 90776 Ldg. Aircraftman S., Junr.; Langridge, 15357 Cpl. R. A., 79th Sqdn.; Latham, 7157 Flt. Sergt. C. J., 149th Sqdn. (now 79th Sqdn.); Latham, 39656 Ldg. Aircraftman R., 1st Balloon Sec.; Lawrence, 86021 Ldg. Aircraftman (A./Cpl.) H. J.; Lawson, 1506 Cpl. (A./Sergt.) J. A.; Levett, 17310 1st Aircraftman T.; Lewin, 17171 Sergt. A. G.. 79th Sqdn.; Loder, 223944 1st Aircraftman C. A., H.Q., 13th Wing; Lovelock, 6533 Sergt. H.; Lowman, 24751 Ldg. Aircraftman W. H., 12th Balloon Sec.; Lynch, 17798 Ldg. Aircraftman F., 7th Sqdn.

Macklin, 13174 Flt. Sergt. D. J., 35th Sqdn.; Marshall, 64559 1st Aircraftman B. J., 79th Sqdn.; Martin, 252 S.M. D., M.M. (died); Mase, 92806 Cpl. T. F.; Matthews, 15119 Sergt. S., 5th Balloon Wing; Maxwell, 15849 Flt. Sergt. A.; McHardy, 114359 1st Aircraftman C. H., 59th Sqdn.; McRae, 3258 S.M. G., 46th Sqdn.; Michell, 7892 Sergt. C. R., 7th Sqdn.; Miles, 11063 Cpl. (A./Sergt.) A. H., 12th Balloon Coy.; Mills, 29559 Sergt. J. F., 88th Sqdn.; Montague, 31905 1st Aircraftman G. J., 3rd Aircraft Park; Moore, 18867 Sergt. (A./Flt. Sergt.) A.; Moore, 59521 1st Aircraftman E., 15th Sqdn.; Moore, 267812 2nd Aircraftman F.; Moorrish, 238943 Ldg. Aircraftman G. C., Aero. Constr. Unit.

Newey, 64483 1st Aircraftman J.; Newnham, 11456 1st Aircraftman W. A.; Norris, 35155 Cpl. C.; Nunn, 1950 Flt. Sergt. C., 57th Sqdn.

O'Connor, 1085 S.M. M., 41st Sqdn., 2nd Bde (now 20th Sqdn.); Owers, 21037 Flt. Sergt. E. A., 101st Sqdn.

Parker, 37284 Cpl. S.; Parsley, 75605 Sergt. C. G., H.Q., 80th Wing (now H.Q., 10th Wing); Parsons, 25888 Cpl. W. G., 12th Balloon Sec.; Pears, 145206 1st Aircraftman E. R.; Pearson, 48007 Ldg. Aircraftman (A./Cpl.) T.; Peasland, 32845 Ldg. Aircraftman (T./Sergt.) R. H.; Peck, 8175 Flt. Sergt. E. R.; Pegg, 15582 Cpl. H. M., 5th Balloon Wing; Phillips, 75732 Ldg. Aircraftman (A./Cpl.) H. K., H.Q., 12th Balloon Sec. (now 216th Sqdn.); Poll, 69063 Sergt. (A./Flt. Sergt.) W.; Pollard, 12572 Flt. Sergt. T., 59th Sqdn.; Powell, 39800 Sergt. H. H., 148th Sqdn.; Purchase, 9055 Flt. Sergt. S. J., 54th Sqdn. (now 80th Wing); Preshous, 60149 Ldg. Aircraftman (A./Cpl.) H.; Pye, 17409 1st Aircraftman L. S., H.Q., 12th Wing (now 12th Sqdn.); Pyle, 11995 Flt. Sergt. W. N.

Reed, 1996 Flt. Sergt. C. S., 43rd Sqdn.; Rees, 15636 1st Aircraftman R. T., 13th Sqdn. (now 12th Wing); Reeves, 203123 Flt. Sergt. W. C., 12th Wing; Reid, 103492 1st Aircraftman E.; Rendall, 27714 Ldg. Aircraftman A. R.; Robertshaw, 402962 Sergt. C., 84th Sqdn.; Robinson, 69297 Ldg. Aircraftman W. G.; Roche, 45518 1st Aircraftman J., 79th Sqdn.; Rowley, 203886 Flt. Sergt. J. G., 210th Sqdn.; Ryan, 98332 Cpl. C. P.

Sayers, 10666 Cpl. J., H.Q., 2nd Wing; Scott, 1184 Flt. Sergt. A., 10th Sqdn.; Shaw, 13606 Chief Mech. W., 29th Sqdn., 2nd Bde.; Smith, 134537 Flt. Sergt. C.; Smith, 674 Ldg. Aircraftman (A./Cpl.) J.; Smith, 7278 Ldg. Aircraftman J. H., H.Q., 2nd Bde.; Spencer, 53232 2nd A.M. C. R., 70th Sqdn., 2nd Bde.; Spillet, 6307 Sergt. E. F., H.Q., 13th Wing; Springthorpe, 10782 Ldg. Aircraftman R., 3rd Balloon Wing; Stokes, 23805 Cpl. A. 46th Sqdn. (now 48th Sqdn.); Stratford, 6199 Flt. Sergt. H. W., 107th Sqdn.;

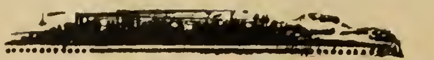
Stroud, 7916 Flt. Sergt. F. W., 1st Balloon Sec.; Strudwick, 18701 Sergt. C.; Sweetman, 27972 Ldg. Aircraftman A. W.; Swindells, 14005 Sergt. (A./Flt. Sergt.) A. J., 101st Sqdn.

Tackley, 27561 Cpl. (A./Sergt.) G. H., 19th Balloon Coy.; Tickner, 28196 Cpl. C. W., H.Q., 5th Balloon Wing; Tiffen, 2596 Sergt. E. G.; Twist, 7595 Cpl. C. M., H.Q., 12th Wing; Tyler, 223761 Flt. Sergt. H. F. G. W., 210th Sqdn.

Vale, 27952 Sergt. J. A.; Veale, 26749 Ldg. Aircraftman R.; Vince, 218150 1st Aircraftman W. E.; Voisey, 568 Flt. Sergt. F. A. C.

Wade, 12425 Flt. Sergt. E. S., 2nd Aircraft Park; Wall, 18361 Flt. Sergt. S. W.; Warshawski, 22868 Cpl. W., 3rd Aircraft Park; Watson, 264270 2nd Aircraftman (A./Cpl.) G. E., 19th (Res.) Lorry Park; Wehber, 227160 Ldg. Aircraftman G.; Welch, 6096 Ldg. Aircraftman (A./Cpl.) L. A., H.Q., 5th Bde.; Wharton, 2320 S.M. J., 92nd Sqdn.; Whiley, 59061 1st Aircraftman H.; Whitaker, 16918 Ldg. Aircraftman S., 6th Sqdn.; White, 109307 1st Aircraftman A.; White, 22987 Cpl. C. W., 2nd Bde.; Wigglesworth, 9408 Flt. Sergt. A., 102nd Sqdn.; Wilkie, 109883 1st Aircraftman J., 2nd Bde.; Williams, 17207 Flt. Sergt. A. F., 10th Sqdn.; Willment, 27083 Ldg. Aircraftman J. A.; Wilson, 19815 Ldg. Aircraftman E.; Wilson, 3827 Flt. Sergt. J. R., 6th Sqdn.; Wilson, 26945 Flt. Sergt. W., 54th Sqdn.; Wilson, 24781 Flt. Sergt. W. H., 48th Sqdn.; Winslade, 10725 Cpl. (A./Sergt.) A. E.; Wood, 8263 Cpl. J.; Woods, 8403 Chief Master Mech. J. W., 29th Sqdn., 2nd Bde.; Wort, 30229 Sergt. H.; Wright, 22823 Sergt. W. H.

Zachau, 48617 Ldg. Aircraftman F.



AVIATION IN PARLIAMENT

R.A.F. Upavon Camp, Wilts

Colonel Burn, on July 15, asked if the young men who enlisted in the R.A.F. and are now stationed at Upavon Camp, Wilts, are being put through a thorough course of training to make them thoroughly efficient?

The Under-Secretary of State for Air (Major-General Seely): I presume that my hon. and gallant friend is referring to the officers now quartered at the Cenaral Flying School, Upavon. They are there awaiting passages to the various Dominions.

Colonel Burn: Are the men who enlisted in the Royal Flying Corps or the R.A.F. being usefully employed and instructed in their duties, or are they only doing fatigue duty in the camp?

Major-General Seely: I was there the other day, and I think everything is being done that could be done in that regard. If the hon. and gallant gentleman wishes to bring forward a particular point I shall be glad to deal with it.

Didsbury Aerodrome

Major Nall asked the Under-Secretary of State to the Air Ministry whether the Whalley Range Cricket Club premises at Didsbury, Manchester, which were taken possession of for military aviation purposes in 1917, are now being used by a company for civilian flying; and whether he will restore these premises to their rightful owners now that they are no longer required for military aviation?

Major-General Seely: The Didsbury Aerodrome will be required for R.A.F. purposes until November, 30, 1919, and has been made available for civilian flying since May 1. The future use of this and similar aerodromes is receiving careful consideration.

Aeroplane Contracts

Maj. Glyn asked the Under-Secretary of State to the Air Ministry what is the policy of the Air Ministry in regard to either the giving or withholding orders to those small aeroplane manufacturing establishments that are associated with foreign aeroplane companies; whether he is aware that many of these smaller concerns are in an indifferent financial position and are only being kept going in a small way in the hope of later on obtaining a Government contract; and whether it is more in the public interest that these buildings should be used for other purposes whenever definite orders to obtain possession of these factories have been made?

Mr. Kellaway: I have been asked to answer this question. I do not quite understand this question, but I may say that the supplies of aeroplanes, contracted for under War conditions, are, and will be for some time to come, sufficient to meet the requirements of the Royal Air Force, without placing further contracts. The use to which the private factories are put is a matter entirely for the owners of the factories.

Flying-Boat Services

Lieut.-Comdr. Kenworthy asked the Under-Secretary of State to the Air Ministry whether it is intended to establish a regular service by flying-boat between the North-East Coast of England and Northern Europe; and, if so, under what conditions?

The Under-Secretary of State for Air (Maj.-Gen. Seely): It is not intended to run a Government service between the East Coast of England and Northern Europe. Those flights which have been and are being undertaken are to demonstrate the possibility of such flights and to gain experience.

Lieut.-Comdr. Kenworthy: Will encouragement be given to private enterprise to establish some such service?

Maj.-Gen. Seely: Oh, yes, Sir. Every encouragement that can properly be given will be given. There is no doubt a great future for flying-boats, especially to these countries.

Capt. Benn: Are any negotiations going on with the Post Office towards setting up an aerial mail?

Maj.-Gen. Seely: Perhaps it would be better to put a question to the Postmaster-General on that point. In regard to flying-boats no actual proposals are now before me, but any such proposals will receive careful consideration.

Lieut.-Comdr. Kenworthy: Have any negotiations taken place with Northern neutral countries, with a view to joint action in establishing such services or assisting them by private enterprise in the matter?

Maj.-Gen. Seely: That is rather a large question. Perhaps the hon. and gallant gentleman would put down a question on that specific point.

Amsterdam Exhibition

Captain W. Benn asked the Under-Secretary of State to the Air Ministry what firms have received from the Air Ministry permission to exhibit machines and engines made under Government contract at the Amsterdam Exhibition?

Major-General Seely: The following firms have received Air Ministry permission to exhibit machines at the Amsterdam Exhibitions:—

Gosport Aircraft Company, F. 5, flying boat.
Messrs. Handley Page, V. 1500.
The Aircraft Manufacturing Company, D.H.X.A.

Admiralty and Airships

In the debate in the House of Commons on July 24 on the Navy Estimates, Mr. G. Lambert said: There is one point which has been alluded to here by Capt. W. Benn, and that is the question of the air. Is the Navy to have its own air service, or is it to be placed under the Air Ministry? I think the Air Ministry, if it is under the War Office, will have considerable difficulty in persuading the Admiralty that the air service of the Navy should be under the War Office. Possibly a little later on my right hon. friend may be able to give us some information.

Mr. Long: It is not settled yet.

Mr. Lambert: I assume it will be settled when the right hon. gentleman next presents his Estimates to us.

Lieut.-Commander Kenworthy urged that the Naval Staff College should be at Camberley in easy and close touch with the Army and Air Force colleges. He went on: The question of airships concerns the Admiralty, and I should like to ask the First Lord to give pause before he proceeds to relate the programme of airship building. These airships cost £350,000 each, and there are great sheds which will be of doubtful value in the future. The reason is that aeroplanes and seaplanes are advancing in efficiency so rapidly that an airship will have about as much chance with the aeroplane as a sailing ship has to-day with a cruiser. The analogy is this—that the sailing ship was useful for a certain time, and then it became obsolete, and this is the same as the airship, which, I believe, will be dead in spite of a non-inflammable gas or any other improvements. Therefore I do beg the right hon. gentleman not to spend too much money on airship building programmes. The money should be spent rather on aeroplanes. There is little enough money, and it should be laid out to the best advantage. I do not think of the airships from the military point of view. People keen on airships are naturally keen on their weapons, but unfortunately the Admiralty is responsible for airships, and the Air Minister for aeroplanes, and therefore the airship schools have an unfair pull in the councils of the war. The First Lord should weigh up these points and consult with all the branches of the sea service—particularly the Navy—with regard to which is the best investment for the country's money. I throw this out as a helpful suggestion.

Capt. Wedgwood Benn: I desire to raise a somewhat large question of policy relating to the construction of airships. At the present time there is a programme of airships. There are six big airships built at a total cost of over £2,000,000. These are being built by the Admiralty, and under the control of the Board of Admiralty. They are being manned, my right hon. friend thinks, by the Admiralty personnel. The contention of those who have had any experience of the Air Service of all parties—for, of course, this is not in the slightest sense a party matter, and they are unanimous in this matter—is that everything that flies in the air should be under one control. This is a fundamental principle, both as regards construction, manning and operations. What is the reason? The right hon. gentleman says that everybody is agreed.

Mr. Long dissented.

Capt. Benn: Then the right hon. gentleman says everybody is not agreed. One of the great mistakes made by the first Coalition Government was that they did not unify the Air Service in 1915, or we should have had the Germans beaten in the air much sooner than we did. Why is it absolutely essential that you should not have two departments of the Government both constructing Air parts? The reason is perfectly obvious. The department over which the right hon. gentleman presides, in the olden days, used to go into the market and compete for the same engine with the department presided over by the Secretary of State for War. Is it not ridiculous that you should have two departments of the same customer competing for one article?

I lay it down that the unanimous opinion of all those competent to form an opinion is that everything that flies in the air should be under one control. I understood that that was the policy of the Government. If it is not the policy of the Government perhaps the right hon. gentleman will say so.

With regard to the use of these things even for war, you should have a unified control, and in regard to the manufacture and use of airships it is absurd that there should be division of control. I have been speaking of these machines as war weapons. If you are spending £2,000,000 upon airships of this kind for war purposes, I think that is a policy which the Committee should never sanction.

Now I turn to a really much more important side of the question, which is the civilian use of this craft. Everybody knows that the airship possesses certain great advantages over the aeroplane. It possesses much greater endurance and a much greater lifting power. It can stop easily, after its speed, and all these qualities give it very great advantages. It can be navigated in bad weather, and can grope its way to its moorings, while under similar conditions the aeroplane is in constant danger. For these reasons the airship has got a very great commercial future. There is no doubt that there is a big commercial future for the airships which can contribute very materially to an advance in aviation, although in its capacity as a war weapon it is of no great importance. Nevertheless, as a means of testing the atmosphere and making experiments in the way of aerial navigation, there is no doubt that the airship has got a very great future before it.

I imagine I am right in saying that there is no collated information about the atmospheric conditions which make for the success or otherwise of the Atlantic flight. It is to the airship that we must look for giving us information of that kind, and for giving the necessary data for the Meteorological Department of the Air Ministry. But the airship is under the control of the right hon. gentleman and has nothing to do with the Ministry. What should be done by the Air Ministry with a unified control should be to make experimental flights over the routes which perhaps are destined to become the postal routes of the world. If you have the airships and the aeroplanes under one control, you may hope to make some advance, but if you have them under separate controls you cannot hope to do so.

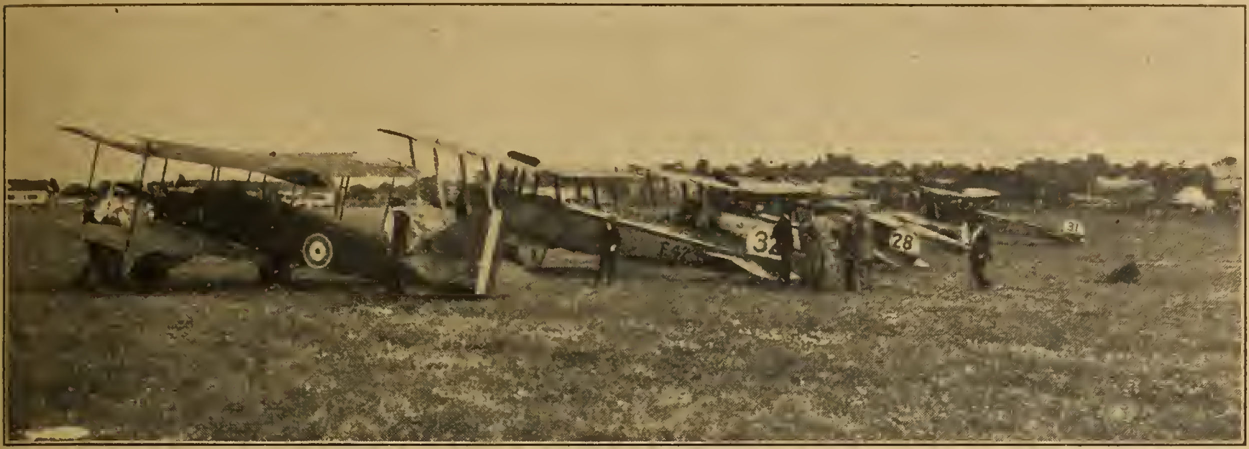
Lieut.-Colonel Moore-Brabazon: I want to say a word with regard to airships in general. We have come rather to the parting of the ways. The only possibility of any future for the airship from the military point of view is the substitution of one of the inert gases for the present highly inflammable gas, but that is a very difficult and expensive matter. We must remember now that aviation is to be found to be of use to this Empire, and I am serving on a Committee which is to see in what way we can help to link up our various Dominions by air service. Over long routes there is no doubt the airship will compare favourably with big aeroplanes in view of the enormous loads they can carry.

I wish to ask the right hon. gentleman two questions: The first is, whether he has any news as to the allocation to Great Britain of the big Zeppelins made in Germany that have been surrendered to the Allies. My second question is as to the policy to be taken by the Government with regard to airships in future.

Dr. Macnamara: On this question of airship policy I do not pretend to be able to speak with anything like practical knowledge, but for the moment, at any rate, the responsibility of the Admiralty for aviation is confined to the construction and maintenance, including repairs, of such rigid and non-rigid airships and airship stations as the Naval Staff desire for war services. The Director of Air Division looks after the requirements of the Navy, and maintains the necessary relations with the Grand Fleet, the Senior Naval Officers of Bases, the Air Council and the Admiralty Departments concerned. That is, for the moment, the shortest possible statement which I can make.

FLYING AT HENDON

There was a little better attendance at the London Aerodrome, Hendon, on Saturday afternoon, the occasion of the July Meeting. The event of the day was a 20-mile cross-country race over the usual course between the aerodrome and Bittacy Hill. The race consisted of five laps of this course, and at 4 o'clock the following starters lined up. Their handicap allowance is shown :—



"Flight" Copyright.

STARTERS IN HENDON'S AIR RACE ON SATURDAY: Left to right—B.A.T., piloted by Major Draper (winner); Avro, pilot Capt. D. H. Robertson, A.F.C.; Avro, pilot Major R. H. Carr, A.F.C., D.C.M. (second); G.-W. Bantam, pilot Capt. P. R. T. Chamberlayne (third) ; and Avro, pilot Lieut. G. R. Hicks, D.F.C.

Capt. P. R. T. Chamberlayne, G.-W. Bantam, 80 Le Rhone, scratch.
Maj. Draper, B.A.T. Baboon, 170 A.B.C., 37 secs.
Capt. D. H. Robertson, Avro, 110 Le Rhone, 47 secs.
Maj. R. H. Carr, Avro, 110 Le Rhone, 56 secs.
Lieut. G. R. Hicks, Avro, 110 Le Rhone, 1 min. 6 secs.

Lieut. R. E. Duke and Capt. H. A. Hamersley were non-starters.

Of the short races held at Hendon since the re-opening of the aerodrome to the public, this was, perhaps, the most interesting yet seen. It was certainly the most spectacular, for on the last lap Carr, who had hitherto been quite a respectable distance behind Draper who was leading on the Baboon, came on considerably and looked like winning the race. Draper had, however, just sufficient in hand to enable him to pass the finishing line first, and the result was as follows :—

	Handicap time			Handicap time.	
	m.	s.		m.	s.
Draper	15	41	Hicks	15	52
Carr	15	42	Robertson ..	16	11
Chamberlayne ..	15	46			

Draper undoubtedly won the race through skilful flying, his performance being very creditable from the moment he left the ground until he descended. He wasted no time

"Flight" Copyright.

The five pilots in Saturday's race at Hendon : Left to right—Capt. Robertson, A.F.C., Maj. Draper, Capt. Chamberlayne, Maj. R. H. Carr, A.F.C., D.C.M., and Lieut. G. R. Hicks, D.F.C.

"Flight" Copyright.

A bunch of four in the third lap in the race at Hendon on Saturday.

in turning or in getting any height, flying as he did very low over the whole of the course.

The first prize was the Hendon Trophy and the London Aerodrome Prize of £20, and the second prize was the London Aerodrome medal and prize of £10.

It was very gratifying to see that the demand for passenger flights was considerable, the enclosure next the flight booking office being practically filled with folk eager for their guinea trips. On Sunday this demand was continued, and all the Grahame-White machines were kept busy until late in the evening.

Flying at Sheffield

SHEFFIELD has been taking a great deal of interest during the past week as a result of the "flying week" arranged by Messrs. Vickers at the instance of the development committee. The four Avros at the Coal Aston aerodrome have been kept busy taking passengers, and the Vickers-Vimy was never without its full complement of 10 passengers when it went for a trip over the city. On July 24 the "Vimy," piloted by Capt. S. Cockerill, took a load of newspapers from Sheffield to Doncaster, and on Saturday the same journey was made with a bag of mails.

On July 25, Capt. Sir John Alcock and Lieut. Sir A. W. Brown were entertained to luncheon at the Vickers works, and were subsequently received by the Lord Mayor and Corporation and the Master Cutler at the Town Hall. In the afternoon they visited Coal Aston aerodrome and Capt. Alcock took the wheel of the Vickers-Vimy during one of her trips.

At Liverpool

THE Waterloo aerodrome on the banks of the Mersey was opened last Saturday. As usual a large crowd had collected, but with the aid of the mounted police they were kept in hand. From the air, the flying ground appeared as a yellow disc of sand surrounded by a black band of humanity, with three Avros in the centre.

Capt. E. Maitland Heriot, D.S.C., Lieut. Shanks and Maj. McMinnies, A.F.C., were the pilots, whilst Lieut. Bambridge, who had the distinction of losing the tail of his machine at 15,000 ft. in France, and descending on the top plane more or less successfully, was in charge of the ground operations. For four hours the machines were busy taking up passengers, and trips to Southport and Blackpool were in great demand.

At Other Centres

FLYING at Morecambe is now in full swing with Lieut. Macrae, M.C., in charge. Lieut. Moxon is established at Douglas, whilst Blackpool has excelled all records—over 1,000 passengers were taken last week. The weather has been perfect and the tides have not interfered with flying. We understand that the daily service to Manchester from Blackpool and Southport is beginning to pay its way, more and more passengers availing themselves of the air journey to the coast. The service has run daily for close on three months without even a forced landing to disturb the even tenor of its way, and there is every hope that August will prove a record. The time-table of this service reads as follows:—

Leave Blackpool daily, Sundays excepted ..	Noon.
Arrive Southport	12.15 p.m.
Arrive Alexander Park, Manchester	12.45 p.m.
Leave Alexander Park, Manchester	2 p.m.
Arrive Southport	2.30 p.m.
Arrive Blackpool	2.45 p.m.

The fare is £4 4s. single, and £9 9s. return.

◆ ◆ ◆ ◆

Prince Albert at Crayford

ON July 23 Prince Albert paid a visit to Crayford in order to re-open the Princess' Theatre in connection with Vickers' works. In the reconstruction of the theatre, which was burnt down in 1916, the former design and decoration scheme has been followed.

Mr. Douglas Vickers presided, and among those present were the Countess of Limerick, Miss Shortt, the Hon. Mrs. Douglas Vickers, Sir Trevor Dawson and Lady Dawson, and Sir Vincent Caillard.

Prince Albert, in opening the theatre, said that not many people had realised what a vast amount of labour to win the war had been done by workers of big firms like Vickers, and their thanks went out to them. We had always been the leading industrial nation of the world, but we were going to have to fight, and it was on the workers more than ever that we depended to secure that end. Only by hearty co-operation between employer and employed could we hope to win through.

During the evening Sir Trevor Dawson presented gold watches, on behalf of Messrs. Vickers to Capt. Sir John Alcock and Lieut. Sir Whitten Brown to commemorate their flight across the Atlantic. A diamond and emerald brooch in the form of a Vickers' aviation badge, was also presented to Miss Kennedy, Sir Whitten Brown's fiancée.

For the opening performance there was an augmented orchestra conducted by Mr. Kendall Grimston, and among those who contributed to the programme were Mr. Albert Sammons, Miss Sterling MacKinlay, Miss Dorothy Varick, Mr. George Baker, Miss Ethel Walker, and Mr. F. A. W. Docker.

Cross Country Races from Hendon

AFTER the events at Hendon on Saturday, Sunday and Monday next, the weekly races will be suspended until the Hendon-Brighton-Hendon race which is provisionally fixed to take place on Saturday, August 30. The Hendon-Manchester-Hendon race will probably take place on Saturday, September 20.

Vickers Workers and Atlantic Prize

ONE of the first acts of Capt. Sir John Alcock and Lieut. Sir A. W. Brown, when they received the £10,000 *Daily Mail* prize for crossing the Atlantic was to set aside £2,000 for distribution among the employees at the Vickers works at Weybridge, who helped to produce the Vickers-Vimy machine. The firm has now decided to augment the amount until it is sufficient to pay one week's wages to all employees at the works. Hence, when the works close for a week early in August they will receive payment for the holiday.

Great efforts are being made to repair the famous "Vimy" by Vickers' sports day, August 23. Capt. Sir John Alcock is expected to fly it to the sports ground at Byfleet.

Mr. Raynham Back

MR. F. P. RAYNHAM, the pilot of the Martinsyde machine entered for the Transatlantic Prize arrived at Woking on Monday, and met with an enthusiastic reception at the works. His misfortunes have in no way dimmed his faith in long-distance flying, although he admits that he has learnt a lot from them as well as from his rivals' success. Now that the Atlantic has been flown he thinks the next thing to do is to make the crossing reasonably safe. His opinion is that the most practical form of machine for the purpose is a flying-boat capable of weathering heavy seas. This will call for greater engine power and machines of much greater carrying-capacity than the biggest machines of the present time.

THE BRITISH SCIENTIFIC PRODUCTS EXHIBITION, 1919

IT has often been said that the war just ended was an engineers' war. While this is undoubtedly true, the claim should, we think, be extended by including the industrial world generally as part of that "engineers' war." Especially does this apply as regards aviation. From a small nucleus of aircraft constructors with which the War was started, the aviation industry has spread to all conceivable branches and forms of industry; from the armament firms down to the makers of tintacks. Indeed, it would be difficult to call to mind a single industry which has not directly or indirectly been drawn upon by the manufacturer of aircraft and its equipment. The high state of perfection to which British aircraft has attained during the War is in no small measure due to a closer co-operation of scientific knowledge and industrial enterprise than ever existed before the War, and the necessity of continuing this alliance after the War is undoubtedly most essential if Britain is to maintain her leading place in the markets of the world.

There is always the danger that this fact may be lost sight of, and that industry may drift back into the old grooves. This is not so much due to indifference of manufacturers as it is due to neglect of their interests by the State, or to lack of support of home products by the public. Inasmuch as the British Scientific Products Exhibitions, organised by the British Science Guild, have for their object the stimulation of the development of industry through the intelligent application of scientific knowledge and method, they should be welcomed by manufacturers and the public alike, and it should be realised that they are of the greatest value to the country. The exhibition held at King's College last year was a most convincing representation of the advantages of close cooperation of scientific knowledge and industrial enterprise. It is to promote the industries established during the War and to stimulate the development of other industries dependent upon the applications of science that the second British Scientific Products Exhibition has been organised by the British Science Guild. As King's College was not available for the purpose this year, the exhibition is held at the Central Hall, Westminster. It is open on week-days from 11 a.m. to 7 p.m., and on Saturdays from 12 a.m. to 9 p.m. The exhibition, by the way, closes on August 6, and we should advise our readers to keep this in mind so as not to miss the opportunity of visiting what is undoubtedly one of the most interesting and instructive shows of the year. The entrance fee is so small as to be within the reach of all—one shilling.

With regard to the exhibits, these include an enormous variety, all of which claim attention, but naturally we must confine ourselves to those relating directly to aircraft. We would point out, however, that visitors chiefly interested in aviation should not by any means take it for granted that all the forms of industry connected directly or indirectly with aviation are represented only in the aircraft section, but that many of the exhibits shown in other sections bear very directly upon matters connected with aircraft construction. Thus, to mention only one instance out of many, the metallurgy section will be found of the very greatest moment to those who are more than superficially concerned in the materials employed not only in aircraft engines, but also in many parts of the aircraft itself.

Space does not permit of giving a complete catalogue of all the various exhibits in the aircraft section, but some idea of the nature of the exhibition may be given by referring briefly to the more important items.

The Airship exhibits, in addition to a number of photographs and diagrams of airships of the rigid and non-rigid types, include a model of R 34, and a great number of instruments and appliances used on board an airship, Thus one may mention cooking apparatus heated by the exhaust gases from the engines, Proto gear for the use of men working in the gas space of an airship, safety lamps for use in spaces where there may be a mixture of hydrogen and air. In addition there are samples of navigation instruments of various types, while a reminder of the martial activities of airships during the War is provided by a course setting bomb sight. Depending from a girder of a rigid airship is a fabric water ballast bag, while the non-rigid type of airship is represented by among other items, ripping panels, rigging cables and patches, etc. There is also a comprehensive collection of airship envelope fabrics with different kinds of painting, etc.

The A.I.D. is well represented by specimens of good and bad aircraft timbers, samples of aeroplane fabrics with data relating to weight and strength, etc., samples of doping, good and bad, and moisture determinators for aircraft timbers. It is not, perhaps, generally known that X-rays photography has been called into service for the determination of defects in wooden aircraft parts, located internally in the wood where they could not otherwise have been detected. A series of X-ray photographs illustrate very convincingly how this can be, and has been, done, in many cases with a probable saving of the lives of officers who would have manned the aeroplanes into which the faulty part would otherwise have been built. The Gauge Department of the A.I.D. shows a variety of types and sizes of gauges used in the construction of engines and 'planes, the gauges being manufactured by a number of different firms.

The different types of aero engines are represented by the exhibition of various engines and parts. Thus there is a complete Rolls-Royce Eagle VIII, component parts of a R.R. engine, a section model (two cylinders only) of a 90 h.p. R.A.F. engine, parts in various stages of manufacture of a Wolseley-Viper, parts of Gnome, Le Rhone, and B.R. 2 engines, three stages of manufacture of a Dragonfly cylinder, and a section of a cylinder, piston and connecting-rod of a Cosmos "Jupiter" engine. A variety of magnetos is also shown. Samples of castings, die castings and other forms, some of a very intricate nature, give a good idea of the perfection to which this form of metal work has attained of recent years.

It is a sign of the times that metal construction of aeroplanes is extremely well represented. A great number of metal spars and wings, some of the latter of the all-metal type, while others are of a composite nature, being made up of metal spars and wood ribs, is exhibited. There are, to mention a few at random, metal spars by firms such as Dunlop, Rudge-Whitworth, Vickers (the latter both in steel and duralumin), Boulton and Paul, and the Steel Wing Co. Many of these spars, especially the later types, show not only a smaller weight per linear foot than the corresponding wooden spar, but also a considerable increase in strength, in some cases this increase amounts to over 50 per cent. Built-up metal struts are also shown, which give good results. Most of these spars, wings and struts were dealt with by Dr. Thurston, in his recent excellent paper read before the Royal Aeronautical Society (which was published in FLIGHT at the time), and the principle of their construction will, therefore, be known to our readers. Many little constructional details cannot, however, be shown adequately in illustrations, and a visit to the exhibition will, therefore, enable readers to examine for themselves these wonderful specimens of the metal constructor's art. While on the subject of metal construction, it should be mentioned that, while the foregoing refers to built-up sections manufactured in most instances from metal in sheet form, there is a very extensive exhibition of tubular metal work, in which the well-known firm of Accles and Pollock is well represented.

The National Physical Laboratory is represented by a small wind tunnel (about 2 ft. diameter) fitted complete with fan, balance and models to be tested. To those who have not had the opportunity of visiting the N.P.L. at Teddington, this small wind channel gives a very good idea of the way in which model data relating to the air forces on parts and complete machines are obtained. Of equally great interest proves a small water channel in which the streamline flow of water past objects placed in the channel is shown by injection of a coloured liquid. The exhibition of these channels, although appearing very elementary to the initiated, cannot fail to prove of the greatest educational value where the general public is concerned, affording as it does an excellent demonstration, although in a small way, of the kind of research work which has done so much to place British aviation in the position where it is to-day.

Needless to say the exhibits in the Aircraft section include a great variety of instruments, such as navigation instruments, cameras, wireless telegraphs and telephones, oxygen apparatus, etc. The space available does not permit of any firm exhibiting complete machines, but the Aircraft Manufacturing Co. are showing a set of excellent scale models, so accurately made that they give a very good idea of the actual machines. They include models of a D.H. (Airco) 6, D.H. (Airco) 9, D.H. (Airco) 9A, and D.H. (Airco) 10A.

There is a great number of other interesting items to be seen at the exhibition, and we would strongly urge those of our readers who can possibly manage to do so to pay a visit to the exhibition. It will not be regretted. And we would again remind our readers that the exhibition closes on August 6.

U.S.A. NAVY F-5-L FLYING BOAT*

The F-5-L boat seaplane is a twin-motored tractor biplane, having a total flying weight of nearly 7 tons, a cruising radius of 10½ hours as a fighter, or 8½ hours as a bomber. It carries a military load of over 1,400 lb., with a crew of four men. This machine is a formidable engine in naval war craft, and it is so designed that it may be quickly and efficiently made under war conditions.

In the case of this machine the United States Navy, as did the Army, took a foreign design and modified it to meet American production methods. It is interesting to note, however, that in this particular case the English design had been based upon an American model, the large Curtiss flying-boat—the H 12—which was the forerunner of both the H-16 and the F-5-L.

The F-5-L is a somewhat larger machine than either the H-12 or the H-16, and is capable of carrying a greater useful load. It was originally developed at Felixstowe, and the name "F-5" was chosen to denote the English experimental seaplane factory at Felixstowe ("F"), and the model number design in machine ("5"). The United States Navy added the letter 'L,' indicating that, as built in U.S.A., it is driven by Liberty engines.

The lines, overall dimensions and main constructional features were worked out in England, and an experimental plane was constructed there. The details with many modifications were worked out at the Naval Aircraft Factory, Philadelphia, to correspond to its production methods. The planes were then put into production at that and other factories, such changes from the first drawings being made as they were found necessary by tests.

Fundamentally the plane is similar to the American Curtiss flying-boats—particularly the H-16 model. But in size and details it is quite different, being larger and better fitted to emergency production. For example, with few exceptions the fittings are soft sheet steel, cut from flat patterns and bent to shape. This obviated the necessity of dies and drop forgings, which are particularly difficult to obtain under war conditions. The struts, likewise, are uniform sections, that is, not tapered, so that they can be shaped with a minimum of hand labour. Throughout, the parts are such that duplication is easy, production methods possible, and readily available equipment suitable

The most noticeable feature in the F-5-L is the degree to which the hull or boat has been streamlined. The hull cover sweeps aft, broken only by the cockpit openings. From an aerodynamic standpoint this is more efficient than the construction of the H-16, where a raised cabin is used. On this model, as on the H-16, the fin edges are continued aft, and join into the lower *longeron*, giving a much stronger and better streamline form. Another feature in the hull construction that is noteworthy is the use of veneer instead of linen doped and painted on the after hull sides. It was found in practice that the linen failed in heavy seas or on a bad landing, but this failure was obviated by the use of veneer.

The specifications herewith will give some idea of the size and capacity of this seaplane. It will be noted that the lift, per square foot of surface is from 9.3 to 9.5 lb. per sq. ft., and is somewhat greater than land practice.

Overall span (top plane)	103 ft. 9½ ins.
Overall span (lower plane)	74 ft. 4 ins.
Overall length	49 ft. $3\frac{11}{16}$ ins.
Overall height	18 ft. 9¼ ins.
Hull beam	10 ft. 1¼ in.
Chord (H-12 curve)	8 ft.
Gap	8 ft. 10½ ins.
Angle of incidence	3° 40′
Dihedral	1° 30′
Angle of incidence of tail	2° 30′
Areas	
Top plane (including *ailerons*)	848 sq. ft.
Lower plane	546 sq. ft.
Ailerons (two)	118 sq. ft.
Total of main planes	1,394 sq. ft.
Main plane fins	30 sq. ft.
Gross weight	13,659.5 lb.
Useful load (1,405 lb. military load)	5,224 lb.
Loading per sq. ft.	9.5
Power plant	Two 330 h.p. Liberties.
Speed range	57-90 m.p.h.
Climb	2,600 ft./10 mins.

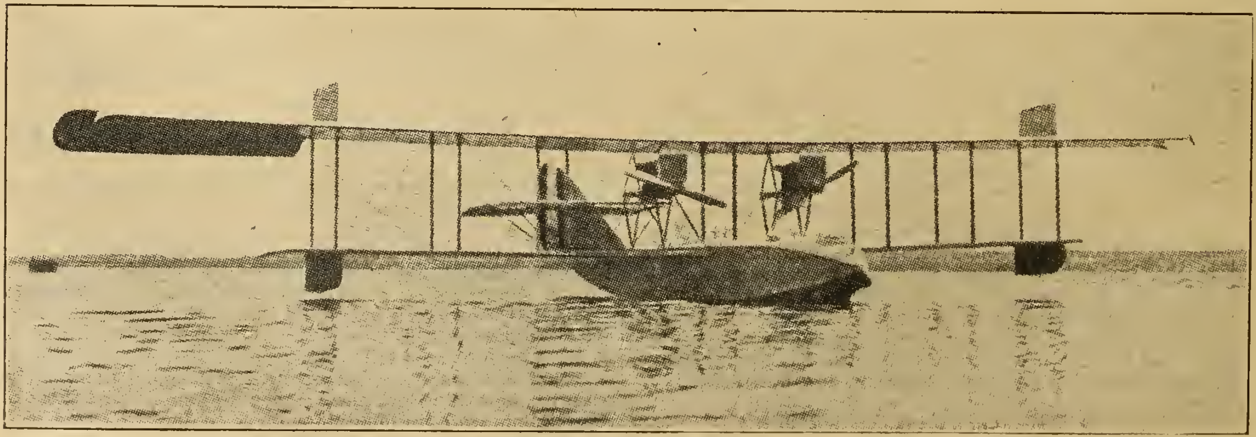
With few exceptions, all large seaplanes have been previously built with unbalanced control surfaces. However, on the F-5-L both the *ailerons* and rudder are balanced. The purpose is, of course, to increase the controllability of the unit, and in the case of the *aileron* control the result is as anticipated. Differing from the usual control surface balance construction, the balance on these *ailerons* is cambered so that it has a positive lift. By this construction the *ailerons* tend to be more sensitive in their action and to operate with less difficulty and with less balance surface.

The planing action is increased by the use of vents extending through the hull aft of the rear steps. Although the cabin top over the pilot's cockpit is eliminated, a certain amount of protection is afforded the pilot by small adjustable windshields.

The whole lay-out of the machine is such that the duties of the crew may be most readily carried out. The observer's cockpit is in the nose of the machine, and from it the widest range of vision is possible. At the bow is mounted the bomb sight, and adjacent to it are the bomb-release pulls, ammunition racks, signal pistols, binoculars, etc. A machine-gun turret is mounted on the scarf-ring of the forward cock-pit.

The pilot's cockpit is just aft the observer's cockpit, and may be readily reached from it when the machine is in operation. The pilots are seated on comfortable seats, hinged on a bulkhead and attached to a transverse tube by means of a snap-catch that may be instantly released. This permits the observer to pass aft at will without disturbing the pilot.

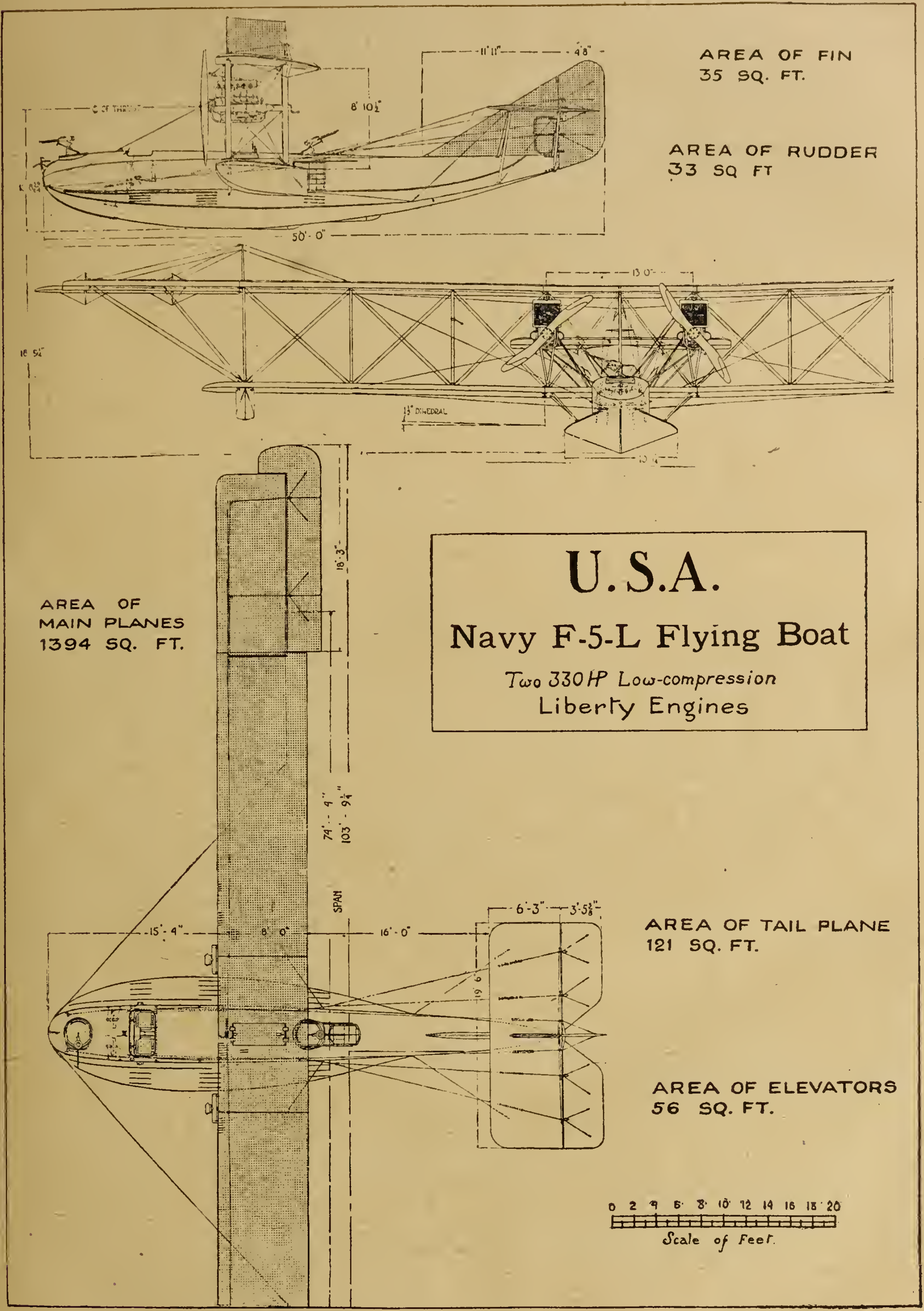
A wheel control of the dual type is used. It comprises a laminated ash yoke on which are mounted the two *aileron*



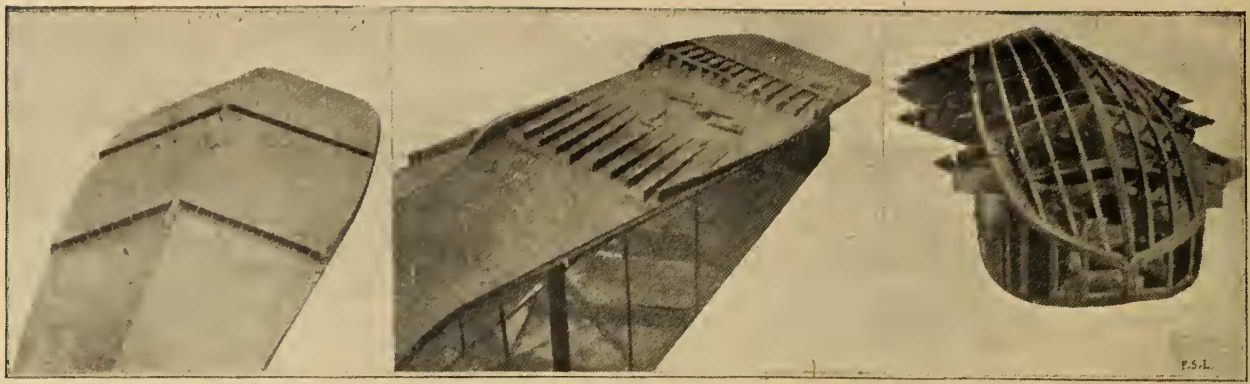
Three-quarter front view of the U.S.A. Navy F-5-L flying-boat

---

* Extracts from an article by S. T. Williams, Chief Engineer, U.S. Naval Aircraft Factory, appearing in *Automotive Industries* (U.S.A.).



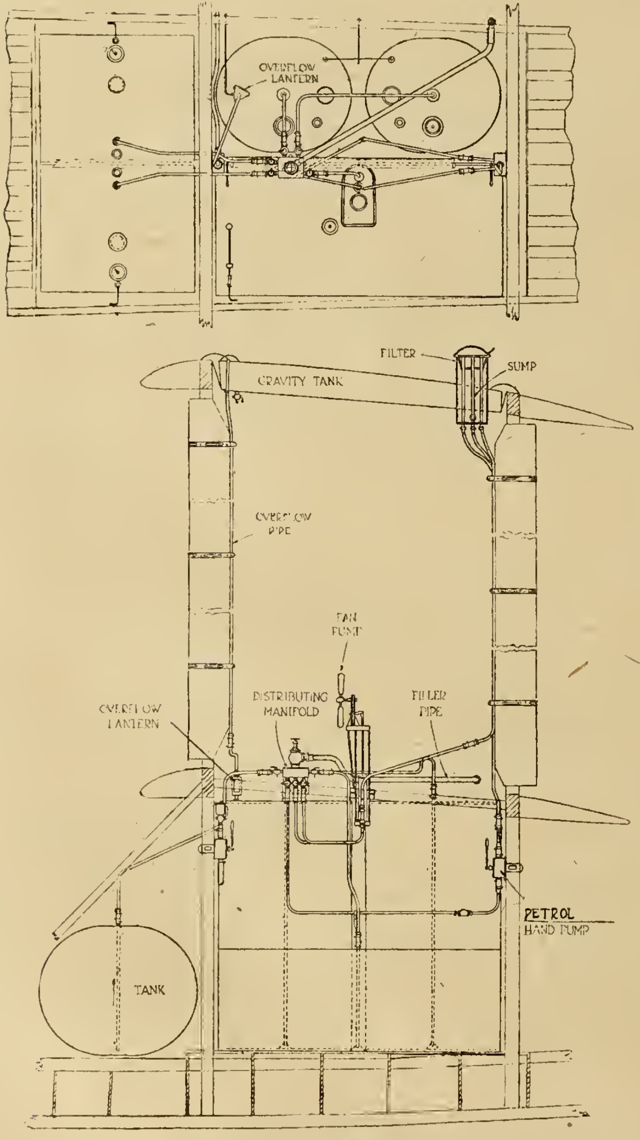
THE U.S.A. NAVY F-5-L FLYING-BOAT. Plan, front and side elevations to scale



Three views showing the construction of the hull of the F-5-L flying-boat

wheels connected by an endless chain. An instrument-board, containing tachometers, alimeters, air-speed indicator, oil-pressure indicators, inclinometer, and pilot-directing bomb sight is mounted directly in front of the pilot.

On the starboard side of the hull are the individual engine switches, ammeters and emergency switches, together with the circuit breakers. The two compasses are mounted at some distance apart, so that they cannot interfere with each other. One is on the deck and the other on the floor. All instruments are self-luminous, but instrument-board lights are provided. The spark controls are at the starboard side of the starboard pilot's seat, but the throttle controls are between the two pilots, so that either may operate them. Fire extinguishers are placed conveniently at each station, those in the pilot's cockpit being attached to the bulkhead beneath the seat. The wireless operator's station is on the starboard side, just aft the pilots. The equipment is mounted on a small veneer table, and used in conjunction with a telescopic mast that is carried in the stern. A celluloid window in the hull side provides necessary light. The mechanics' station is amidships by the petrol tanks and pumps, and their main duty is to see that the plane is "trimmed" by pumping petrol from the tanks alternately; to see that the engines do not overheat, and that all parts function properly. The water and oil thermometer are mounted on the sidewalk beam adjacent to the mechanics' station.



Diagrams of the fuel installation on the F-5-L flying-boat

Aft the mechanics' station, or wing section, is the rear gunner's cockpit. Three guns are accessible from this station, and it also provides a good point of observation or position for aerial photography. All machines are equipped with inter-communicating telephones, the receivers being incorporated in the helmets and connection effected by terminal boxes at each station. It is thus possible for all members of the crew to be in constant communication. In addition to the equipment indicated, the following are some of the miscellaneous items usually carried: tool kits, water buckets, range and running lights, pigeons, emergency rations, drinking water, medicine chest, sea anchor, chart board, mud anchor, anchor rope, heaving lines, signal lamp, binoculars, Very's pistol, ammunition, life jackets, and possibly electric warmers. Included also are the priming cans, drinking cups and usually several personal items. All this is exclusive of the ordnance equipment of bombs, machine guns, etc.

Considering the size of the machine and the amount of material carried, the performance is quite remarkable. In fact, it compares very favourably with the performance of land planes having the same specifications and not hampered by the heavy boat construction. The time required to get the machine from the water varies with the wind velocity, but with a 15-mile wind and the plane fully loaded, from 30 to 40 sec. is required. The speed at take-off is about 47 knots on the air-speed indicator, and a machine of this design has made a climb of 4,200 ft. in 10 mins. A horizontal speed of from 85 to 90 m.p.h. is attained, but on patrol duty they are generally flown at a more economical speed, such as 70 m.p.h. When geared Libertys were tried out in one of these machines a speed of 102 m.p.h. was attained, but this was a special power-plant equipment. The engine revolutions are about 1,500, though this, of course, varies with the types of propeller used. At full speed the petrol consumption is about 65 galls. per hour, and the oil consumption about 2.6 galls. per hour. By throttling down the engine to 1,350 r.p.m., or to a speed of about 60 knots, the petrol consumption per hour is reduced to 44 galls., the oil consumption remaining the same. This gives a maximum cruising time of 10.6 hours with a light machine, or 8½ hours fully loaded. The cruising time at full speed is 7.3 hours and 5.9 hours respectively.

The advantages of operating at cruising speed are many, and it is at this speed that the plane is chiefly operated. Among the advantages are increased engine life, greater ease of control, longer cruising radius, less strain on plane parts, and time for more extended observation. When running at full speed, control is not particularly easy, though under normal conditions one pilot can operate the machine without difficulty. However, the reserve control is necessary to lift the machine from the water, and in cases of emergency, though not ordinarily used.

(To be concluded.)

AIRISMS FROM THE FOUR WINDS

A well-deserved recognition of the services rendered during air-raids has been made by Southwark, the Mayor of that Borough having last week presented 91 medals to Volunteers.

– – –

Ilford has a local War-trophies museum of its own, and the local air-raid syren is one of the honoured items which has found a resting-place amongst the evidences collected of Hun beastliness.

– – –

If all the theatrical setting is necessary, which has accompanied a mid-air wedding in New York last week-end, most folk will probably think it better to remain single. That any sane people, or any decent cleric, can be found to participate as principals in absurdities of this kind must be attributed to the aftermath of the effects of war. As a scientific stunt of the Barnum order this most recent marriage by wireless telephony, supplemented by megaphone obbligato for the benefit of the bride and bridegroom's guests, the affair might pass muster. But as a serious and solemn ceremony the sooner this sort of fooling is rendered illegal the better.

–

Fooling of this type is hardly likely to obtain much vogue in Switzerland, where the latest enactments of this close-borough Federal Council not only places somewhat penal responsibilities upon all foreign aviators, but positively forbids "stunts" of any kind. One comfort, at best Switzerland hardly lends itself to flying as a pastime, in the ordinary sense.

– – –

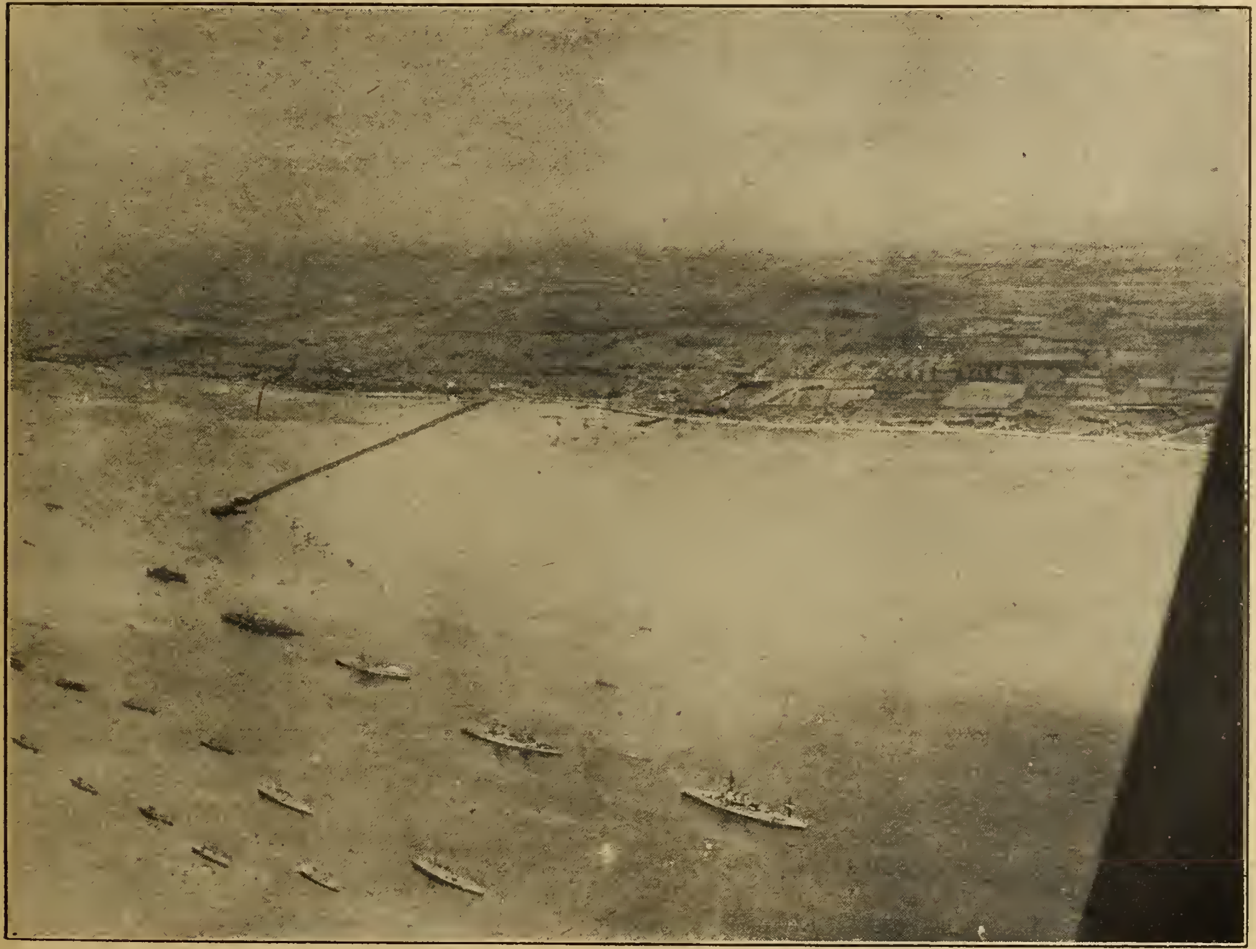
In Paris no less than four Commissions are about to get busy estimating and arranging compensation for the damage suffered by the Gay City's inhabitants from bombardments by aeroplanes and long-range guns during the War. There this sort of trouble is treated as National, and the Huns are being called upon to liquidate the bill. Wonder what is being done this side of the streak, in the same direction ?

– – –

From the scene of operations in the region of the Northern Dvina the Bolshies military report of July 25 tells the same old, old story that "an enemy aeroplane dropped 17 bombs without causing any damage." We only hope the laying of these 17 eggs effected, relatively, as much damage as the hundred or so of bombs dropped in London, etc., did, which officially were at the time reported as resulting in "no damage."

– – –

Nothing like getting in early ! The first strike of aerial mail pilots—male ones—has taken place and been settled. It appears it was started on July 25 in New York because the Post Office Department refused to reinstate two pilots discharged for refusing to ascend recently in a fog, the New York—Chicago aerial mail being the service most affected. It was brought to a temporary happy conclusion the next



"Flight" Copyright.

OUR FLEET IN THE THAMES ON VICTORY DAY: A view, from an aeroplane, of a portion of the Fleet off Southend, and showing the town of Southend and the Pier.

day by the promise of a conference with the Washington postal authorities. All the same, it's a bit early in aviation history to start emulating the irresponsible "down tools" brigade, and we shall await further details as to that exact order "to ascend in a fog," which might put a very different complexion upon the whole incident.

* * *

QUITE a nice little batch of 300 decorations were conferred by the General-in-Chief of the R.A.F. at the R.A.F. Investiture in the quadrangle at Buckingham Palace one day last week. Prince Albert, who is a captain in the Force, accompanied King George, and there were many very notable recipients who were present to receive their reward for heroic war deeds.

* * *

Is it a direct result of R. 34's double Atlantic crossing, that large dirigibles for service with the American Navy are to be pushed on. In announcing this speeding up Admiral Benson, Chief of Naval Operations, said that Congress had authorised the construction of large hangars and the construction or purchase of two large dirigibles. "We are going ahead," he said, "with this important development. At the outset our large dirigibles will be used for experimental purposes."

He added that the work of construction of the hangars will be rushed at top speed so that the first dirigible may be "laid down" at the earliest possible moment.

* * *

A MYSTERIOUS "mono" has apparently made its appearance in London. Recently "Perplexed" asked through a Londoner's Diary "what was the breed of the huge bird that took up its position about 8.30 p.m. one day last week on the top of the gilded cross of St. Paul's Cathedral.

"It remained there till 9 o'clock next morning," 'Perplexed' continues, "and was watched by many hundreds of people from the G.P.O., and by the St. Paul's shop residents. It was shot at twice, but that did not disturb its repose.

"It had a huge beak, like an eagle's, and a short, thick neck, and its wings when opened out appeared to be about 15 ft. or 17 ft.

"It was thought that it might have escaped from some private aviary.

"I cannot identify the fowl from this description. Possibly it was the German eagle taking one long, last, disappointed look at London, and muttering, '*What* a city to loot!'"

If this sort of thing continues, the sea serpent will soon have to look to its laurels.

* * *

MR. A. G. BARKER, of Green Lanes, has views about airship nomenclature. R. 34 and N.S. 106 and similar signs are hardly attractive, and Mr. Barker suggests as alternatives, such identifying names as "Columbus II" or "The Aerial Columbus." We quite agree with this critic that "the present system of continuous numbering will not do at all," but at the same time we hope something more original and attractive than the "Columbus" suggestion may materialise.

* * *

MR. WINSTON CHURCHILL has imagination without doubt, and for that reason he is a welcome head to the Air Ministry, although we have in no way lessened our objections to the dual control position at present existent. Mr. Churchill, nevertheless, upon every suitable occasion is to the fore with the importance of the R.A.F., both in the present and in the future. Last week he once again emphasised his belief in the effectiveness and the economy of our Air Force, when replying to a question in the House by Lieut.-Commdr. Kenworthy, who was desirous of knowing what our future policy was in regard to the Army of Occupation in Mesopotamia. The Government's future policy, said the Air Minister, was "to keep down the Army as much as possible, and it was hoped to make considerable use of the Air Service with the view to economising troops."

* * *

MOSQUITOES—in North Carolina, at any rate—will begin to wish that flying had never been invented, for man-made insects are invading their territory, with a view of their—the mosquitoes'—eventual extinction. The U.S. Navy Department recently sent out Ensign Van Court on an aeroplane along the coast of North Carolina, near Morehead City, to spy out the breeding-places of mosquitoes. Once these are located the sanitation engineers do the rest.

* * *

THE latest thing from the land of stunts is rather—er—well!! It consists of a boxing bout in an aeroplane above Camp Dix, N.J. The boxers will be belted within a miniature "ring" in the tonneau of a large bombing 'plane, whilst the referee and timers will occupy another 'plane flying alongside. Nothing is said about the seconds. No doubt they will "drop in" by means of Guardian Angel parachutes.

AVRO FLIGHTS AT SOUTHPORT: Captain Collison landing after a popular guinea circuit of the town

◆ ◆ ◆ ◆

A Trial in Portugal

EVIDENTLY aviation is being seriously considered in Portugal, as word comes that a competition over the course Lisbon-Oporto-Vianna-Lisbon is being organised as a test for selection of machines in the flight of over 2,000 miles from Lisbon to Guinea.

Up-to-Date Bolshies in Portugal

BOLSHEVISTS in the villages round Lisbon are said by the local newspapers to have made an attempt to get possession of an aviation school and to be manufacturing bombs. It is added that a police investigation of the matter is being conducted.

INTERNATIONAL AIR NAVIGATION CONVENTION

In our last issue we reproduced the International Air Navigation Convention, drawn up in Paris, and this week we deal with the annexes. In the main, the details of the regulations are similar to those for civilian flying in the United Kingdom, published in Flight, of May 8, 1919, and in such cases we have not reprinted them *in extenso*, but have only pointed out where they differ from the English regulations. Therefore the following should be read in conjunction with a copy of Flight, May 8.

ANNEX A.

The Marking of Aircraft

I.—General.

(*a*) The nationality mark will be represented by capital letters in Roman characters, *e.g.*,

France.................. F.

The registration mark shall be represented by a group of four capital letters; each group shall contain at least one vowel, and for this purpose the letter Y shall be considered as a vowel. The complete group of five letters shall be used as a call sign of the particular aircraft in making or receiving signals by wireless telegraphy or other methods of communication, except when opening up communication by means of visual signals, when the usual methods will be employed. The nationality and registration marks are assigned in accordance with the table contained in section VIII. of this Annex.

(*b*) On aircraft other than State and commercial, the registration mark shall be underlined with a black line.

(*c*) The entry in the register and the certificate of registration shall contain a description of the aircraft and shall indicate the number or other identification mark given to it by the maker; the nationality and registration marks mentioned above; the usual station of the aircraft; the full name, nationality, and residence of the owner and the date of registration.

(*d*) All aircraft shall carry affixed to the car or to the *fuselage* in a prominent position a metal plate, inscribed with the names and residence of the owner and the marks of nationality and registration.

Certificate of Registration.

(*Provisional Form.*)

Nationality....................	Maker........................
Nationality mark	Maker's number................
Registration marks	Description...................
Date of registration	Owner's full name.............
Type of aircraft.... { Tourist ..	Owner's residence.............
Commercial	Owner's nationality...........
State	Station of the craft..........
Signature and seal of authority issuing this certificate }	....

[Sections II., III., IV., V., VI., VII., are as in Schedule IV. of the British Regulations.]

VIII.—Table of Marks.

The nationality mark of the State named below applies to the aircraft of its Dominions, Colonies, Protectorates, Dependencies, or of countries of which it is the Mandatory State.

Country.	Nationality Mark.	Registration Marks.
U.S.A.	N	All combinations made in accordance with the provisions of Section I. (*a*) of this Annex, using a group of 4 letters out of the 26 of the alphabet, each group containing at least one vowel, *e.g.*, ADCJ, PURN.
British Empire ..	G	
France	F	
Italy	I	
Japan	J	
Bolivia	C	All combinations made with B as first letter.
Cuba	C	All combinations made with C as first letter.
Portugal ..	C	All combinations made with P as first letter.
Roumania ..	C	All combinations made with R as first letter.
Uruguay ..	C	All combinations made with U as first letter.
Czecho-Slovakia ..	L	All combinations made with B as first letter.
Guatemala ..	L	All combinations made with G as first letter.
Liberia	L	All combinations made with L as first letter.
Brazil	P	All combinations made with B as first letter.
Poland	P	All combinations made with P as first letter.
Belgium	O	All combinations made with B as first letter.
Peru	O	All combinations made with P as first letter.
China	X	All combinations made with C as first letter.
Honduras ..	X	All combinations made with H as first letter.
Serbia-Croatia-Slavonia ..	X	All combinations made with S as first letter.
Haiti	H	All combinations made with H as first letter.
Siam	H	All combinations made with S as first letter.
Ecuador	E	All combinations made with E as first letter.
Greece	S	All combinations made with G as first letter.
Panama	S	All combinations made with P as first letter.
Hedjaz	A	All combinations made with H as first letter.

ANNEX B.

Certificates of Airworthiness

The following main conditions govern the issue of certificates of airworthiness:—

1. The design of the aircraft in regard to safety shall conform to certain standard minimum requirements.

2. A satisfactory demonstration must be made in flying trials of the actual flying qualities of the type of aircraft examined, provided that machines subsequently manufactured which conform to the approved type need not be subject to such trials. The trials shall conform to certain standard minimum requirements.

3. The construction of every aircraft with regard to workmanship and materials must be approved. The control of the construction and of the tests shall be in accordance with certain standard minimum requirements.

4. The aircraft must be equipped with suitable instruments for safe navigation.

5. The standard minimum requirements of paragraphs 1 to 3 inclusive shall be fixed by the International Commission for Air Navigation. Until they have been so fixed each contracting State shall determine the regulations under which certificates of airworthiness shall be granted or remain valid.

ANNEX C.

Log Books

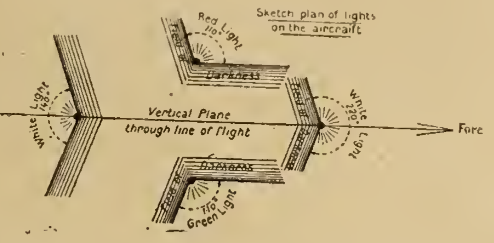
[The particulars regarding entries are the same as in Section V. of the British Supplementary Air Regulations. *See* Flight, May 8.

It is pointed out that the journey log shall be kept for all aircraft; that the aircraft log, engine log and signal log are obligatory only in the case of aircraft carrying passengers or goods for hire.]

ANNEX D.

Rules as to Lights and Signals
Rules of the Air

[This is the same as in Schedule VII. of the British Regulations with the exception that a sketch is given, showing the angular limits laid down in the rules. These limits shall be determined when the aircraft is in its normal attitude for flying on a rectilinear horizontal course. Metric measurements are given instead of British, *i.e.*, 2 metres instead of 6 feet; 3 kiloms. instead of 2 miles.]



[In Section II. Rules as to signals, there is a new rule 18, and the British Regulation 18 has been reworded. The new rules are as under.]

18. To warn an aircraft that it is in the vicinity of a prohibited zone and should change its course, the following signals shall be used:—

(*a*) By day: three discharges, at intervals of 10 seconds, of a projectile showing, on bursting, white smoke, the location of the burst indicating the direction the aircraft should follow.

(*b*) By night: three discharges, at intervals of 10 seconds, of a projectile showing, on bursting, white stars, the location of the burst indicating the direction the aircraft should follow.

19. To require an aircraft to land, the following signals shall be used:—

(*a*) By day: three discharges, at intervals of 10 seconds, of a projectile showing on bursting black or yellow smoke.

(*b*) By night: three discharges, at intervals of 10 seconds, of a projectile showing on bursting red stars or lights.

In addition, when necessary to prevent the landing of aircraft other than the one ordered, a searchlight which shall be flashed intermittently shall be directed towards the aircraft whose landing is required.

22.—(*a*) In the event of fog or mist rendering aerodromes invisible, their presence may be indicated by a balloon acting as an aerial buoy and/or other approved means.

(*b*) In fog, mist, falling show or heavy rainstorm, whether by day or night, an aircraft on the water shall make the following sound signals with a sound apparatus:—

(1) If not anchored or moored, a sound at intervals of not more than two minutes, consisting of two blasts of about five seconds duration with an interval of about one second between them.

(2) If at anchor or moored, the rapid ringing of an efficient bell or gong for about five seconds at intervals of not more than one minute.

III.—Rules of the Air.

[These rules are similar to the British rules, except that two new rules dealing with risk of collision, are inserted after the British rule 20 (22 in the International rules). These new rules are as follows:—]

23. Risk of collision can, when circumstances permit, be ascertained by carefully watching the compass bearing and angle of elevation of an approaching aircraft. If neither the bearing nor the angle of elevation appreciably change, such risk shall be deemed to exist.

24. The term "risk of collision" shall include risk of injury due to undue proximity of other aircraft. Every aircraft that is required by these rules to give way to another to avoid collision shall keep a safe distance, having regard to the circumstances of the case.

[Rules 25 to 34 are similar to the British rules 21 to 30.
Rule 35 same as British rule 31.]

V.—Rules for Air Traffic on and in the Vicinity of Aerodromes.

[Rules 36 to 48 are similar to the British rules 32 to 44, except that a white flag (instead of blue) shall be used to indicate a right-handed circuit (Rule 36), and the distances and dimensions are given in metric equivalents.]

VI.—General.

[Rules 49 to 51 are similar to the British rules 45 to 47.]

ANNEX E.

Minimum Qualifications necessary for obtaining Certificates as Pilots and Navigators

I.—Certificates for Pilots of Flying Machines.

(*A.*) *Private Pilot's Flying certificate.*

(Not valid for purposes of public transport.)

[These are similar to the regulations for "A" Private Pilot's Flying Certificate in the British Supplementary Air Regulations, with the exception that a practical knowledge of international air legislation is required.]

(*B.*) *Pilot's Flying Certificate for Flying Machines used for Purposes of Public Transport.*

[These are similar to the regulations for "B" Pilot's Flying Certificate for flying passenger or goods aircraft, with the exception that a knowledge of elementary meteorology is required, and there is a new clause reading:—]

Pilots who hold the military pilot's certificate shall be entitled to the private pilot's flying certificate, but, in order to obtain the pilot's flying certificate for purposes of public transport, it will be necessary to pass the technical conditions for navigation as required by B (2) (*c*).

II.—Certificates for Pilots of Balloons.

[These are not mentioned in the British regulations.]

1. *Practical Tests:* The candidate must have completed the following certified ascents:—

1. By day: 3 ascents under instruction.
   1 ascent in control under supervision.
   1 ascent alone in the balloon.
2. By night: 1 ascent alone in the balloon.

Each ascent shall be of at least two hours' duration.

2. *Theoretical Tests:* Elementary aerostatics and meteorology.

3. *Special Requirements:* General knowledge of a balloon and its accessories; inflation; rigging; management of an ascent; instruments; precautions against cold and high altitudes.

Knowledge of rules as to lights and signals and rules of the air; rules for air traffic on and in the vicinity of aerodromes.

Practical knowledge of international air legislation. Map reading and orientation.

III.—CERTIFICATES FOR AIRSHIP OFFICER PILOTS.

[These are not mentioned in the British regulations.]

Every airship officer pilot shall have qualified as pilot of a free balloon.

There shall be three classes of airship officer pilots.

The holder of a first-class certificate is qualified to command any airship.

The holder of a second-class certificate is qualified to command airships under 20,000 cubic metres capacity.

The holder of a third-class certificate is qualified to command airships under 6,000 cubic metres capacity.

All military and naval airship officer pilots are entitled to a third-class certificate.

All military and naval airship officer pilots who have commanded airships over 6,000 cubic metres capacity are entitled to a first-class certificate.

QUALIFICATIONS FOR THIRD-CLASS CERTIFICATE.

Practical Tests: (*a*) Twenty certified flights (three of which shall be by night) in an airship, each flight being of at least one hour's duration. In at least four of these flights the candidate must have handled the airship himself, under the supervision of the commanding officer of the airship, including ascent and landing.

(*b*) One cross-country flight on a predetermined course of at least 100 kilometres, terminating with a night landing, and made with a duly authorised inspector on board.

Theoretical Examination: Aerostatics and meteorology. (Density of gases, laws of Mariotte and of Gay-Lussac; barometric pressure, Archimedes principle; confinement of gases; interpretation and use of meteorological information and of weather charts.)

Physical and chemical properties of light gases, and of materials used in the construction of airships.

General theory of airships.

Dynamic properties of moving bodies in air.

General Knowledge: Elementary knowledge of internal combustion engines.

Elementary navigation; use of the compass; location of position.

Inflation; stowage; rigging; handling; controls and instruments.

QUALIFICATIONS FOR SECOND-CLASS CERTIFICATE.

Practical Tests: To be eligible for a second-class certificate a candidate must be holder of a third-class certificate and have at least four months' service as a third-class officer on an airship, and also have completed at least 10 flights as third-class officer on an airship of capacity above 6,000 cubic metres, in which he has handled the airship himself including ascent and landing, under the supervision of the commanding officer of the airship.

Theoretical Examination: Advanced knowledge of the subjects required for the third-class certificate.

QUALIFICATIONS FOR FIRST-CLASS CERTIFICATE.

Practical Tests: To be eligible for a first-class certificate a candidate must be holder of a second-class certificate, have at least two months' active service as a second-class officer on an airship, and also have completed at least five flights as second-class officer of an airship of capacity above 20,000 cubic metres, in which he has handled the airship himself, including ascent and landing, under the supervision of the commanding officer of the airship. Each flight must be at least of one hour's duration with a minimum of 15 hours for the five flights.

Theoretical Examination: As required for a second-class certificate.

IV.—CERTIFICATE FOR NAVIGATORS.

Aircraft used for public transport carrying more than 10 passengers and having to make a continuous flight between two points more than 500 kilometres apart overland, or a night flight, or a flight between two points more than 200 kilometres apart over sea, must have on board a navigator who has been granted a certificate as such after passing a theoretical and practical examination in the following:—

[The requirements are the same as in the British regulations.]

V.—MEDICAL CERTIFICATES.

[Regulations 1 to 5 are similar to No. 4 to 7 in II. Licensing of Personnel in the British regulations. The following two are new:—]

6. No aeronaut who, before the date of the present Convention, has given proof of his flying ability, shall, so long as he retains such ability, be necessarily disqualified because he fails to fulfil all of the above requirements.

7. Each contracting State may raise the conditions set forth above, as it deems fit, but these minimal requirements shall be maintained internationally.

ANNEX F.

International Aeronautical Maps and Ground Markings

[This section is new.]

International maps shall be made and ground marks established in accordance with the following general principles:—

I.—MAPS.

1. Two types of aeronautical maps shall be used. They are hereafter mentioned as *general* maps and *local* maps.

2. The index scheme for the aeronautical maps, both general and local, shall be based on the index scheme adopted for the "International 1 : 1,000,000 scale map" by the official International Congress convened for the purpose in London in 1909 and in Paris in 1913.

NOTE.—Extract from the resolutions adopted by the Conferences at London and Paris:

The sheets of the International 1 : 1,000,000 scale map shall include 6 degrees of longitude and 4 degrees of latitude. The limiting meridians of the sheets shall be at successive intervals, reckoning from Greenwich, of 6 degrees, and the limiting parallels, reckoning from the Equator, shall be at successive intervals of 4 degrees.

The longitudinal sectors, from longitude 180 degrees E. or W. of Greenwich, are given numbers from 1 to 60, increasing in an easterly direction.

The 22 zones of 4 degrees in depth, extending from the Equator on each side to 88 degrees latitude, are given letters from A to V.

The polar areas, extending for 2 degrees, are lettered Z.

In the northern hemisphere each sheet shall bear a descriptive symbol composed of the letter N, followed by the zone letter and sector number corresponding to its position, thus N.K.—12.

In the southern hemisphere the letter S shall replace the letter N. Example, S.L.—28.

3. The metre shall be used as the standard of measurement for lengths, distances, heights and depths, reserving for each nation the right to add figures expressing these quantities in its own units.

4. The colours, symbols, and arrangements for production adopted for the International 1 : 1,000,000 scale map shall be used as far as practicable on the aeronautical maps.

5. The general maps shall be drawn on Mercator's projection and shall be to a scale of 1 degree of longitude equals 3 centimetres. The general maps shall have marked on them in fine lines the meridians and parallels of each degree, and the meridians and parallels limiting the unit sections of the 1 : 1,000,000 map shall be accentuated. The same designation of unit sections shall be used as for the 1 : 1,000,000 map.

6. Each general (Mercator) map shall bear the French heading *Carte Générale Aéronautique Internationale* (*see* the conventional sign plate, Fig. 1) and under it a translation of this heading in the language of the country publishing the map. It shall also bear an appropriate geographical name.

Each sheet shall show at least the following: principal physical features and geographical names, wireless stations, marine lighthouses (height and range at sea level, colour and character of the light); national frontiers, prohibited areas, principal air routes, lines of equal magnetic variation, South Polar distance, latitude, old and new notation of longitude (*see* paragraph 7), with an outer margin containing letters and numbers referring to the index of the 1 : 1,000,000 map, legend of symbols in English or French and in the language of the country publishing the maps, publisher's name, and date of publication and of successive editions.

7. The local maps shall be drawn to a scale of 1 : 200,000.

NOTE.—For local aeronautical maps of sparsely inhabited countries, the scale of 1 : 500,000 or 1 : 1,000,000 as appropriate, may be used.

In addition to the customary latitude and longitude notations, the local aeronautical maps shall bear numbers enclosed in rectangles, corresponding to a new system of co-ordinate reckoning based on the antimeridian of Greenwich and the South Pole. The new *grid* reckoning, with regard to latitude, shall commence with the South Pole as zero and increase northward by degrees and minutes to 180 degrees at the North Pole, and with regard to longitude shall commence with the antimeridian of Greenwich as zero and run eastward by degrees and minutes to 360 degrees.

8. Each unit sheet of the local aeronautical maps shall bear the French heading *Carte Normale Aéronautique Internationale* (*see* the conventional sign plate, Fig. 2), and under it a translation of this heading in the language of the country publishing the map. It shall comprise one degree of latitude and one degree of longitude, and shall be designated by a locality name and by the new co-ordinates (described in paragraph 7) of the south-west corner of the sheet, the unit digits being accentuated. In these designating co-ordinates, the figures referring to the South Polar distance shall invariably be written first.

EXAMPLES.—The sheet whose southern boundary is 49 degrees N. (*i.e.*, 139 degrees South Polar distance) and western boundary 2 degrees E. (*i.e.*, 182 degrees from the antimeridian of Greenwich) will be numbered 139–182.

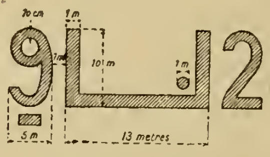
Or the sheet whose southern boundary is 36 degrees S. (*i.e.*, 54 degrees South Polar distance) and western boundary 7 degrees W. (*i.e.*, 173 degrees from the antimeridian of Greenwich) will be numbered 54–173.

9. The local aeronautical unit sheet shall show, as far as the date is known, the following:—

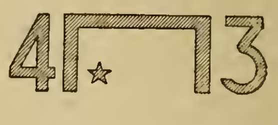
(*a*) *Within the limiting Meridians and Parallels.*—Twenty-minute projection grid; roads divided into two classes according to their relative visibility from the air; railways of all kinds, cities and towns in outline and the plan of the principal public roads crossing them (villages similarly if practicable, otherwise their positions indicated); principal features of the surface water system; woodlands and other areas unsuitable for landing, aerodromes, hangars for airships, plants for balloon inflation, permanent landing places on ground and water, aeronautical ground marks (beacons and fixed navigational lights), marine lighthouses (height, range at sea level, colour and character of the light); wireless stations, meteorological stations, overhead electric power lines, remarkable objects, national frontiers, prohibited areas, principal air routes, names of important bodies of water, towns, and important villages: the topographical relief by shading and figures indicating heights, the most important of which to be surrounded by an oval ring as (712).

(*b*) *Outside the limiting Meridians and Parallels.*—A title, consisting of the name designating the locality and the index numbers of the sheet; a border scale graduated to minutes; the names of the neighbouring sheets; latitude, South Polar distance, old and new notation of longitude (*see* paragraph 7); scale of kilometres; legend of symbols in English or French and in the language of the country publishing the map; magnetic variation diagram; key map showing abridged numbers of the sheet concerned and the eight surrounding sheets; frontiers and the names of the countries, parts of which are embraced by the key map; publisher's name and date of publication.

10. The forms of the general and local maps, titles, marginal notations, diagrams, and legends, shall be as shown by the accompanying illustrations.



Arrangement of mark for south half of unit sheet. The short sides of the frame shall be oriented true north-south.



Arrangement of mark for north half of unit sheet having the same orientation of short sides.

11. The general and local aeronautical maps and guide books of the areas traversed by the most important routes which may be established by international agreement shall be prepared first.

NOTE.—On account of the inadequacy of the usual methods of topographic mapping for making aeronautical maps, it is strongly recommended that steps be taken to survey from the air the areas along the most important international routes. Such surveys would furnish indispensable information regarding the features necessary to be shown on the maps the aviator is to use.

II.—UNIVERSAL SYSTEM OF GROUND MARKS.

1. All ground marks shall conform with the scheme of numbering adopted for the unit sheets of the local international aeronautical maps.

For this purpose each mark shall show (*see* the diagrams):—

(*a*) The abridged number which designates the sheet within which it lies;

(*b*) An open rectangle, whose short sides shall be oriented north-south; the frames shall be open towards the opposite half of the unit sheet;

(*c*) A dot indicating the approximate position of the mark on the north or south half of the corresponding unit sheet.

The numbers shall be placed close to the frame at the top, bottom or sides, but not inside.

Where marks are placed so close to each other as to admit of possible confusion, the round dot may be replaced by a square, triangular or star-shaped dot.

It is recommended that the minimum dimensions of the marks be those indicated in the sketches.

2. Special attention shall be given to the distribution of marks along chosen international routes.

Note.—Steps to establish suitable marks for landing at night shall be eventually taken, in accordance with the decision of the International Commission for Air Navigation.

ANNEX G.

Collection and Dissemination of Meteorological Information

[This section is new.]

1. Nature and object of meteorological information to be furnished by Contracting States:—

(*A*) "Statistical" is required for the purpose of indicating the degree of safety and convenience of different routes or aerodromes for different types of aircraft.

It consists of:—

(*a*) Analysis and summaries of past meteorological records.
(*b*) Summaries of current observations.

(*B*) "Current" is required for the purpose of:—

(*a*) Keeping a current record of the weather.
(*b*) Making forecasts.

It consists of:—

1. The results of daily observations.
2. Lists of active stations at which these observations are taken.

(*C*) "Forecasts" are for the purpose of telling all concerned when and where flying is possible and the best conditions for the same. They are statements of conditions anticipated:—

(*a*) "Short period" during the next three or four hours.
(*b*) "Normal" during the next 20 to 30 hours.
(*c*) "Long period" during the next two or three days.
(*d*) "Route" for particular region or route during the next six hours.

2. Methods and times of furnishing the different types of information:—

(*A*) "Statistical" is furnished by Central Meteorological Offices for general information.

(*a*) Analysis and summaries of past records—by the publication of special handbooks, giving averages, frequencies and extremes of the principal meteorological elements, together with charts and diagrams; prominence to be given to meteorological conditions of areas known to have special meteorological peculiarities.

(*b*) Summaries of current observations—by the monthly publication of the information obtained each month.

(*B*) "Current" is furnished by meteorological offices to meteorological offices.

(*a*) Results of daily observations—telegraphically by:—

1. Regular reports at fixed hours (*see* Appendix I) and
2. By special reports at intermediate times when requested (*see* Appendix II).

(*b*) Lists of stations whenever necessary, to keep other countries informed where observations are being taken, giving also local and topographical details affecting weather conditions at each station.

(*c*) "Forecasts" are furnished by Meteorological Offices for general information by publication in the public Press, telegraphically to other countries if required, or any other, the best, means to bring them to the notice of these requiring them (*see* Appendix III).

APPENDIX I.—Regular Reports.

These are of two kinds:—

1. Individual station reports.
2. Collective station reports.

1. Individual station reports are the results of observations of individual stations, taken at 0100, 0700, 1300, and (1800 or) 1900 G.M.T. The reports are made as soon as the observation has been taken and are rendered to a central collecting station or office: where reports for only two of these hours are possible or sufficient, the hours should be separated by an interval of twelve hours. (It is recommended that the standard hours be changed to 0300, 0900, 1500 and 2100 G.M.T. by international agreement.)

Reports will give information on the following, whenever possible:—

1. Wind.
2. Pressure.
3. Temperature and humidity.
4. Fog and visibility.
5. Clouds.
6. Precipitation.
7. Thunderstorms, hurricanes, tornadoes, dust-storms.
8. Other weather phenomena.
9. State of sea.

And also on upper air currents and upper air temperature and humidity, from stations where facilities are available for observation.

Reports will be made in the general form and in the codes given in Appendix IV.

2. Collective reports are a collection of the individual reports received by a central station or office and transmitted to other central offices. They are of three classes:—

Class 1.—The central office in this case is usually the main office of a country; it transmits its reports, within 1½ hours of the time the observations are taken at the individual stations, to all main offices of other countries within a radius of 1,500 kilometres.

Class 2.—These are reports made for the purpose of giving countries over 1,500 kilometres distant information essential to making their own forecasts. The central office is that of a selected State which possesses a high-power wireless station capable of worldwide ranges (minimum range 3,000 kilometres). The report is made within three hours of the observations, and is a collection of reports selected from the Class I reports and abridged (*see* Appendix IV). It should include a forecast of conditions in the country of origin.

Class 3.—These are local reports made by local centres to other local centres (any within 500 kilometres). The report is a collection of reports, selected from the Class I reports from stations in the vicinity and abridged (*see* Appendix IV.). It is made within 30 minutes of the time of observation.

APPENDIX II.—Special Reports.

Special reports give the results of continuous observations at aerodromes having meteorological stations on recognised air routes. They are to be rendered within thirty minutes of a request from a central office on a specified aerodrome on the route. The maximum distance from which these reports will be required is 500 kilometres. The requests may take the form of a demand for hourly reports.

The reports are rendered by telephone or wireless, and may be from one country to another in the case of an international air route. The reports, when made by telegram, will be in the form and code given in Appendix IV.

APPENDIX III.—Forecasts.

Short-period forecasts covering three to four hours will give a statement of the anticipated conditions of cloud, weather, surface wind, and visibility, together with direction and speed of wind at heights of 1,000 and 2,000 metres, and an estimate of meteorological fitness for different types of aircraft.

Normal forecasts for twenty to thirty hours will give similar information, but in more general terms.

Long-period forecasts give a general statement of the prospects for the next two or three days.

Route forecasts are made twice daily by central offices from information received from individual stations and will give a statement of conditions anticipated in the different regions or routes of the country for about six hours ahead.

APPENDIX IV.

[This deals with the general form in which reports are to be rendered and codes for their transmission, together with the meteorological symbols and codes for every conceivable weather condition. Doubtless this technical information will eventually be embodied in a booklet which will be distributed to those concerned.]

ANNEX H.

Customs

General Provisions.

1. Any aircraft going abroad shall depart only from aerodromes specially designated by the customs administration of each contracting State, and named "customs aerodromes."

Aircraft coming from abroad shall land only in such aerodromes.

2. Every aircraft which passes from one State into another is obliged to cross the frontier between certain points fixed by the contracting States. These points are shown on the aeronautical maps.

3. All necessary information concerning customs' aerodromes within a State, including any alterations made to the list and any corresponding alterations necessary on the aeronautical maps and the dates when such alterations become valid, and all other information concerning any international aerodromes which may be established, shall be communicated by the States concerned to each other and to the International Commission for Air Navigation, which shall notify such information to all of the contracting States. The contracting States may agree to establish international aerodromes at which there may be joint customs services for two or more States.

4. When, by reason of a case of *force majeure*, which must be duly justified, an aircraft crosses the frontier at any other point than those designated, it shall land at the nearest customs aerodrome on its route. If it is forced to land before reaching this aerodrome it shall inform the nearest police or customs authorities.

It will only be permitted to leave again with the authorisation of these authorities, who shall, after verification, stamp the log book and the manifest provided for in paragraph 5; they shall inform the pilot of the customs aerodrome where he must necessarily carry out the formalities of customs clearance.

5. Before departure, or immediately after arrival, according to whether they are going to or coming back from a foreign country, pilots shall show their log books to the authorities of the aerodrome and, if necessary, the manifest of the goods and supplies for the journey which they carry.

6. The manifest is to be kept in conformity with the attached form No. 1. The goods must be the subject of detailed declarations in conformity with the attached form No. 2, made out by the senders.

Every contracting State has the right to prescribe for the insertion, either on the manifest or on the customs declaration of such supplementary entries as it may deem necessary.

7. In the case of an aircraft transporting goods the customs officer, before departure, shall examine the manifest and declarations, make the prescribed verifications and sign the log book as well as the manifest. He shall verify his signature with a stamp. He shall seal the goods or sets of goods, for which such a formality is required.

On arrival the customs officer shall ensure that the seal is unbroken, shall pass the goods, shall sign the log book and keep the manifest.

In the case of an aircraft with no goods on board, the log book only shall be signed by the police and customs officials.

The fuel on board shall not be liable to customs duties provided the quantity thereof does not exceed that needed for the journey as defined in the log book.

8. As an exception to the general regulations, certain classes of aircraft, particularly postal aircraft, aircraft belonging to aerial transport companies regularly constituted and authorised, and those belonging to members of recognised touring societies not engaged in the public convenience of persons or goods, may be freed from the obligation of landing at a customs aerodrome and authorised to begin or end their journey at certain inland aerodromes appointed by the customs and police administration of each State, at which customs formalities shall be complied with.

However, such aircraft shall follow the normal air-route, and make their identity known by signals agreed upon as they fly across the frontier.

Regulations Applicable to Aircraft and Goods.

9. Aircraft landing in foreign countries are in principle liable to customs duties if such exist.

If they are to be re-exported, they shall have the benefit of the regulations as to permit by bond or deposit of the taxes.

In the case of the formation between two or more countries of the Union of touring societies, the aircraft of the said countries will have the benefit of the regulations of the "Tryptique."

10. Goods arriving by aircraft shall be considered as coming from the country where the log book and manifest have been signed by the customs officer.

As regards their origin and the different customs régimes, they are liable to the regulations of the same kind as are applicable to goods imported by land or sea.

11. With regard to goods exported in discharge of a temporary receiving or bonded account or liable to inland taxes, the senders shall prove their right to send the goods abroad by producing a certificate from the customs of the place of destination.

Air Transit.

12. When an aircraft to reach its destination must fly over one or more contracting States, without prejudice to the right of sovereignty of each of the contracting States, two cases must be distinguished:—

(1.) If the aircraft neither sets down nor takes up passengers or goods, it is bound only to keep to the normal air route and make itself known by signals when passing over the points designated for such purpose.

(2.) In other cases, it shall be bound to land at a customs aerodrome and the name of such aerodrome shall be entered in the log book before departure. On landing, the customs authorities shall examine the papers and the cargo, and take, if need be, the necessary steps to ensure the re-exportation of the craft and goods or the payment of the dues.

The provisions of paragraphs 9 (2) are applicable to goods to be re-exported. If the aircraft sets down or takes up goods, the customs officer shall verify the fact on the manifest, duly completed, and shall affix, if necessary, a new seal.

Various Provisions

13. Every aircraft during flight, wherever it may be, must conform to the orders from police or customs stations and police or customs aircraft of the State over which it is flying.

14. Customs officers and excise officials, and generally speaking, the representatives of the public authorities, shall have free access to all starting and landing places for aircraft; they may also search any aircraft and its cargo to exercise their rights of supervision.

15. Except in the case of postal aircraft, all unloading or throwing out in the course of flight, except of ballast, may be prohibited.

16. In addition to any penalties which may be imposed by local law for infringement of the preceding regulations, such infringement shall be reported to the State in which the aircraft is registered, and that State shall suspend, for a limited time or permanently, the certificate of registration of the offending aircraft.

17. The provisions of this Annex do not apply to military aircraft visiting a State by special authorisation (Articles 31, 32 and 33 of the Convention), nor to police and customs aircraft (Articles 31 and 34 of the Convention).

[The document concludes with the form of manifest or general declaration of cargo, showing how particulars relating to machine, commander, goods, &c., are to be set forth. Also the form of the customs declaration is shown.]

Personals.

Casualties

Lieut.-Col. A. C. BODDAM-WHETHAM, D.S.O., 4th Battn. Argyll and Sutherland Highlanders and R.A.F., of Earlscliffe, Folkestone, who was killed on June 22, 1919, at the age of 35, in an aeroplane accident in Egypt, was the eldest son of the late J. W. Boddam-Whetham, late of Kirklington Hall, Notts, and Mrs. Boddam-Whetham.

Lieut. C. R. WENTWORTH KNIGHT, R.A.F., who was killed in action at Topsa on June 21, at the age of 21, after continuous service in France and elsewhere since January, 1915, was the only son of Mr. and Mrs. W. H. Knight, of Towns End House, Limington, Ilchester.

Lieut.-Col. CHARLES FREDERICK POLLOCK, O.B.E., A.F.C., late R.A.F., died on July 17, aged 53.

Sec. Lieut. DONALD C. TUCKER, R.F.C., previously reported missing on March 24, 1918, now officially reported killed in action on that date, at the age of 19, was the youngest son of Frank J. Tucker and Mrs. Tucker, Durley Park House, Keynsham, Somerset.

Married

Maj.-Gen. EDWARD B. ASHMORE, C.B., C.M.G., M.V.O., formerly Royal Artillery, now R.A.F., commanding the London Air Defences, was married on July 17 at Holy Trinity Church, Prince Consort Road, S.W., to Miss BETTY PARSONS, daughter of the Rev. F. W. Parsons, vicar of Tandridge, Oxted, Surrey.

Lieut. CHARLES FREDERIC BARTON, R.A.F., of Toronto, Canada, was married on July 5 at Woodton Parish Church, to MARY LETITIA DRIFFIELD LEE, younger daughter of the Rev. Frederick and Mrs. Lee, of Woodton Rectory, Bungay.

Maj. GEORGE PURVIS BULMAN, O.B.E., R.A.F., only son of the late W. W. Bulman, of Alexandria, Egypt, and Mrs. Purvis Bulman, Queen's Club Gardens, was married on July 16, at Christ Church, Sunderland, to EMMELINE PRESTON, youngest daughter of Mr. and Mrs. G. P. FAIRMAN.

CHARLES NOEL GREGORY DORE (R.A.F.), son of the late S. Lammas Dore, and of Mrs. S. Lammas Dore, of Pinner Hill, Middlesex, was married on July 18 at Holy Trinity Church, Paddington, to EVELYN EMILY, daughter of the late Duncan GELLION, and of Mrs. Duncan Gellion, of 2, Orsett Terrace, Hyde Park, W.

Capt. H. S. EVAMY, R.A.F., was married on July 9 at St. Matthias' Church, Torquay, to DOROTHY JEANETTE, eldest daughter of Mr. and Mrs. C. J. HANNAFORD, of Chulmleigh and Torquay, Devon.

Capt. EUGENE COURTENAY PERRIN, O.B.E., 4th Bn. Cheshire Regt. and R.A.F., elder son of John E. Perrin, of Hoylake, Cheshire, and Mrs. Perrin, was married on June 30 at Lillington Parish Church, to KATHERINE ARTHUR MARY VIOLET, widow of Capt. C. A. GRAZEBROOK, K.R.R.C., and daughter of the late Arthur Hickman and Mrs. Morgan, of Radlett, Herts.

Maj. C. F. A. PORTAL, D.S.O., M.C., R.A.F., son of Mr. E. R. Portal, formerly Master of the Craven Hounds, of Eddington House, Hungerford, was married on July 21, at Denton, Grantham, to Miss JOAN MARGARET WELBY, third and youngest daughter of Sir Charles Glynne Welby and Lady Maria Welby, of Denton Manor.

Capt. DENIS C. W. SANDERS, A.F.C., R.A.F., eldest son of Dr. and Mrs. Gordon Sanders. Villa Martha, Cannes, France, was married on July 23, at St. Baldred's, North Berwick, to NANCY M. G., widow of the late Ivan B. SPROT, Lieut., 1st Battn., The Queen's Own Cameron Highlanders, and daughter of Sir George and Lady Berry, Drumsheugh Gardens, Edinburgh, and King's Knoll, North Berwick.

Lieut. WILLIAM ABDY SYCAMORE, Lieut. R.E. (T.F.), only son of Capt. Edward Sycamore, R.A.F., and Mrs. Sycamore, of Brightlingsea, Essex, was married on July 23, at Wadsley Parish Church, to KATHERINE DAVIDSON, only daughter of the late Mr. and Mrs. Frank CLARENCE.

Lieut. W. M. N. TOLFREE, R.A.F., youngest son of Mr. and Mrs. W. H. Tolfree, of Winsford, Cheshire, was married on June 26 at Kast-el-Nil Garrison Church, Cairo, to FRANCES WINIFRED, only daughter of Mr. and Mrs. F. R. NASH, of Guildford, Surrey.

To be Married

The engagement is announced between Capt. J. R. FRANKISH, M.B.E., R.A.F., eldest son of the late Mr. and Mrs. W. J. Frankish, of Kinnington House, Lincolnshire, and DOROTHY EDITH, elder daughter of Jeffry WHITEHEAD and Mrs. Whitehead, of Croydon, Surrey.

A marriage has been arranged, and will take place on Wednesday, September 10, at Bromsgrove Parish Church, between Capt. H. E. JUDGE, R.A.F., and OLIVETTE, daughter of Mrs. EADIE, Rigby Hall, Bromsgrove, Worcestershire.

The engagement is announced between Capt. HUGH PUGHE LLOYD, M.C., D.F.C., Croix de Guerre, R.A.F., second son of Mr. and Mrs. L. T. Lloyd, of Alfrick, Worcester, and KATHLEEN, youngest daughter of Maj. R. T. MEADOWS, D.S.O., and Mrs. Meadows, Dunheved, Saltash, Cornwall.

The engagement is announced between Capt. MAUDUIT, 7th Dragoon Guards and R.A.F., eldest son of Lieut.-Col. Mauduit, of 57, Sloane Street, and Mrs. Mauduit, and IRENE, daughter of the late Capt. A. H. BROOKSBANK, 19th Hussars, and Mrs. Brooksbank, of Middleton Hall, Yorkshire.

The engagement is announced between Capt. MITTON, Lincolnshire Regt., and R.A.F. only son of Mr. and Mrs. W. H. Mitton, of Sunnyside, Sleaford, and DAPHNE YSEULT, daughter of Baron DE BELABRE, French Consul, Newcastle-on-Tyne, and great-ganddaughter of Admiral Sir John West, G.C.B.

The engagement is announced between Capt. BERNARD A. TAYLOR, R.A.F., only son of Mr. and Mrs. A. E. Taylor, of Crawley, Sussex, and KITTY, third daughter of the late Capt. H. F. LEICESTER LOCOCK and Mrs. Leicester Locock, of Pook's Hill, Angmering, Sussex.

Items

Maj.-Gen. Sir HUGH TRENCHARD (Chief of the Air Staff), Brig.-Gen. C. L. LAMBE (Director of Equipment, R.A.F., and Col. A. M. LONGMORE, R.A.F., had the honour of being received by His Majesty at an audience at Buckingham Palace on July 25.

Mr. THOMAS KEPPEL NORTH, O.B.E., of Barnes Cray, Crayford, Kent, superintendent of Messrs. Vickers. Ltd., Crayford Works, since 1913, who died on February 10, intestate, has left property of the value of £19,629.

General Sykes Honoured

MAJ.-GEN. F. H. SYKES, Controller-General of Civil Aviation, while attending a meeting of the International Commission in Paris, was presented by Maj. Duval, on behalf of President Poincare, with the Cross of the Legion of Honour.

Exploring the Damascus-Bagdad Route

A MESSAGE from Cairo states that a number of British officers, equipped with ten Ford cars and a Handley-Page aeroplane have left Cairo to pioneer an aeroplane route from Damascus to Bagdad.

THE ROYAL AIR FORCE

London Gazette, July 18

Royal Air Force

The following temporary appointment is made at the Air Ministry :—

Staff Officer, 3rd Class (P.).—Lieut. (actg. Capt.) D. F. Cox ; Feb. 19, and to retain the actg. rank of Capt. till April 30.

Group Commander (graded as Col. Staff.).—Lieut. Col. C. E. H. Rathbone, D.S.O. ; April 25, vice Lieut.-Col. H. A. Williamson, C.M.G.

Staff Officer, 2nd Class (Air).—Capt. G. S. Trewin, A.F.C. ; July 6.

Staff Officer, 3rd Class (P.).—Sec. Lieut. (actg. Lieut.) J. M. McEntegart ; Dec. 20, and to be actg. Capt. till April 30 (substituted for the notification in the *Gazette* of Jan. 21).

The notification in the *Gazette* of June 20 concerning Lieut. G. H. Godfrey is cancelled.

Flying Branch

Capt. C. E. H. C. Macpherson ceases to be graded for purposes of pay and allowances of Maj. (A.) ; May 31.

Capt. H. C. Irwin to be graded for purposes of pay and allowanees as Capt. while employed as Capt. (A.) and (S.) ; May 1.

Lieuts. to be granted for pay and allowances as Capts. while employed as Capts. (K.B.) :—W. C. Knight, C. K. Osborn ; May 1.

J. A. Sykes (Lieut., Gordon Highrs.) is granted a temp. commn. as Sec. Lieut. (A.) ; June 28, 1918, and to be Hon. Lieut.

A. Jenart (Sec. Lieut., York. and Lanes. R.) is granted a temp. commn. as Sec. Lieut. (O.) ; Oct. 25, 1918.

Lieut. D. S. Buchanan (Lieut., I.A.R.O.) relinquishes his commn. on revision to I.A.R.O. ; July 18.

The following relinquish their commns. on ceasing to be employed :—Lieut.-Col. R. Bell-Irving (Maj. (Temp. Lieut.-Col.), Brit. Col. R.) ; April 9. Lieut. V. O. Lousdale (Lieut., R.H. and R.F.A.) ; June 30. Lieut. F. V. Heakes (Lieut., Cent. Ont. R.) ; July 3. Lieut. L. Rimmer (Lieut., W. Ont. R.) ; July 4. Lieut. W. C. Brewer (Lieut., W. Ont. R.) ; July 6. Capt. D. Carruthers (Capt., Can. A.S.C.), Lieut. H. G. Clements (Lieut., Alberta R.), Lieut. K. B. Conn, D.F.C. (Lieut., Cent. Ont. R.) ; Lieut. G. M. Guillon (Lieut., Quebec R.) ; Lieut. H. L. Holland (Lieut., Can. Cyclist Corps), Lieut. C. McEwen, M.C., D.F.C. (Lieut. (actg. Capt.) Sask. R.), Lieut. J. C. McKeever (Lieut., Cent. Ont. R.) ; Lieut. P. B. O. L. B. Morency (Lieut., Quebec R.), Lieut. J. L. M. White, D.F.C. (Lieut. (actg. Capt.), Can M.G.C.), Sec. Lieut. (Hon. Lieut.) J. Whitford (Lieut., Manitoba R.) ; July 7. Lieut. R. L. Coote (Lieut., W. Ont. R.), Lieut. S. M. Gibson (Lieut., Manitoba R.), July 8. Sec. Lieut. (Hon. Capt.) F. G. Godsell (Lieut., Gloster. R., T.F.), Lieut. S. B. Plummer (Lieut., E. Ont. R.), Lieut. G. L. Shepherd (Lieut., W. Ont. R.) ; July 8.

(Then follow the names of 394 officers who are transfd. to the Unemployed List under various dates. We regret that owing to great pressure on our spaec it is impossible to reprint this portion of the List.—Ed.)

Capt. B. S. Wemp, D.F.C., relinquishes his commn. on account of ill-health contracted on active service, and is granted rank of Maj. ; June 13.

The following Lieuts. relinquish their commns, on account of ill-health, and are permitted to retain their rank :—S. C. Shepherdson (contracted on active service) ; June 19. R. G. Pratt ; June 27 (substituted for notification in *Gazette* April 8. J. W. Baillie, F. R. C. Cobbold (caused by wounds). R. A. Crabtree (contracted on active serivce) ; July 4. F. C. A. Thorpe (caused by wounds), C. G. Wood (contracted on active service) ; July 7. Lieut. W. G. R. Bailes (caused by wounds) ; July 11.

Lieut. H. L. Yates resigns his commn. ; June 18 (substituted for notification in *Gazette* May 13).

Lieut. G. G. L. Blake, D.F.C., D.C.M., to take rank and precedence as if his appointment as Lieut. bore date March 17.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—C. E. Robinson (caused by wounds) ; July 4. G. V. Straker ; July 10 (substituted for notification in *Gazette* June 6.

Sec. Lieut. C. Oldfield is removed the Service for absence without leave ; Jan. 26.

The notification in *Gazette* March 28 concerning Sec. Lieut. J. M. Scott is cancelled.

The notification in *Gazette* May 30 concerning Lieut. L. D. Brown is cancelled.

The notification in *Gazette* June 3 concerning Lieut. W. E. Watt is cancelled (the notification in *Gazette* April 4 to stand).

The notification in *Gazette* June 17 concerning Lieut. C. C. G. Girvan is cancelled.

The notification in *Gazette* June 24 concerning Sec. Lieuts. T. Mundy and E. A. Murray is cancelled.

Administrative Branch

Lieut.-Col. G. Hilton, D.C.M., to be Lieut.-Col. from (S.O.) ; July 6.

Lieut. A. B. Monk to be actg. Capt. while employed as Capt., from Nov. 30, 1918, to April 30 (substituted for notification in *Gazette* May 23).

Lieuts. to be graded for purposes of pay and allowances of Capts. while employed as Capts. :—S. Currington, M.B.E., R. Elphick, (Hon. Capt.) L. V. Popkiss ; May 1.

Lieuts. (A.) to be Lieuts. :—J. H. Taylor ; May 6. H. A. Zinn ; July 8.

Lieut. G. A. F. Hudson to be Lieut., from (S.) ; July 25 (substituted for notification in *Gazette* of July 15).

Sec. Lieuts. to be Lieuts. :—G. D. Ashby ; Oct. 20, 1918. (Actg. Capt.) G. T. Armitage ; Dec. 17, 1918.

The following are granted temp. commns. as Sec. Lieuts. :—C. Jackson ; Nov. 21, 1918. C. J. Elliott ; July 14.

The following relinquish their commns. on ceasing to be employed :—Lieut. S. P. Briggs (Lieut., Northants R.) ; June 16. Sec. Lieut. (Hon. Capt.) D. M. Berry (Capt., R. Fus.) ; June 25.

(Then follow the names of 47 officers who are transfd. to the Unemployed List under various dates.)

Lieut. (actg. Capt.) C. E. Morgan relinquishes his commn. on account of ill-health, and is granted the rank of Capt. ; May 25, 1918 (substituted for notification in the *Gazette* of May 24, 1918).

Lieut. E. Croghan relinquishes his commn. in order to resume his medical studies ; July 1.

Lieut. G. C. Levick (K.R.R.C.) relinquishes his commn. on account of ill-health contracted on active service) ; July 14.

Sec. Lieut. J. C. Child relinquishes his commu. on account of ill-health, and is permitted to retain his rank ; Dec. 23, 1918 (substituted for notification in the *Gazette* of Nov. 12, 1918).

The notifications in the *Gazette* of May 13 and July 4 concerning Lieut. H. W. Piper are cancelled.

The notification in the *Gazette* of April 25 concerning Sec. Lieut. D. Miller is cancelled.

The notification in the *Gazette* of May 6 concerning Maj. J. M. Boyd, M.B.E., is cancelled.

Technical Branch

Lieut. H. W. Prockter to be graded for purposes of pay and allowances of Capt., whilst employed as Capt., Grade (A.) ; May 1.

Lieut. J. R. Coulthard to be graded for purposes of pay and allowances of Capt. whilst employed as Capt., Grade (B.) ; May 1.

Sec. Lieut. (actg. Capt.) E. P. Dampier to be Sec. Lieut., Grade (B.), from (Ad.), and to retain the actg. rank of Capt. whilst employed as Capt. ; Oct. 1, 1918.

Lieuts. to be actg. Capts. without pay and allowances of that rank whilst employed as Capts., Grade (B.) :—W. F. Mytton (substituted for notification in the *Gazette* of March 21) ; J. M. B. E. St. Amory (substituted for notification in the *Gazette* of March 21) ; Dec. 1, 1918.

Lieuts. to be Lieuts., Grade (A) :—E. R. V. Collett, from (O) ; Nov. 1, 1918. J. S. Stevenson, from (Ad.) ; Dec. 15, 1918.

C. N. Smith (Lieut., R. Welsh Fus.) is granted a temp. commn. as Sec. Lieut., Grade (B) ; May 22, 1918, and to be Hon. Lieut.

(Then follow the names of 41 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. J. Penrose relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; June 24.

The initials of Lieut. N. V. Harle are as now described, and not "H. V.," as stated in *Gazette* May 2.

The date of appointment of Sec. Lieut. T. Mundy and Sec. Lieut. F. A. Murray is March 8, and not May 8, as stated in *Gazette* May 23.

The notification in *Gazette* May 16 concerning Lieut. E. R. V. Collett is cancelled.

The notification in *Gazette* Dec. 3, 1918, concerning C. Jackson is cancelled.

Medical Branch

Maj. F. H. Stephens (Staff Surgeon, R.N.) relinquishes his commn. on reverting to R.N. Medical Services ; Feb. 11 (substituted for notification in *Gazette* March 22).

Four officers transfd. to Unemployed List.

The notification in *Gazette* Feb. 14 concerning Capt. A. E. McCulloch is cancelled.

Chaplains' Branch

Rev. R. Hall is granted the relative rank of Col. while employed as Principal Chaplain (Wesleyan) ; May 1 (substituted for notification in *Gazette* May 20 granting the relative rank of Lieut.-Col.).

(Then follow the names of 266 Overseas Cadets granted temp. commns. as Sec. Lieuts. and 15 Cadets granted hon. commns. as Sec. Lieuts.

Col. (actg. Brig.-Genl.) K. Wigram, C.B., D.S.O. (Bt.-Col. (T.) Brig.-Genl.). Indian Army), relinquishes his commn. on ceasing to be employed ; April 10.

The following Temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed :—W. Naylor, T. T. Sawday ; June 16. H. B. Peiree ; July 17.

London Gazette, July 22

The following temporary appointment is made :—

Deputy Director (Qrmr. Servs.).—Col. F. C. Halahan, C.M.G., D.S.O, M.V.O. ; July 1, vice Lieut.-Col. (actg. Col.) A. Fletcher, C.M.G., C.B.E., M.C.

The following temporary appointments are made :—

Commander.—Maj.-Gen. J. F. A. Higgins, C.B., D.S.O., A.F.C., July 22, and to be graded for purposes of pay and allowances as Maj.-Gen. whilst so employed.

Brigadier-General (*Staff*).—Lieut.-Col. A. L. Godman, C.M.G., D.S.O., to be graded for purposes of pay and allowances as Brig.-Gen., Staff, May 1, whilst employed as Chief Staff officer of an area.

Group Commanders (Graded as Cols., Staff).—Lieut.-Col. (actg. Col.) R. H. Clark-Hall, D.S.O. ; July 16. Lieut.-Col. T. C. R. Higgins, C.M.G. ; July 1.

Staff Officer, 1st Class (P.).—Maj. H. A. Mitchell, O.B.E. ; May 23.

Staff Officer, 2nd Class (T.).—Maj. N. F. D. Buckeridge ; May 31, vice Lieut. F. Jewell.

Staff Officers, 3rd Class (P.).—Capt. L. E. Middleton ; July 20. Sec. Lieut. G. D. Ashby ; April 23, and to be actg. Capt. till April 30. (T.).—Lieut. J. W. Sawyer ; May 23. Sec. Lieut. W. Bye ; Feb. 2, aud to be actg. Capt. till April 30. Sec. Lieut. H. Norrington ; March 10, and to be actg. Capt. till April 30.

Air Attaché (*Madrid*).—Maj. (actg. Lieut.-Col.) W. D. S. Sanday, D.S.O., M.C. ; May 2, and to retain the actg. rank of Lieut.-Col. whilst so employed.

Flying Branch

Maj. R. S. Robinson to be actg. Lieut.-Col. whilst employed as Lieut.-Col. (A. and S.), from April 1, 1918, to April 30 (substituted for the notification in the *Gazette* of Aug. 6, 1918).

Capt. H. G. White to be actg. Maj. whilst employed as Maj. (A.) ; May 1.

Capt. S. T. L. Greer, A.F.C., to be graded for purposes of pay and allowances as Maj. while employed as Maj. (A) ; May 11.

Capt. H. G. Travers, D.S.C., to be graded for purposes of pay and allowances as Maj. while employed as Maj. (A. and S.) ; May 1.

Capt. W. G. Pigott relinquishes the grading for purposes of pay and allowances as Maj. (K.B.) ; May 5.

Lieuts. to be actg. Capts. while employed as Capts. (A.) :— J. Boyd, D.F.C. (from Oct. 14, 1918, to Nov. 21, 1918) ; M. J. Langley ; May 31.

Lieut. C. N. H. Bilney to be actg. Capt. while employed as Capt. (A. and S.) ; May 31.

Lieut. O. R. Gayford, D.F.C., to be actg. Capt. while employed as Capt. (O.) ; May 31.

Capts. to be graded for purposes of pay and allowances of Capts. while employed as Capts. (A'ship) :—R. E. V. Jellife ; July 2, 1918, to Jan. 31. A. J. H. MacColl ; May 22, 1918, to Jan. 31.

Lieuts. to be graded for purposes of pay and allowanees as Capts. while employed as Capts. (A.) :—N. C. Buckton, F. H. Davies, C. J. S. Dearlove, G. E. Gibbs, M.C., W. J. F. Harvey, D.F.C., G. L. Hobbs, M.C., C. L. King, M.C., D.F.C., H. F. Nicholls, D.F.C., A. D. K. Perkins ; May 1.

Lieuts. to be graded for purposes of pay and allowances as Capts. while employed as Capts. (A. and S.) :—G. H. Boyce, E. J. L. Hope ; May 1.

Sec. Lieut. H. C. T. Gompertz to be Lieut. ; Dec. 23, 1918.

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts. :—W. W. Langdon (A.), J. H. McCaghey (S.), G. W. McDougall (A.), H. G. Pratt (O.), D. E. Spalton (O.) ; May 31.

T. C. Beeken (Sec. Lieut., W. Riding R.) is granted a temp. commn. as Sec. Lieut. (S.) ; Oct. 19, 1918.

P.F.O. A. K. Smithells (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A.) ; July 2, 1918.

The following relinquish their commns. on ceasing to be employed :—Sec. Lieut. (Hon. Capt.) A. W. B. Becher (Capt., K.O.Y.L.I.) ; March 20. Lieut. H. Holroyd (Lieut., Sask. R.) ; May 20. Capt. (Hon. Maj.) E. G. Joy (Maj., Cent. Ont. R.) ; May 31. Lieut. (Hon. Capt.) H. S. Quigley, M.C., D.C.M. (Capt., Can. Engrs.) ; July 3. Lieut. A. F. G. Clarke (Sec. Lieut., R.A.S.C.) ; July 4. Lieut. M. L. Doyle, D.F.C. (Capt., Quebec R.) ; Lieut. E. J. Mills (Lieut., Quebec R.) ; July 6. Lieut. A. E. de M. Jarvis, D.F.C. (Lieut., E. Ont. R.) ; Sec. Lieut. (Hon. Lieut.) J. E. Palmer, D.C.M. (Lieut., Can. M.G.C.) ; Lieut. W. L. Rutledge, M M (Lieut., Sask. R.) ; July 7. Capt. R. Duncan, M.C. (Capt., Sask. R.) ; July 8. Lieut. E. O. Houghton (Lieut., C. Ont. R.) ; July 10. Maj. R. W. Bruce (Capt. (Temp. Maj., Sask. R.) ; July 14. Lieut. E. Mills (Sec. Lieut., R.H. and R.F.A.) ; July 23.

(Then follow the names of 274 officers who are transfd. to the Unemployed List under various dates. We regret that owing to pressure on our space it is impossible to reprint this portion of the List.)

Maj. G. R. Elliott (Capt., 3rd Dn. Gds.) resigns his commn., and is permitted to retain his rank ; July 22.

Capt. A. W. Williams, D.F.C., relinquishes his comm. on account of ill-health contracted on active service, and is permitted to retain his rank ; July 9.

Capt. G. Chadwick (Manch. R.) relinquishes his commn. on account of ill-health contracted on active service ; July 14.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—E. I. Sutcliffe (caused by wounds) ; May 20. J. H. F. Baker ; July 11. C. F. Eckel ; July 20 (substituted for the notification in *Gazette* March 4).

Lieut. L. C. Galloway relinquishes his commn., being physically unsuited for the duties of pilot and observer, and is permitted to retain his rank ; June 6 (substituted for the notification in *Gazette* Nov. 12, 1918).

Lieut. C. P. Tiptaff (Conn. Rang., T.F.) relinquishes his commn. on account of ill-health ; July 20.

Sec. Lieut. W. C. Saville relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; June 5 (substituted for the notification in *Gazette* Jan. 17).

Sec. Lieut. W. Coutts to take rank and precedence as if his appointment as Sec. Lieut. bore date Dec. 2, 1918.

Sec. Lieut. H. J. Bateman to take rank and precedence as if his appointment as Sec. Lieut. bore date Jan. 1.

The notification in the *Gazette* of Feb. 14 concerning Flight Cdt. T. C. Beeken is cancelled.

The notification in the *Gazette* of Feb. 21 concerning Capt. J. P. Inglefield is cancelled.

The notification in the *Gazette* of March 21 concerning Lieut. J. Valentine is cancelled.

The notification in the *Gazette* of April 1 concerning Capt. C. O. F. Modin, D.S.C., is cancelled.

The notification in the *Gazette* of June 27 concerning Capt. W. R. Read, M.C., A.F.C., is cancelled. The notification in the *Gazette* of May 27 to stand.

The notification in the *Gazette* of June 27 concerning Sec. Lieut. T. C. Beeken is cancelled.

The notification in the *Gazette* of July 4 concerning Sec. Lieut. (Hon. Lieut.) P. H. West is cancelled.

Administrative Branch

Maj. L. A. Burrowes to be actg. Lieut.-Col. whilst employed as Lieut.-Col. ; May 1.

Capt. H. A. Fordham to be Capt., from (S.O.) ; March 11.

Sec. Lieuts. to be actg. Capts. whilst employed as Capts. :—H. Gambier ; May 1. (Hon. Lieut.) W. H. Hoile, from (T.) ; May 31.

Lieuts. to be graded for purposes of pay and allowances of Capts. whilst employed as Capts. :—E. R. W. Close ; May 1. W. E. Berwick ; July 5.

Lieuts. to be Lieuts. :—A. L. Kidd, from (O.) ; May 3. W. M. Long, from Unemployed List ; July 1. L. A. Eggar, from (S.O.) ; July 5.

Sec. Lieuts. to be graded for purposes of pay and allowances of Capts. whilst employed as Capts. :—(Hon. Capt.) A. K. O. Cochrane, (Hon. Lieut.) E. Meynell, D.C.M. ; May 1.

Sec. Lieuts. to be graded for purposes of pay and allowances of Lieuts. whilst employed as Lieuts. :—(Hon. Lieut.) A. Colling, A. Lindsay, R. Parker, R. H. Sturgeon ; May 1.

Sec. Lieuts. (O.) to be Sec. Lieuts. :—R. E. Shears ; April 17. I. B. Boyce ; June 11.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in rank as Sec. Lieuts. :—H. C. Bird (substitutde for notification in *Gazette* of May 2), H. V. Hall ; April 1, 1918.

The following relinquish their commns. on ceasing to be employed :—Sec. Lieut. P. C. Cooper (Sec. Lieut., Northants R.) ; April 20. Lieut. (Hon. Capt.) T. E. Gentles (Capt., Lab. Corps) ; June 21. Capt. L. J. Torrie (Capt., Ind. Army) ; June 25. Capt. L. G. G. Groves (Lieut., R.N.) ; July 8.

(Then follow the names of 54 officers who are transfd. to the Unemployed List under various dates.)

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—W. R. Nichols ; Jan. 15 (substituted for notification in *Gazette* of Oct. 11, 1918). W. I. Parke, contracted on active service ; July 4.

Sec. Lieut. W. C. Probets resigns his commn. and is permitted to retain his rank ; July 23.

The surname of Capt. H. Vyvyan-Robinson is as now described, and not H. V. Robinson, as stated in the *Gazette* of May 30.

The notification in *Gazette* of June 24 concerning Sec. Lieut. (actg. Lieut.) S. S. Vanderhook is cancelled.

The notification in *Gazette* of Jan. 24 concerning Sec. Lieut. J. R. Coulthard is cancelled.

The notification in *Gazette* of March 7 concerning Sec. Lieut. J. P. Wardle is cancelled.

The notification in *Gazette* of April 25 concerning Lieut. E. D. Warburton is cancelled.

The notification in *Gazette* of May 9 concerning Lieut. G. M. Smith is cancelled.

The notification in *Gazette* of June 3 concerning Lieut. H. C. R. Milward is cancelled.

The notification in *Gazette* of July 15 concerning Capt. R. S. Lindsell, O.B.E., is cancelled.

The notification in *Gazette* of Oct. 18, 1918, concerning J. W. S. Appleton is cancelled.

Technical Branch.

Lieut.-Col. (actg. Col.) A. Fletcher, C.M.G., C.B.E., M.C., to be Lieut.-Col., Grade (B), from Dep.-Dir , and to relinquish the actg. rank of Col. ; July 1.

Sec. Lieut. (Hon. Lieut.) O. C. Lees to be actg. Lieut.-Col., Grade (A), whilst specially employed ; May 30.

Capt. F. Holloway, O.B.E., to be graded for purposes of pay and allowances of Maj. whilst employed as Maj., Grade (A) ; May 22.

Lieut. J. A. Atkinson to be actg. Capt. whilst employed as Capt., Grade (A), from June 1, 1918, to April 30.

To be graded for purposes of pay and allowances of Capts. whilst employed as Capts., Grade (A) :—Lieut. J. Y. de la C. Elliott, Lieut. H. F. Groves, Lieut. W. A. Hancock ; May 1. Sec. Lieut. E. T. W. Nockold ; to May 30.

Sec. Lieut. J. R. Coulthard to be actg. Capt. whilst employed as Capt., Grade (B), from Dec. 21, 1918, to April 30.

To be graded for purposes of pay and allowances of Capts. whilst employed as Capts., Grade (B) :—Lieut. J. I. Thompson, Lieut. J. A. V. Welsh, Sec. Lieut. W. C. Titheradge ; May 1.

Lieut. (Hon. Capt.) R. Godfrey to be Lieut., from (Ad.) ; April 22, 1918 (substituted for notification in *Gazette* of Dec. 17, 1918).

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts., Grade (A) :—L. Freeborn, G. H. Winckworth ; May 31.

Sec. Lieut. (Hon. Lieut.) J. L. Miles to be graded for purposes of pay and allowances as Lieut. while employed as Lieut., Grade (A) ; May 1.

Sec. Lieut. C. E. Kitchenside to be graded for purposes of pay and allowances as Lieut. while employed as Lieut., Grade (B) ; May 1.

Sec. Lieut. (Hon. Capt.) G. C. Clark to be Sec. Lieut. (Hon. Capt.), Grade (A), from Grade (B) ; Feb. 6 (substituted for notification in *Gazette* of April 1).

Sec. Lieut. J. K. Thomson to be Sec. Lieut., Grade (A), from Grade (B) ; March 14.

Sec. Lieut. M. P. Stoneham to be Sec. Lieut., Grade (A), from (Ad.), from Dec. 9, 1918, to Feb. 1.

Sec. Lieuts. to be Sec. Lieuts., Grade (B) :—F. G. A. Terrill, from (Ad.) ; Jan. 20. A. Jukes, from (S.O.) ; May 1.

J. W. S. Appleton is granted a temp. commn. as Sec. Lieut., Grade (A) ; Oct. 16, 1918.

Maj. W. R. Wills relinquishes his commn. on revision to I.A.R.O. ; July 16.

The following relinquish their commns. on ceasing to be employed :—Lieut. G. W. E. Baker (Lieut., R. Berks. R.) ; June 22. Sec. Lieut. (Hon. Lieut.) C. C. Newton-Wade (Capt., K.O.Y.L.I.) ; July 8. Lieut. C. H. Shelton (Lieut., R.H. and R.F.A.) ; July 31.

(Then follow the names of 52 officers who are transfd. to the Unemployed List under various dates.)

Lieut. T. A. Burns relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; July 21.

Sec. Lieut. (Hon. Capt.) U. Brown (Welsh R., T.F.) relinquishes his commission on account of ill-health, contracted on active service ; July 20.

Sec. Lieut. H. P. Bolt is antedated in his appointment as Sec. Lieut., Grade (A) ; Feb. 21.

The surname of Capt. G. E. Lygo is as now described, and not "Liggs," as stated in *Gazette* of April 1.

The notification in *Gazette* of March 25 concerning Lieut.-Col. (actg.Col.) S. E. Smith is cancelled.

The notification in *Gazette* of March 11 concerning Sec. Lieut. J. R. Coulthard is cancelled.

The notification in *Gazette* of May 16 concerning Lieut. J. A. Atkinson is cancelled.

The notification in *Gazette* of May 16 concerning Capt. L. R. Prichard is cancelled.

The notification in *Gazette* of May 30 concerning Lieut. J. A. Atkinson is cancelled.

The notification in *Gazette* of June 24 concerning Lieut. G. Glen is cancelled.

Medical Branch

E. W. Craig, M.C. (Temp. Capt., actg. Maj., R.A.M.C.), is granted a temp. commn. as Capt. ; Oct. 1, 1918, and to be actg. Maj., with seniority from May 10, 1918 (substituted for notification in *Gazette* of Jan. 1).

(4 officers transfd. to Unemployed List.)

The notification in *Gazette* of April 4 concerning Capt. T. E. Mulvany is cancelled.

Dental Branch

G. F. Charles is granted a commn. as Capt. ; July 1 (substituted for notification in *Gazette* of July 4).

Memoranda

Lieut. F. T. Court to be Hon. Capt. ; Dec. 29, 1918.

Capt. (actg. Maj.) R. S. Lindsell, O.B.E., relinquishes his commn. on ceasing to be employed ; June 1.

The following Temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed :—J. S. Low ; March 16. T. H. Thresh ; June 16. F. H. Wheeler ; July 16.

(3 officers transfd. to Unemployed List.)

Sec. Lieut. H. G. Keene to take rank and precedence as if his appointment as Sec. Lieut. bore date Jan. 1.

The notifications in *Gazette* May 27 concerning D. Morrison and C. D. Law are cancelled.

(Then follow the names of 46 Overseas Cadets granted temp. commns. as Sec. Lieuts., and six Cadets granted hon. commns. as Sec. Lieuts.

London Gazette, July 25.

The following temporary appointment is made :—

Staff Officer, 3rd Class.—Sec. Lieut. G. T. Armitage ; May 23, and relinquishes actg. rank of Capt.

The surname of Lieut.-Col. C. E. H. Rathhorne is as now described, and not "Rathbone" as stated in *Gazette*, July 18.

Flying Branch.

Capt. D. G. Donald to be actg. Major whilst employed as Major (A.) ; May 1.

Lieut. J. A. Rutherford to be Lieut. (A.) from (T.) (Nov. 27, 1918).

The following relinquish their commns. on ceasing to be employed :—

Lieut. (Hon. Capt.) W. L. Haight (Capt., W. Ont R.) ; April 24. Sec. Lieut. (Hon. Lieut.) F. J. Mawdesley (Lieut., C. Ont. R.) ; May 13 ; Capt. (Hon. Major) J. A. Dennistoun (Major, Manitoba R.) ; June 9 (substituted for notification in *Gazette*, June 24) ; Sec. Lieut. (Hon. Lieut.) A. T. le F. Johnson (Lieut., Lord Strathcona's Horse) ; July 17.

(Then follow the names of 109 officers who are transfd. to the Unemployed List under various dates.)

Lieut. J. F. Hunt relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; July 20.

Lieut. H. S. Round to take rank and precedence as if his appointment as Lieut. bore date April 1.

Sec. Lieut. (Hon. Lieut.) J. C. Ambler (Lancs. Fus., T.F.) relinquishes his commn. on account of ill-health ; July 10.

The rank of Lieut. W. Wilkinson is as now described, and not "Sec. Lieut," as stated in the *Gazette* of July 22.

The surname of Lieut. E. C. Cockburn is as now described and not "Cockwin," as stated in the *Gazette* of March 25.

The notification in the *Gazette* of March 21 concerning Sec. Lieut. C. A. Newham is cancelled. The notification in the *Gazette* of April 29 to stand.

The notification in the *Gazette* of April 1 concerning Sec. Lieut. A. J. Newnham is cancelled.

The notification in the *Gazette* of April 4 concerning Lieut. J. Milton is cancelled.

The notification in the *Gazette* of June 3 concerning Lieut. L. M. McAhb is cancelled. The notification in the *Gazette* of July 8 to stand.

The notification in the *Gazette* of July 15 concerning Lieut. H. S. Symonds is cancelled.

SIDE-WINDS

"Miralite" is numbered among those who join in the glory of the historic voyage of the R 34, for the pistons of the Sunbeam engines were made of this alloy. Miralite, Ltd., are naturally proud of the part their pistons played in the achievement, but at the same time it is but the culmination of a series of searching tests to which they have submitted their speciality. "Miralite," it may be pointed out, is an aluminium alloy, which has proved itself eminently suitable for the making of pistons either die-cast or moulded in sand. Its use, however, is not restricted to this particular work. The manufacturers have experimented with it, and have evolved certain modifications which enable them to supply Miralite for a variety of purposes. One of the most interesting developments is the making of piston-rings, and the results so far obtained indicate that they will largely supersede the cast-iron ring. There is not the possibility of scoring the cylinder, which is a risk always present when the latter are used—in fact, in one testing-shop Miralite piston-rings have entirely replaced cast-iron rings on this account.

* * *

Another use for Miralite is in the making of carburettor parts. It is a well-known fact that petrol has an adverse effect upon aluminium, but Messrs. Miralite, Ltd., have produced an alloy which has so far successfully withstood prolonged tests. All these developments are full of promise, and the firm, whose works are at 87-91, High Street, Mortlake, S.W. 14, will be glad to send particulars to any enterprising companies who are on the look-out for new things.

Father Thames was on his best behaviour on Sunday last, when the employees, numbering some 120 of Messrs. S. Smith and Sons (Motor Accessories), Ltd., of Great Portland Street, forgot all the worries and troubles of the motor and aircraft industries of the present day and made merry in right good fashion. The party boarded the launch at 10.30 at Richmond for Chertsey, all the arrangements having been very carefully planned at no small trouble by Mr. Dandie and Mr. Seaborne, to whom all expressed their heartiest congratulations and appreciation. The directors of the firm entered whole-heartedly into the fun, much to the gratification of all. The music and songs were excellent; in fact, nothing in any way could have been better.

* * *

Called to Le Havre recently by French engineers, Barimar, Ltd., the British welding specialists, effectively repaired by metal-fusion the American liner *Saccarappa*, carrying valuable cargo. Their French *confrères* declared that the "damage was irreparable by ordinary systems," but Barimar reconstructed the windlass in a few hours, thus enabling the vessel to proceed. A French branch of the British company is now being formed to assist in the reconstruction of French derelict machinery by special processes, and similar organisations are also being established in India, Australia, New Zealand, South Africa, British East Africa, Italy, Scotland, Ireland, Belgium and Sweden.

CORRESPONDENCE

THE R 34'S ENGINES

[1976] In reference to the recent successful cross-Atlantic and return journey of H.M.A. R 34, this ship, as you are aware, is fitted with our 270 h.p. "Maori" Type IV engines, and it is thought that the following information regarding the performance of the engines during this trip will be of some assistance to you:—

We will deal with the two reported incidents of the trip first.

The failure of the studs in the connecting-rod big-end on the port engine in the aft car was caused by the engine being allowed to run after the white metal had run out of the big-end bearing. The reasons for the absence of the white metal on this bearing are somewhat obscure, as the crew state that the oil pressure was correct at the time of the breakdown. Previous to the actual breakdown of the engine, the clutch between the engine and the propeller shaft was accidentally thrown out, with the result that the engine was caused to race to a high speed. It is possible that this caused the failure of the white metal, and it would only be a matter of time before the broken metal was hammered out. As the engine up to the time of this mishap had run approximately 300 hours, it can be assumed that the failure was not due to any defect in either material or workmanship.

The chewing-gum episode has been greatly exaggerated. When our representative visited Pulham to meet the ship on her arrival, he expected to have difficulty in finding the engine under heaps of chewing-gum, but to his great surprise he could not locate the repair until he received the assistance of a mechanic in charge of the engine.

It seems that the head had broken off one of the small screws securing the water-plate on the cylinder-jacket, and that this allowed a very small drip of water. To stop it, the mechanic fitted a small plate over the hole, securing the plate under the head of the two adjacent screws. Just before finally tightening these screws, he had a brilliant idea and inserted a small piece of chewing gum.

This, you will agree, is somewhat different to the reports which have been made, referring to the use of chewing-gum to repair a broken-down engine.

It is understood that it was not necessary to stop the engine to effect this repair.

With the exception of these items, no serious trouble was experienced, the engines running quite satisfactorily both on the outward and return journey, during which the five engines between them put up a total of approximately 900 hours' running, to which must be added over 600 hours previous running.

Many non-stop runs were made of anywhere between 20 and 36 hours' duration, without any incident worth mentioning, the engines being closed down at the ends of these periods for a few hours' rest as per pre-arranged programme.

After the breakdown of the port engine in the aft car, the starboard engine was run under full throttle conditions for 29 hours, and was quite satisfactory, this run being terminated by the landing of the ship at Pulham.

We have been congratulated from high quarters on the performance of both engines and machinery, for which we are solely responsible, but unfortunately we are not allowed to use these congratulations for publicity purposes.

For The Sunbeam Motor Car Co., Ltd.,
J. S. Irving.

Wolverhampton.

LANDING FEES

[1977] It is a source of gratification to us to see that the Bournemouth Aerodrome is recognised as a suitable arrival and departure centre for commercial and passenger machines, and that a few interested business people have already made use of its ideal situation.

We wish to make public the fact that it is our intention to foster in every way possible the development of the main air routes, and by bringing forward from time to time the new conditions arising from aerial traffic, create a feeling of goodwill and mutual effort throughout this enterprising industry.

The advent of aerial transport opens up a great many points for consideration, such as suitable aerodromes and routes, etc., of which at the moment there are few, also when it is understood that aviation must be fostered upon a business basis, the handling of machines, goods and passengers effectually, becomes an important factor, this must create labour and it requires organisation, this will cost money, and it is upon running cost of the complete services that the future depends. The question arises, will it pay? This can be answered in the affirmative, that is if all points are carefully considered and co-operation maintained.

The present system of aerodrome dues are insufficient, and as this transport system develops it will be necessary to make adequate arrangements for handling and disposal of goods and passengers, and as we have already experienced the amount of work entailed, perhaps we are some of the few best able to realise the necessity of organisation in this direction, and estimate the cost, but before a scale of charges or system of organisation is suggested, the necessity of the opinion and co-operation of all interested business people is essential, at the same time while giving this matter attention, we think that for some considerable time no charges beyond aerodrome dues should be made, and that all aerodromes should operate upon this understanding, and by mutual effort obtain an efficient service.

It will be necessary to go right into this matter. As the systematic co-operation of the various aircraft firms and commercial people is essential, the system obtaining upon one aerodrome should be on exactly the same lines as others, to avoid confusion. Plenty of time, money and brains have been spent upon this one side of the question alone, so now let us have the fruit of this study from all quarters to achieve the result desired.

The Bournemouth Aviation Co., Ltd.,
M. Y. Bates, Ground Engineer.

Bournemouth.

COMPANY MATTERS

Vickers, Ltd.

The directors of Vickers, Ltd., announce the following interim dividends for the half-year ended June 30 last, payable to holders registered on August 5:—2½ per cent. (less income-tax) on the preferred 5 per cent. stock and 5 per cent. preference shares; 2½ per cent. (free of income-tax up to 6*s*. in £) on the cumulative preference shares; 1*s*. per share (free of income-tax up to 5*s*. in £) on the ordinary shares. Dividends will be posted on August 30.

NEW COMPANIES REGISTERED

AERIAL PHOTOS, LTD., 81A, George Street, Edinburgh.—Capital £18,000 in £1 shares. Objects: To carry on the business of (*a*) aerial photography, including cinematograph films; (*b*) aerial passenger transit, and (*c*) commercial aerial advertising, &c. First directors: Capt. R. S. J. B. Andrews, C. H. C. Smith, and O. Hardic.

MORRIS JONES ROPE CO., LTD.—Capital £3,000 in £1 shares. Acquiring business carried on at Brunswick Works, Eldon Street, Sheffield, as the "Morris Jones Rope Co.," manufacturers of and dealers in all kinds of wire ropes, aircraft, &c. First directors: J. W. Jones and E. M. Jones.

* * *

A Hangar Invention

The Royal Commission on Awards to Inventors at a meeting on July 29, heard evidence regarding a claim by Messrs. Delacombe, Marechal, and Hervieu, in respect of sheds for kite balloons and aeroplanes. It was stated that these sheds were used extensively round the Mediterranean and the coasts of England in connection with the anti-submarine campaign.

M. Hervieu said that by his invention the roof was built on the ground, and afterward raised into position.

The royalties paid to June, 1917, were stated to be £13,000, which excess profits and income-tax had reduced to £1,750.

Brig.-Gen. Masterman, R.A.F., said the sheds had proved to be entirely satisfactory, and Capt. Burgess, of the Aircraft Designs Department of the Air Ministry, said that M. Hervieu was at the top of the tree as a designer of aeroplane sheds. It appeared from the evidence that the sum spent on construction, on which royalty was claimed, amounted to nearly one million sterling

Mr. Trevor Watson, who appeared for the Treasury, while admitting the value of the designs, submitted that a royalty basis was not a proper basis of award.

The Chairman stated that the Commission would consider their award.

No Municipal Aerodrome for Middlesbrough

They do not appear to have very enterprising municipal authorities up Middlesbrough way. At any rate, the corporation of that city, having been offered by the Government the first chance of purchasing the Redcar Aerodrome, have decided that they have no use for it.

An Aerodrome at Ilford

Application has been made to the Ilford Council for the hiring of the Hainault recreation ground for use as a civilian aerodrome for two years.

Disposal of Canteen Profits

The Government have approved an organisation for the disposal of the canteen profits which have accumulated during the War. The sums are considerable, and will be devoted to the benefit of disabled and discharged officers, N.C.O.s, and men; widows, children, and orphans of deceased officers, N.C.O.s, and men; the provision of social and recreation benefit for ex-officers, N.C.O.s, and men; the benefit of serving officers N.C.O.s and men as regards recreation.

It is hoped that this new organisation will take the form of a United Services Fund for the good of past and present sailors, soldiers, and airmen or their dependents. Gen. Sir Julian Byng, who is leaving the Army for this purpose, has been appointed chairman of the board of management, and the executive committee will include representatives of all ranks of serving and ex-serving officers and men and women.

Sage "Milestones"

A printers' error crept into the table of dimensions of Sage machines in our issue of last week. In the column giving the stagger the dimensions were given in ft. and ins.; these, of course, should read 11·8 ins., etc., etc.

* * *

Aeronautical Specifications Published

Abbreviations:—cyl.=cylinder; I.C.=Internal combustion; m.=motors.

Applied for in 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 24, 1919

11,389. Fuller Accumulator Co. and H. C. Brown. Lamps for aircraft. (128,615.)
11,441. W. Hutchings. Machine for measuring aircraft propellers. (128,619.)
11,540. S. A. Flower. Transverse frames of airships. (128,621.)
11,614. S. O. Cowper-Coles. Metal wing for flying-machines. (128,622.)
11,743. L. Paulhan and H. J. L. M. de Chevardiere de la Grandville. Aerial propellers. (128,629.)
11,754. Portadown Weaving Co. and T. J. Greeves. Transparent flexible material for aeroplane wings. (128,630.)
11,874. Austin Motor Co. and Sir H. Austin. Mounting of aeroplane propeller and gun firing axially through same. (128,634.)
11,889. E. R. Calthrop. Parachute-launching devices for aeroplanes. (128,636.)
12,059. British and Colonial Aeroplane Co. and W. T. Reid. Aircraft fuselages. (128,643.)
12,060 and 12,061. British and Colonial Aeroplane Co. and W. T. Reid. I.C. engines for aircraft. (128,644 and 128,645.)
12,113. J. J. Mayrow. Fuselages. (128,651.)
12,311. H. F. Mordey, W. Lane and P. H. Houghton. Aircraft propellers. (128,657.)
12,349. S. E. Groves and T. W. H. Ward. Dopes or varnishes. (128,659.)
12,406. E. E. Brown and D. J. Mooney. Metal construction for aircraft. (128,663.)
12,483. E. R. Calthrop. Parachutes. (128,669.)
12,534. F. H. Bramwell and Sunbeam Motor Car Co. Observation apertures for aircraft. (128,671.)

Published July 31, 1919

12,742. A. H. Ackerman and F. G. Ericson. Landing-chassis. (128,971.)
1,2807. British Aeroplane Varnish Co. and S. E. Groves. Dopes. (128,974.)
12,899. Aeronautical Instrument Co. and G. Brewer. Balloons. (128,979.)
12,904. Vickers, Ltd. and H. A. Savage. Aircraft gun mountings. (128,980.)
12,906. G. H. Thomas, G. de Havilland and H. R. Morgan. Poppet valves. (128,981.)
12,907. G. H. Thomas, G. de Havilland and H. R. Morgan. Determining direction of escape of lubricant from cylinders. (128,982.)
13,025. G. Caproni. Chaser aeroplane. (128,989.)
13,058. J. D. Brunton. Joints in stream-line, etc, wires. (128,990.)
13,127. A. O. Warren, W. and E. G. Prior. Fuselage, wings, struts, etc. (128,993.)
13,249. H. W. Phillips. Spars. (128,994.)
13,254. W. D. Oddy. Propeller-shaping machines. (128,995.)
13,299 and 13,300. Blackburn Aeroplane and Motor Co. and J. W. Copley. Attachment devices for connections in aircraft. (128,997 and 128,998.)
13,302. Blackburn Aeroplane and Motor Co. and J. W. Copley. Aeroplane rudders. (128,999.)

Applied for in 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 24, 1919

11,063. Aeronautical Instrument Co. and G. Brewer. Indicating turning movements of aeroplanes, etc. (128,757.)
11,666. J. J. Mayrow. Wings, aerofoils, etc. (128,770.)
14,459. T. H. Martyn. Fuel feed for engines in which cylinders rotate. (119,036.)
20,897. E. E. Brown and D. J. Mooney. Metal construction for aircraft. (128,846.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 31, 1919

5,987. D. J. Mooney and E. E. Brown. Metal spars, longerons, etc. (129,234.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages liii, liv, lv and lvi)

NOTICE TO ADVERTISERS.

In order that "Flight" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates*:—

United Kingdom.	*s.*	*d.*	Abroad.	*s.*	*d.*
3 Months, Post Free	7	1	3 Months, Post Free	8	3
6 ,, ,,	14	1	6 ,, ,,	16	6
12 ,, ,,	28	2	12 ,, ,,	33	0

These rates are subject to any alteration found necessary under war conditions.

Should any difficulty be experienced in procuring "Flight" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office by forwarding remittance as above.*

FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World.
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 554 (No. 32, Vol. XI.) AUGUST 7, 1919 Weekly, Price 6d. Post Free, 7d.

Flight
The Aircraft Engineer and Airships
Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.*
These rates are subject to any alteration found necessary under war conditions

CONTENTS

	PAGE
Editorial Comment:	
The New Nomenclature	1037
Airship Control	1037
German Airsbips for the R.A.F.?	1038
Air Navigation Rules	1038
The Future of the R.A.F.	1040
Not a Blind Alley	1040
Flight—and the Men: Capt. I. F. Fairbairn-Crawford	1039
Good and Bad Looping	1041
A Mechanical Aero-Engine Starter	1042
The Royal Aero Club: Official Notices	1043
The Royal Air Force	1044
Royal Air Force: Service in the	1046
Developments in Aircraft Design	1048
"Westlands" at Yeovil	1054
The Amsterdam Exhibition	1056
Civilian Flying	1057
The U.S.A. Naval Flying Boat F-5-L	1058
Personals	1062
Airisms from the Four Winds	1063
Air Services	1064
In Parliament	1068
Side-Winds	1069
Correspondence	1069
Company Matters	1070

EDITORIAL COMMENT

The New Nomenclature

BY Royal Warrant His Majesty has been pleased to approve a series of new titles for officers of the Royal Air Force. Although some of the new ranks have a sound to the ear which is at first a little incongruous, it is simply because they are strange, and use and custom will speedily remove the feeling of strangeness with which such titles as "marshal of the air," will be used. The departure from military titles is a wise and thoroughly sound move. It is one we have advocated from the moment the decision was taken to constitute the R.A.F. as it now is. Above all things it is essential to develop and foster in the Air Service that best of all traits leading to sound *esprit de corps* which can only be described, inadequately it is true, as exclusiveness. By that we mean the pride in a Service which stands apart, though not aloof, from all other Services—a pride which is at its highest in the Royal Navy, and which has made that Service in great measure what it is. In order to maintain that spirit of exclusiveness—or self-containedness would possibly better describe what we mean—it is essential that there should be neither room nor opportunity for confusion, even in such a matter as the titles by which its officers and men are called. The borrowing of Air Force titles from the Army we have always held to have been a very serious mistake. As we pointed out when these titles were adopted, it would have been far better to have taken over the old R.N.A.S. ranks of Squadron-Commander, Flight-Commander, and the rest than to have rated everyone Colonels, Majors and the like.

What has been done now is practically to adopt the R.N.A.S. system of nomenclature, with certain slight modifications which are quite insufficient to obscure the source of their inspiration. In the higher ranks, of course, new titles have been coined. Obviously, the supreme rank could have been neither Field-Marshal nor Admiral of the Fleet, so a not unhappy combination of the two has been made, with the resultant that the highest rank to which an officer of the R.A.F. can attain is Marshal of the Air. Who, beside the Sovereign, who as chief of the R.A.F. will automatically take the rank, will be the first to be honoured with the bâton?

◆ ◆ ◆

Airship Control

It has now been definitely decided that airships are to be transferred from the Admiralty to the Air Ministry. This was announced in the House the other day by Mr. Bonar Law, who was called upon to answer a series of questions put by Lieut.-Col. Malone, who was very curious to know exactly what was to happen. Some of these questions were so apparently aimless as to suggest that the enquirer had a good deal less knowledge of his subject than he should have possessed. But to those who know the course things were taking with regard to this question of the control of lighter-than-air craft, all these seemingly superfluous queries had a distinct purpose behind them.

The fact of the matter is that the negotiations between the Admiralty and the Air Ministry have been dragging on for some time. The former desired to retain control, and the latter was at one time—and that very recently—inclined to give way. It was only that very broad hints of impending trouble if the Air Force were split in the way contemplated reached the right quarter which really brought the question to a head last week, and, what is better, resolved it satisfactorily. Even after it had been decided that the airships were to pass over to the Air Ministry, there were suspicions that all was not as clear as might be, and hence the questions. However, the future is settled, and the R.A.F. is to be as Parliament intended it should be, a separate, united and independent Force.

It is worth while referring to certain aspects raised by the questions. A great point was made of the desire to know whether airships working with the Fleet are to be under the orders of the Air Ministry or of the Admiralty. It is perfectly clear that when aircraft are working either with the armies in the field or fleets at sea they must be, for operations, under the sole command of the commander-in-chief or of officers of general rank delegated by him to carry out certain military tasks. There can be no question about this. Any other system would be fore-doomed to failure and disaster. But they will not be under the War Office or the Admiralty, as the case may be, and it was in order to clear up the situation that the apparently futile questions were put. Administratively, units of the R.A.F. will always remain as much under the Air Ministry as a Naval contingent serving with troops ashore is under the Admiralty. In such a case, the force retains all its Naval status, and is as much subject to Admiralty administration as ever, although for purposes of military command it must take the orders of the senior military authority on the spot.

Now, so long as it is understood that this is to be the status of R.A.F. units working with the fleets or armies, the position is unexceptionable. But there was an uneasy suspicion in the minds of the questioners that something different was intended under the cloak of the taking over of the airships by the Air Ministry. We do not say whether it was justified or not, but it was thought that the taking over was to be purely nominal, and that airships actually supplied for naval purposes would be handed over to the Admiralty, lock, stock and barrel, to become not only under the military command of the Navy, but to be under Admiralty administration as well. Whether that was the intention of the powers that be or not, it has been very effectually put to one side, and we feel that Col. Malone and those who were with him, in insisting that full information should be given the House, are deserving of the thanks of all who believe in the Royal Air Force one and indivisible.

◆ ◆ ◆

German Airships for the R.A.F.? Arising in some part out of the foregoing discussion of the fight for the control of the airship branch—for it has been nothing less—it is interesting to note the reply of Gen. Seely to Col. Moore-Brabazon on the subject of the allocation of German airships. The latter desired to know how many airships would be allocated to this country under the terms of Peace, and whether they would pass under the control of the Admiralty or of the Air Ministry. The Under-Secretary was not too precise in his answer. All the information he vouchsafed was that under the Peace terms all German airships are to be handed over to the Allies, but the exact number allotted to this country has not yet been decided. The airships will be taken over in Germany by the R.A.F. Section of the Inter-Allied Aeronautical Commission of Control, and their allotment as between the Admiralty and the Air Ministry will be determined by the decision made on the general question of responsibility for airships!

So that at the time this answer was given—one day last week—the "general question of responsibility for airships" had not been decided! It would seem as though there had been need for pressing and searching questions on the matter of policy regarding airship control. Undoubtedly a very ugly situation has been very narrowly avoided.

◆ ◆ ◆

Air Navigation Rules The Air Ministry has thought it necessary to issue the following important notification to aviators and firms engaged in civil flying:—

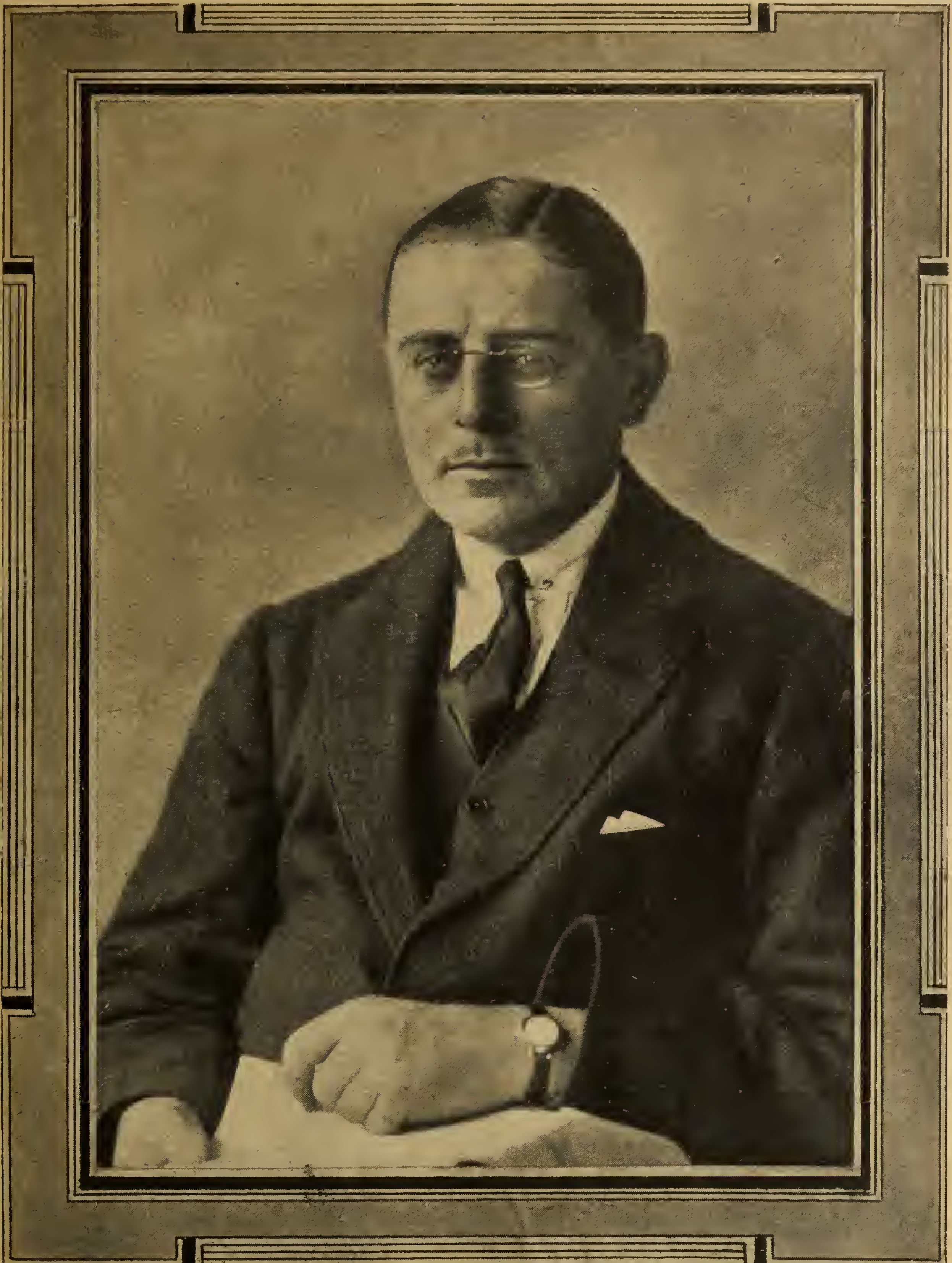
It is notified that, though the Air Navigation Regulations have been in force since May 1, and it is felt that pilots and others have now had ample opportunity of acquainting themselves with the regulations, numerous instances of their infringement are still being reported. The regulations were made with a view to securing the public safety, and in future proceedings will be taken when they are contravened. The public are requested to co-operate with the Air Ministry in this matter by forwarding to the Secretary (C.G.C.A.), Air Ministry, London, particulars of alleged offences, including, if possible, the registration number or mark of the machine in question.

The most common instances of infringement are:—

1. Dropping of leaflets and other advertising matter. (For the purposes of the Victory Loan campaign the Secretary of State for Air waived the provision in the regulations against the dropping of leaflets from aircraft, but the exemption has now been withdrawn.)
2. Taking up and landing passengers as a regular proceeding at places which have not been licensed as aerodromes.
3. Low flying—(*a*) over towns; (*b*) to the danger of the public elsewhere.
4. Neglecting to obliterate military markings when a machine has ceased to be a military machine.
5. Obscuring registration marks by means of advertisements or otherwise.

We are quite in accord with the determination of the Ministry to suppress dangerous flying over populous areas, and for the sake of the cause of safety we trust that the appeal to the public to assist in bringing offenders to book will bear fruit. But there is one aspect of the matter to which we should like to refer. In (1) the Ministry refers to the dropping of leaflets and other advertising matter, and then goes on to explain that for the purposes of the Victory Loan campaign the Secretary of State waived this provision. Now, we feel very strongly that this was quite wrong. If it is an offence against public safety to drop advertising matter from aircraft—and such a proceeding might easily lead to serious accidents in the streets—in one case, it is no less in another. If, for example, it be wrong to advertise FLIGHT in this manner, it is equally wrong to thus advertise a Government loan. More so, in fact, inasmuch as a Government Department should set an example rather than attempt to set itself above the law with the connivance of another Department. To our way of thinking, the methods adopted to advertise the recent loan were undignified in the extreme—to call them cheap would be to mix a metaphor, for they cost the nation a good round sum of money

Flight—And the Men



"Flight" Copyright.

Captain I. F. FAIRBAIRN-CRAWFORD, General Manager of the Aeroplane and Airship Departments, Sir W. G. Armstrong, Whitworth and Co., Ltd., Newcastle-on-Tyne.

from which it received very little return. We trust that if and when another loan is issued, or when the Government desires to make a moving appeal to the people, it will at least not ask any Department to connive at the commission of acts which, within a month, have to be specially notified as being against the law. There is very little doubt that pilots have offended in the belief that the prohibition was a dead letter, owing to the example given them during the loan campaign. Let us have no more of it.

◆ ◆ ◆

The Future of the R.A.F.

The Air Ministry has announced the conditions of permanent service of officers and men in the peace-time Royal Air Force. The announcement is rather belated, but in extenuation of the delay it should be pointed out that the R.A.F. is not quite in the same position as the Navy or the Army. Both of the latter Services were in being before the war and no creative work has had to be done in the establishment of their post-war strength. Whether they remain at the strength they were in 1914 or whether their numbers be reduced or increased is merely a matter of Government decision which can be carried out by the Admiralty and War Office Staffs with ease and celerity. In the case of the R.A.F., however, it was impossible to determine the constitution of the Staff before the strength of the new Force and the manner of its organisation had been determined. As everyone knows, there was no R.A.F. before the war and thus there was no administrative headquarters. All this has had to be created and has meant a large measure of delay in the announcement of ultimate details.

The full text of the official document stating the terms of service is published in another part of this issue of FLIGHT, so there is no need to refer to it in detail, except in a very general sort of way. It should be noted that, so far as the commissioned branches are concerned, it is proposed to feed these through a special R.A.F. college similar in constitution to Sandhurst and Osborne, which is to be opened in February next. The age for entry to this college has been set at 17½ and the youth who is admitted will, for the first year, receive what may be described as a general education, with a comparatively small amount of technical instruction. In the second year his instruction will be mainly technical, and provided he passes out at the end of that year, he will then be sent to join a squadron, in the same way that the Sandhurst cadet goes to join a regiment.

◆ ◆ ◆

Not a Blind Alley

There is one thing that should be emphasised, and that is that the young man who elects to take a commission in the R.A.F. is by no means entering a "blind alley" occupation. Even if he secures only a temporary commission he need not fear that. Temporary commissions are to be for three or four years and at any time during that period an officer may be offered a permanent one. In the event of his being so offered a permanent commission, he will have secured a great deal of knowledge which will be of inestimable use to him in civil life. He can specialise in flying, engineering, designing, photography, wireless telegraphy and telephony, or mechanical transport. Thus at the end of his service he will find himself in possession of a degree of training in technical subjects far in advance of that which he would probably have had as a civilian student.

Service in the non-commissioned ranks is equally attractive. A young man of 18 may join up and be taught a trade and earn pocket money at the rate of a guinea a week while he is learning. At the same time he will receive clothing, lodging and food free and will thus have no expenses. If he shows particular aptitude, he can rise to the rank of sergeant-major, when he will receive pay at the rate of 18*s.* per day. (By the way, is it intended to retain these ranks copied from Army nomenclature or are they to be altered as those of the officers have been ?)

The men it is particularly desired to attract are those with a knowledge, or a desire to learn, carpentry, or draughtsmen, coppersmiths, electricians, fitters, instrument makers, camera repairers, moulders, pattern-makers, turners and wireless operator mechanics. All boys entered and trained in the service, will be advanced to the rank of leading aircraftsmen at 5*s.* 6*d.* to 6*s.* 2*d.* per day on satisfactory completion of training, and the position just now is such that promotion to non-commissioned rank is certain to be extraordinarily rapid—and the commencing pay of a sergeant is 9*s.* 6*d.* per day.

Men who have been working for civilian firms of aircraft constructors are, unfortunately, being discharged in large numbers, but there seems to be a great opportunity for many of them in the R.A.F. We shall certainly have to wait for the "boom" in civilian aviation for another year or more, and in the meantime the R.A.F. holds promise of being just the Service in which men who wish to keep in close touch with the industry will be able not only to keep up their standard of craftsmanship but to better it. Men who have served for three or four years should then be able to command high wages and from that point of view alone the R.A.F. is certainly a most attractive Service. Not the least advantageous point about the issue of the new terms of service is that the announcement clears up finally all the uncertainty which has been rife regarding the future of the Force and places it, once and for all, in the same position as the Navy and Army. In a word, it is now constituted as a permanent part of our standing defences, in which service for officers and men is as stable and certain as in either of the other two.

◆ ◆

Honours for Sir Hugh Trenchard

IT was announced on Wednesday that H.M. the King has been pleased to approve that the following honour be conferred upon the high officer of the Air Force mentioned below, in recognition of the great services rendered to the country during the war :—

Air Vice-Marshal Sir H. Trenchard, K.C.B., D.S.O. : Baronetcy.

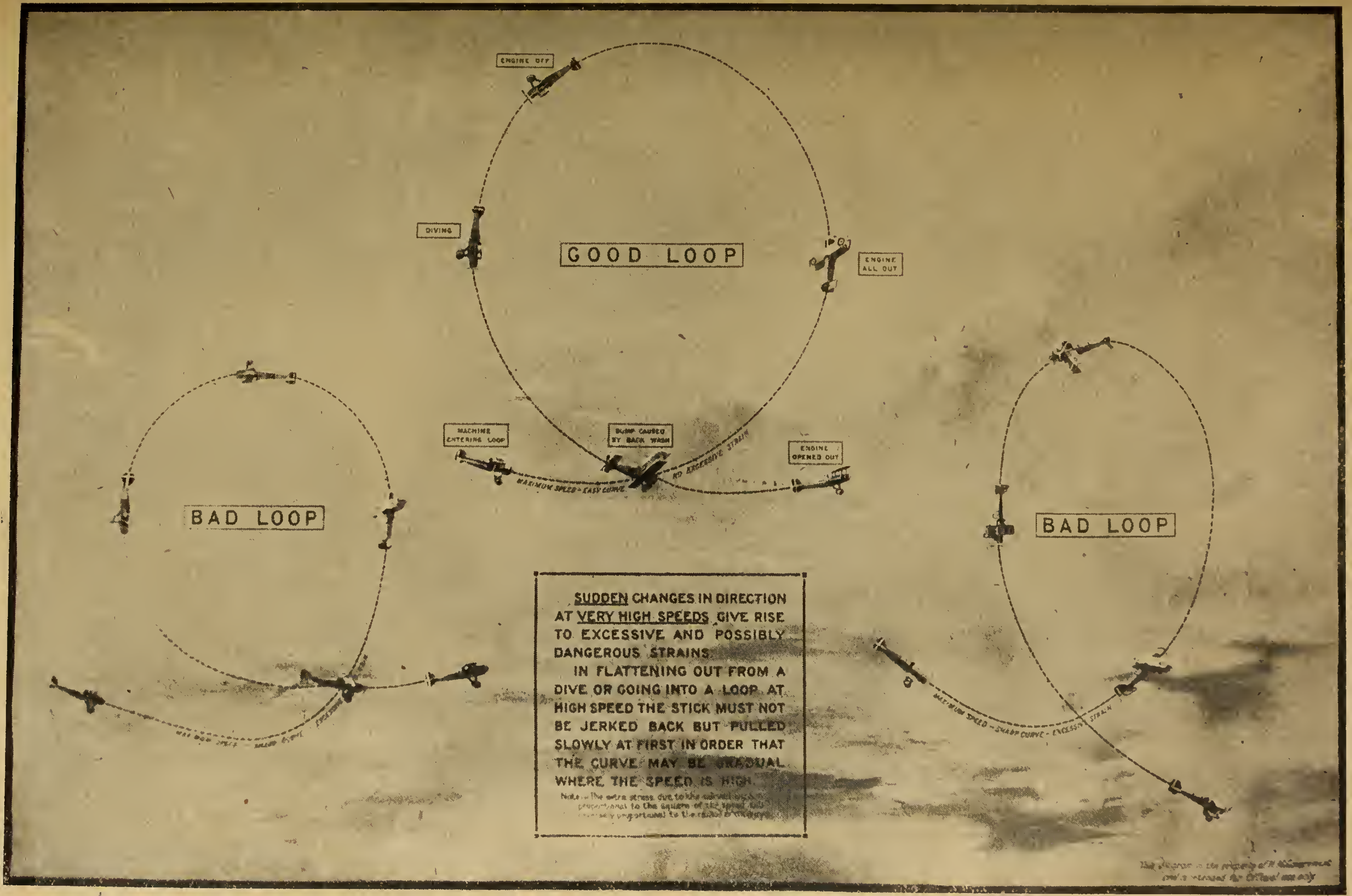
In the House of Commons, on Tuesday, Mr. Lloyd George handed to the Speaker a message from the King signed by his own hand. The Speaker read the message as follows :—

"His Majesty, taking into consideration the eminent services rendered during the late war by those officers who commanded and directed his forces by sea, on land, and in the air, and being desirous, in recognition of such services, to confer upon them some signal mark of his favour, recommends to his faithful Commons that he should be enabled to grant to :—

"Air Vice-Marshal Sir Hugh Trenchard : £10,000."

The Air Ministry

A PARLIAMENTARY paper, issued the other day, which gives the total number of persons on the staffs of the various Ministries, shows that whereas on November 11, 1918, the number engaged in the Air Ministry was 4,646, in March, 1919, it had diminished to 4,090.



SUDDEN CHANGES IN DIRECTION AT VERY HIGH SPEEDS GIVE RISE TO EXCESSIVE AND POSSIBLY DANGEROUS STRAINS.

IN FLATTENING OUT FROM A DIVE OR GOING INTO A LOOP AT HIGH SPEED THE STICK MUST NOT BE JERKED BACK BUT PULLED SLOWLY AT FIRST IN ORDER THAT THE CURVE MAY BE GRADUAL WHERE THE SPEED IS HIGH.

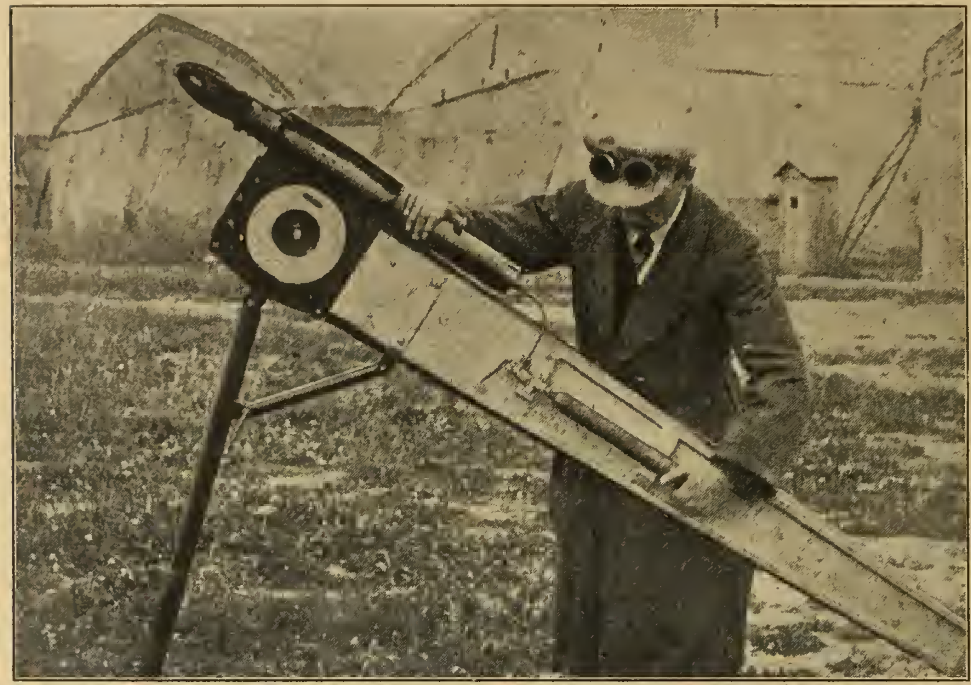
Note.—The extra stress due to the [illegible] proportional to the square of the speed [illegible] [illegible] proportional to the [illegible]

This diagram is the property of H.M. Government and is issued for Official use only

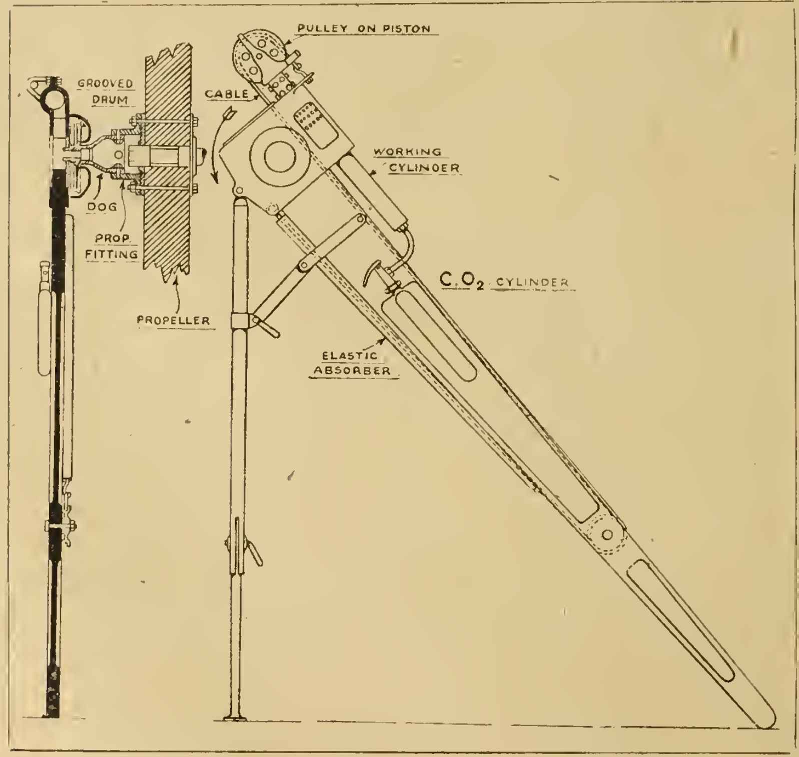
Good and Bad Looping. (*Drawing published by the Air Technical Services for use at the R.A.F. Schools.*)

A MECHANICAL "PROP-SWINGER," THE ODIER

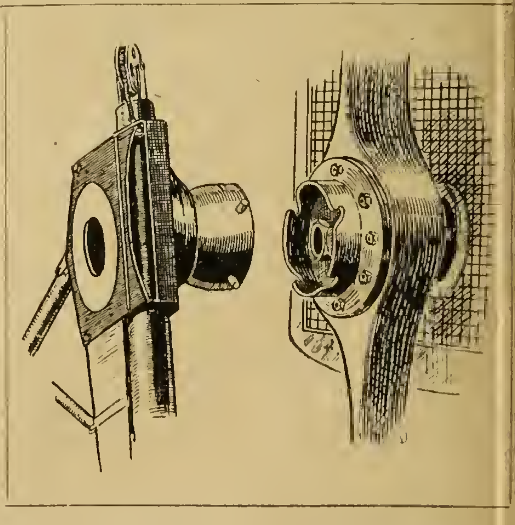
THE primitive and not to say dangerous process of "swinging the prop" in starting-up an aero engine is one of the problems in aviation that has constantly received the attention of designers. Various types of self-starters which form a part of the power plant itself have been devised and used with more or less success, but the fact that these add considerably to the total weight of the machine—an extra weight that is useless during flight—rather detracts from their value. The starting-gear incorporated in, and driven by, a motor car or motor lorry evolved by the late B. C. Hucks, though excellent, is cumbersome and somewhat limited in action. It appears to us, therefore, that the device invented by M. Odier, and supplied by Messrs. The Borel Establishment, of 22 bis, Boulevard Bourdon, Neuilles s/s Paris, gets very near to solving the problem, for in the first case its weight is by no means excessive, thereby possessing a distinct advantage over other types when carried on the machine, and, secondly, when compared with other portable devices, like the Hucks, its compactness, low weight and safety in operation render it much more efficient.


The Odier portable aero-engine starter.

Briefly, the Odier starter, which is shown in the accompanying illustrations, consists of a "bipod," carrying at its upper end a long steel cylinder and piston. Attached to the extremity of the piston, which projects outside the cylinder, is a pulley over which a cable is passed, having one end fastened to the cylinder and the other end wound four times round a grooved drum and then secured to an elastic absorber. The grooved drum is mounted on a short shaft having a bell-shaped extremity on which four projections are placed symmetrically around the periphery in such a way that they can be made to engage with sloping recesses in a standard fitting mounted on the boss of the propeller or tractor screw.



General arrangement of the Odier portable aero-engine starter.


Sketch showing the driving coupling of the Odier portable aero-engine starter.

Mounted on the apparatus is a small tube or reservoir, containing liquid carbonic acid and connected up to the cylinder. The operation of starting-up is as follows:—The apparatus—which can be adjusted in height by means of the telescopic leg shown—is held so that, with the legs resting on the ground, the driving dog is brought into contact with the fitting on the air screw. On pressing a small lever, pressure from the CO_2 reservoir forces the piston outwards, thereby tightening the cable around the drum and causing the latter to make two sharp revolutions. The air screw is thus also rotated and the engine started, and through the angle given the recesses in the air screw fitting, the starter is pushed forward and disengaged. Should the engine backfire, neither the apparatus nor the operator are in any way injured, for as soon as the drum rotates in the opposite direction it brings the piston back, against the already expanded gas, when the cable becomes slack, leaving the drum free to rotate indefinitely.

The carbonic acid flasks are similar to those used for fire-extinguishers, flame-projectors, "Sparklets," etc., each flask being capable of giving five starts with a 300 h.p. Hispano-Suiza engine. Larger flasks are also supplied. Hundreds of these starters have been used on all types of engines, such as the 130 h.p. Clerget, 200 and 300 h.p. Hispano-Suiza, 400 h.p. Liberty, 350 h.p. Napier, Rolls-Royce, etc.

That this starter is easy and speedy in operation is proved by the fact that at a certain aerodrome an apprentice, 15 years old, started six machines in seven minutes. On another occasion a 400 h.p. twin-engined Borel-Odier postal seaplane had to make seven forced descents upon the water owing to a leak in the radiator. As it was very rough, starting by hand would have been out of the question, but fitted with the stationary type Odier starter—which is bolted on the crank-end, with operating controls situated inside the cockpit—fourteen successful starts were easily accomplished.

◆ ◆ ◆ ◆

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Vice-Patron of the Club

H.R.H. The Prince of Wales has honoured the Club by becoming a Vice-Patron.

Society of British Aircraft Constructors and Royal Aero Club

A Meeting of the Joint Standing Committee of the Society of British Aircraft Constructors and the Royal Aero Club was held on Thursday, July 24, 1919, when there were present:—Royal Aero Club: Lieut.-Col. J. T. C. Moore-Brabazon, M.P., in the Chair, Lieut.-Col. F. K. McClean, Lieut.-Col. Alec Ogilvie and Mr. Harold E. Perrin, Secretary. Society of British Aircraft Constructors: Mr. R. O. Cary, Mr. Hamilton Fulton, Mr. N. G. Gwynne and Mr. Charles V. Allen, Secretary.

Chairman.—On the motion of Mr. N. G. Gwynne, seconded by Lieut.-Col. F. K. McClean, Lieut.-Col. J. T. C. Moore-Brabazon, M.P., was unanimously elected to the Chair.

The appointment of the Joint Standing Committee was reported as follows:—

Society of British Aircraft Constructors

Capt. P. D. Acland.
Mr. R. O. Cary.
Mr. Hamilton Fulton.
Mr. N. G. Gwynne.

Royal Aero Club

Lieut.-Col. F. K. McClean.
Lieut.-Col. J. T. C. Moore-Brabazon, M.P.
Mr. J. H. Nicholson.
Lieut.-Col. Alec Ogilvie.

Records.—It was decided that the word "Record" should not be used in any advertisement except in the case of a definite record having been granted by the Royal Aero Club.

SPECIAL COMMITTEE MEETING

A Special Meeting of The Committee was held on Wednesday, July 30, 1919, when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Lieut.-Col. John D. Dunville, R.A.F., Lieut. Col. Spenser D. A. Grey, D.S.O., R.A.F., Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., Lieut.-Col. F. K. McClean, Lieut. Col. Alec Ogilvie, Col. C. R. Samson, D.S.O., R.A.F., and Mr. Harold E. Perrin, Secretary.

Golf

Royal Air Force Club *v.* Royal Aero Club

A Golf Match between the Royal Air Force Club and the Royal Aero Club took place at Worplesdon on Tuesday, July 29, 1919. The morning's play resulted in the Royal Air Force Club being defeated by 6 points to 1. The afternoon was given up to four-ball matches, in which the teams finished "2 all." The Royal Aero Club won, therefore, on the day's play by 8 points to 3.

THE FLYING SERVICES FUND

(*Registered under the War Charities Act*, 1916)

Administered by the Royal Aero Club

For the benefit of *Officers, Non-Commissioned Officers and Men* of the Royal Air Force who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

Honorary Treasurer:

The Right Hon. Lord Kinnaird.

Committee:

H.R.H. Prince Albert, K.G. (*Chairman*).
Mr. Chester Fox.
Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F.
Lieut.-Col. C. E. Maude, R.A.F.

Secretary:

H. E. Perrin.

Bankers:

Messrs. Barclays Bank, Ltd., 4, Pall Mall East,
London, S.W. 1.

Subscriptions:

	£	s.	d.
Total subscriptions received to July 29, 1919 ..	15,077	19	1
Amount paid for a passenger flight with Mr. H. G. Hawker on May 31, 1919. Per the Sopwith Aviation and Engineering Co., Ltd.	42	0	0
Total, August 1, 1919	15,119	19	1

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

A Deal in Aeroplanes

The Aircraft Disposal Board have just sold 260 new Avro aeroplanes to Mr. S. W. Copley, of 1, Queen Victoria Street, E.C. 4. It is understood that this comprises the whole surplus stock of machines of this type which the Department possessed. The highest number of aeroplanes sold to a single purchaser previously by the Board was about 100.

And Another in Engines.

Another big deal reported is that by which the United Aircraft Engineering Corporation of New York, through its London agents, the Canadian and General Trust, Ltd., have bought from the Aircraft Disposal Department 700 aircraft engines and a large number of aeroplanes.

These are for export to Canada and the United States, to develop the commercial use of aircraft in both countries.

A New Record Claim

A brief message from New York claims that an American aviator has beaten the altitude record by climbing to 30,700 ft. It is stated that "uhe thermometer then recorded 25 deg. below zero, and the motor became chilled, forcing the aviator to descend."

The name of the aviator, the make of machine, and the place where it occurred are, however, unimportant details which were not worth reporting apparently.

THE ROYAL AIR FORCE

NEW TITLES IN THE R.A.F.

The Secretary of the Air Ministry makes the following announcements:—

His Majesty the King has been pleased to assume the title of Chief of the Royal Air Force.

His Majesty, on the advice of the Secretary of State for War and Air, has approved of new titles for the commissioned ranks of the Royal Air Force. These are set out below, with their corresponding ranks in the Navy and the Army:—

Air Force.	Navy.	Army.
Marshal of the Air	Admiral of the Fleet	Field-Marshal
Air Chief-Marshal	Admiral	General
Air Marshal	Vice-Admiral	Lieut.-General
Air Vice-Marshal	Rear-Admiral	Major-General
Air Commodore	Commodore	Brig.-General
Group Captain	Captain	Colonel
Wing Commander	Commander	Lieut.-Colonel
Squadron Leader	Lieut.-Commander	Major
Flight Lieutenant	Lieutenant	Captain
Flying Officer (or Observer)	Sub-Lieutenant	Lieutenant
Pilot Officer	Midshipman	Sec. Lieutenant

The object is to preserve and to emphasise the principle of the independence and integrity of the Royal Air Force as a separate service among the fighting services of the Crown. Hitherto the titles borne by officers of the Royal Air Force have been exclusively military in character, and as such they are not suited to a service which has not only to serve the special services of the Army, but also those of the Navy, and in addition has a strategic and tactical sphere of action independent of the other two fighting services.

It is, of course, not easy to command unanimous agreement on matters of nomenclature, but very long and careful consideration has been given to the choice of the titles now approved, and many interesting alternative suggestions have been rejected.

The scheme is framed on the principle (*a*) that the ranks should as far as possible correspond to actual functions; (*b*) that the ranks should as far as possible correspond to equivalent status in the three services; and (*c*) that there should be no repetitions in titles apart from the prefixes in the higher ranks. A distinction is preserved between the regimental officers and officers of general rank. Officers of general rank in the Royal Air Force are "Air Officers," and the expression "Air Officer" corresponds to the expression "General Officer" in the Army or "Flag Officer" in the Navy.

The new titles came into force on Monday.

COMMISSIONS IN THE R.A.F. AND SERVICE IN THE R.A.F. RESERVE

The Air Ministry makes the following announcement:—

It has been decided that officer personnel of the Royal Air Force will be provided for the present:—

1. By awarding a limited number of permanent commissions.
2. By granting 2,500 temporary commissions.

Permanent Commissions

A list of officers who have been awarded permanent commissions appears in the *London Gazette* to-day (August 1), but there remain to be awarded a further number of officers selected from those now serving in Russia, these attached to the Department of Controller-General of Civil Aviation and to the Department of Director-General of Supply and Research, and in some special cases which are still under consideration. The question of the award of permanent commissions to officers serving with airships will be dealt with later.

A certain number of permanent commissions will also be awarded in about six months' time to selected applicants from among the officers who are then serving on the temporary commission list.

No officer on the permanent commission list has been awarded a commission in a rank higher than the substantive rank he held except second lieutenants who have been commissioned as lieutenants. The necessary adjustment will be made in promotion Gazettes at an early date.

Officers employed as stores officers will in future belong to the Quartermasters' Branch of the R.A.F., unless they take up a flying qualification, and permanent commissions are only offered to these officers on this understanding. They will come under the rate of pay of the Quartermaster Branch, but will meantime be permitted to draw the higher rates laid down in the new scheme of officers in the general list until the position of each individual officer has been settled.

The new rates of pay and allowances in the case of officers given permanent commissions will run from August 1, these officers for the present being paid through the same agents as now.

Officers who have hitherto held temporary commissions only are informed that the War gratuity issuable in their case will be on the scale for permanent officers as their War service will now reckon as pensionable.

Any officer accepting a permanent commission to which he has been gazetted must notify this fact to the Air Ministry (D. of P.) through his O.C. at the earliest possible date and in any case not later than:—

(*a*) August 15 in the case of officers at home stations.

(*b*) August 31 in the case of officers with the Fleet in home waters or with the Forces of occupation in France and Germany.

(*c*) September 30 in all other cases.

Temporary Commissions

The scheme of entry for temporary commissions is open:

(*a*) To officers still serving who have not been awarded permanent commissions; and

(*b*) To demobilised officers.

It is not applicable to officers attached or lent from the other regular forces. Their terms of service in the R.A.F. will be dealt with separately.

As a general rule candidates must not be more than 25 years of age on application, and must have qualified as flying officers. A limited number of officers of other classifications may, however, be selected. In the case of these officers the age limitation will not be enforced.

Employment will be for a period of three years. On the completion of two years of this service officers may be permitted, if desirous, to extend their services to four years in all. After the period of three or four years' service on the active list, officers will pass into the reserve for a further period of four years' service. During the period of service on the active list an officer may be called upon to serve in any part of the world.

Any officer who at any time is found to be physically unfitted for the duties of the R.A.F. may be gazetted to the Reserve or out of the Service.

Officers not desirous of completing their full period of service on the active list may, at the discretion of the Air Minister, be permitted to transfer to the Reserve at any time.

All candidates will be required to pass a medical examination as to their physical fitness before acceptance.

Any temporary commission granted under these conditions may be terminated at any time under the rules laid down in the Royal Warrant for pay and promotion of the Army.

Whilst on the active list officers entered under the above provisions will, for the purpose of rank and command, be on exactly the same basis as permanent officers of the R.A.F.

Officers will be eligible for promotion during their period of service, if qualified in all respects under such conditions as may be laid down for permanent officers.

Applications by officers already demobilised should be made on Form 168, which can be obtained on written application to Secretary, Air Ministry (P.O.S.), London, W.C. 2.

Applications will be received at any time prior to the termination of the Army of Occupation period, but all applicants will be informed without delay whether their application is accepted.

Officers on joining will be brought on to the rate of pay of their approved rank.

The rates of pay and allowances and conditions of issue will be those normally in force from time to time for permanent officers of the R.A.F.

Service under this scheme will not affect the amount or date of issue of any gratuity which may otherwise be issuable in respect of past service.

As from August 4, 1919, in the case of officers continuing to serve without a break from the war period, and as from the date of entry in other cases, officers will be eligible for a gratuity of £75 for each year's service and proportionally for broken periods. This gratuity will be payable to them on the completion of their period of service on the active list, *i.e.*, on passing into the Reserve.

An officer placed in the Reserve before the full period of his service on the active list is completed, either at his own request or for physical unfitness due to causes beyond his control, may be paid such gratuity as the Air Council may think fit, not exceeding the above scale.

Officers injured whilst on duty will be eligible for non-effective benefits under the same conditions as permanent officers. In any case in which a pension is awarded, however, the officer will not receive in addition the gratuity to which temporary service would have entitled him.

The widows and children, or other dependants of officers killed whilst on duty, will be eligible for the same pensions and allowances as would be applicable to the widows and children or dependants of permanent officers of the R.A.F.

Officers will be required to provide themselves with the uniform of their rank. No outfit allowance will be payable to officers entered under this scheme unless they are subsequently directed to adopt a different pattern of uniform from that at present in force.

General

Officers of the flying, technical, and administrative branches (including Staff Officers) who :—

(*a*) Are not on the selected list for permanent commissions ;

(*b*) Are not serving in Russia or with the Controller-General of Civil Aviation, and the Director-General of Supply and Research ; and

(*c*) Have not applied for temporary commission or for re-seconding in the case of officers belonging to the other regular services

will be regarded as eligible for demobilisation as soon as their services can be spared.

Officers desirous of consideration under (*c*) should send in their names through G.O.C. of Area, or direct to the Secretary, Air Ministry, if unattached. Applications will be considered as they are received.

Officers of the Regular Forces may be re-seconded without prejudice to their subsequent return to their parent service.

While a small proportion of officers in the permanent commission list are not flying officers, and while some temporary commission may also be awarded to officers who are not flying officers, the Air Ministry desires to point out that all officers given commissions who are not flying officers will, with the exception of certain technical officers, be required to qualify as pilots within 12 months from August 1, 1919, the policy and intention being that in future all commissioned service, except Quartermaster's service, within the Air Force will be undertaken by flying officers only. This is the reason why "flying risk" pay has been abolished.

Special regulations will be issued shortly governing the pension rights of officers holding temporary commissions in the R.A.F. who had served as commissioned warrant officers, warrant officers and ratings on regular engagements in the Royal Navy, or as warrant officers, N.C.O.'s, and men on regular engagements in the Army, including those who had been given commissions in the Army.

R.A.F. Reserve

An R.A.F. Reserve will be constituted, consisting of three classes :—

(*a*) For flying officers.

(*b*) For certain technical officers.

(*c*) For General Service duties.

The following conditions of service in the Reserve are applicable only to officers entered under the special regulations for temporary comissioned service. Full Reserve Regulations will be published shortly.

Those in classes (*a*) and (*b*) require to keep up-to-date in the latest development, and periodical re-qualifying courses are, therefore, necessary.

Flying officers entered under the foregoing conditions for temporary commissioned service will, on completing their period of service on the active list, be placed in Class A. of the Reserve for a period of four years. They may be permitted subsequently to re-enrol in this Class up to the age of 30 if of the rank of captain or below, 35 if of the rank of major, and 40 if of the rank of lieutenant-colonel.

Officers will hold the substantive rank which they held at the end of their active service period. They will be required to present themselves at the nearest R.A.F. training station not less than two days in each quarter, and to carry out not less than 12 hours' flying per annum on up-to-date war type machines. They will receive the full pay and allowances of their rank for each day upon which training is carried out, subject to the limitation that no officer will be allowed pay more than six days in any one quarter or 24 days in a whole year. In cases of accidents or injuries during such training, they will be eligible for non-effective benefits under the same conditions as permanent officers.

A retaining fee of £30 will be paid on the completion of each year's service in Class A. of the Reserve, provided that certificates are produced showing that the necessary flying and attendance have been carried out. This retaining fee will be held to cover all contingent expenses for upkeep, wear and tear of uniform, etc. The customary travelling expenses will be allowed in addition for each occasion of training.

Any officer who for special reasons is unable to carry out his training in any quarter is to report the reasons in full for the approval of the Air Ministry. Except under exceptional circumstances no officers will be allowed to omit two consecutive quarters' training.

Officers unable for any cause to complete their full period of flying service in Reserve Class A. may be permitted to transfer to Class B. or Class C. of the Reserve if considered suitable.

The object of Class B. of the Reserve is to provide technical officers on mobilisation for the following branches :—

(*a*) Engine and rigging.

(*b*) W/T and signals.

(*c*) Photography.

(*d*) Armament.

The officers of Class B. of the Reserve will, in the immediate future, be drawn from the following sources :—

(*a*) By the voluntary enrolment of a limited number of those who have served in one of the above technical branches during the War.

(*b*) By officers who transfer from Class A. of the Reserve either on completion of their service in that Class or when they have been permitted to retire before completion of such service.

(*c*) From officers of the permanent list permitted to retire.

Officers who have completed four years' service in Class A. of the Reserve may, if below the rank of captain, be advanced to that rank on joining Class B. Enrolment in Class B. will be for periods of four years, which may be extended up to the age of 40.

Officers in Class B. will be required to undergo a technical course lasting for 14 days in each year at the R.A.F. technical school for their particular branch, and will be expected to pass a medium standard re-qualifying examination at the conclusion of the course.

Subject to satisfactory compliance with the provisions outlined in the preceding paragraph officers will receive the full pay and allowances of their rank for the period of annual training together with an annual retaining fee of £20. This retaining fee is held to cover the incidental expense of upkeep of uniform, etc. They will also be allowed the customary travelling expenses for each occasion of travelling.

In cases of accidents or injuries during training, officers will be eligible for non-effective benefits under the same conditions as permanent officers.

Any officer who for special reasons is unable to carry out his period of annual training is required to report the reasons for the decision of the Air Ministry.

Class C. of the Reserve is intended to provide officers on mobilisation for various duties not requiring up-to-date technical knowledge or skill.

Service in Class C. of the Reserve will be entirely voluntary. There will be no annual qualifying courses and no retaining fee. The age limit will be 50.

AIR FORCE CADET COLLEGE

The Air Ministry announces that a Royal Air Force Cadet College for the training of the permanently commissioned officers of the Royal Air Force will be opened next February.

The place where the college is to be established will be announced shortly. The number of cadets to be admitted on the opening of the college will be 55.

Admission will be by competitive examination. The Air Council fully considered the alternative of admission by nomination combined with a qualifying literary examination.

but decided to adopt for the present the system now in force for the entry of cadets to the Royal Military Academy, the Royal Military College, and cadetships in the Royal Navy (special entry), in order to secure an early entry and to make the training of the future officers of the Royal Air Force begin at the earliest possible moment. This decision does not prejudice future modifications in the system of entry designed to substitute nomination for a competitive examination, should experience show such a course to be desirable.

Candidates may compete for one or more of the above colleges and cadetships alternatively at the same examination. The subjects in the case of the R.A.F. Cadet College will be as follows :—

OBLIGATORY.—1, English ; 2, English history and geography ; 3, mathematics A (elementary) ; 4, one of the following languages : French, German, Italian, Spanish, Russian, Arabic, Hindustani.

OPTIONAL.—1, Latin ; 2, Greek ; 3, any one of the seven languages mentioned above other than that taken as an obligatory subject ; 4, mathematics B (intermediate) ; 5, mathematics C (higher) ; 6, science (physics and chemistry) ; 7, elementary engineering.

All obligatory subjects must be taken up and not more than three of the optional subjects. Each subject will carry 2,000 marks. In addition, candidates may take up freehand drawing, to which 400 marks will be allotted. The syllabus in each subject will be that now in force for the other colleges and cadetships mentioned above. Candidates will be required to qualify—*i.e.*, to obtain not less than 33 per cent. of the total marks allotted—in each of the obligatory subjects. Provided a candidate qualifies the total of marks gained in all the subjects taken up will determine his place on the list.

The examination will be held in November. Candidates must have attained the age of 17½ and must not have attained the age of 19 on January 1, 1920, to be eligible to compete. Candidates will be required to pass a medical examination which will be conducted at or about the time of the competitive examination.

The course at the college will last two years. During the second year of the course candidates will be taught to fly.

The regulations governing the entry of King's cadets, honorary King's cadets, and candidates specially nominated by the Air Council will be similar to those now in force in the case of the Royal Military Academy and the Royal Military College. Detailed regulations for admission and for the course at the college will be issued shortly, and will include full information as regards fees and allowances.

WARRANT OFFICERS, NON-COMMISSIONED OFFICERS AND AIRMEN.

NEW RATES OF PAY AND PENSION

1. THE rates of pay and pension for the ranks of the Royal Air Force below commissioned rank have been under review, and the standard rates now authorised are as shown in the accompanying statements.

2. The rates of pay will come into force on August 1, for all men not dispensed before that date, in substitution for existing rates and bonus, but in any case where the present rates of pay, together with Army of Occupation bonus, are more beneficial than the new standard rates, a vested right to the old rates will be allowed as follows :—

(*a*) Men on regular engagements may draw their present rates plus bonus, if more beneficial than the new rates, up to March 31, 1920.

This will include men now serving who may, without a breach in their service, re-engage or sign regular engagements.

(*b*) *New Enlistments*

All men enlisting on or after August 1, 1919, whether with previous service or not, will come on the new rates of pay forthwith.

(*c*) *Men Serving for Occupation Period.*

These men, if not on regular engagements, retain the old rates plus bonus until discharge, if more favourable.

3. Rates of pay for the Medical and Schoolmaster Branches will be subsequently announced.

4. Badges for good conduct will be granted, under regulations to be promulgated, after 3, 8 and 13 years' service. Each badge will carry pay of 3*d.* a day up to a maximum of 9*d.*

5. The present rates of separation allowance will be continued under existing conditions as to entitlement until December 31, 1919, when the rates and conditions of issue will be again reviewed. This will not, of course, affect the position of men serving for the period of occupation or those who have extended their service for two, three or four years with reserved rights to this allowance.

6. A further announcement will be made as to allowance (other than separation allowance).

7. Further details as to rates and the conditions of their issue will be published in regulations in due course.

ROYAL AIR FORCE. (Other ranks).

The rates of pay proposed are as follows :—

TECHNICAL—GROUP I.

			Over 3 years.		Over 6 years.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*
Sergeant-major, Class I ..	14	0	rising by 1*s.* a day a year to 18*s.*			
Sergeant-major, Class II ..	13	0	—		—	
Flight-sergeant	11	6	12	0	12	6
Sergeant	9	6	10	0	10	6
Corporal	7	9	8	0	8	6
Leading aircraftman	5	6	5	10	6	2
Aircraftman I.	4	6	4	10	—	
Aircraftman II.	4	0	—		—	
Boy	1	6	—		—	

Applicable to the following trades and occupations :—

Blacksmith.
Carpenter (boat builder).
Carpenter (motor body builder).
Carpenter (propeller maker).
Carpenter (rigger).
Coppersmith (1)
Draughtsman (normally boys only)
Electricians (compass setter and repairer).
Fitters and subsidiary combined trades.
Fitter (aero engine).
Fitter (general).
Fitter (M.T.)
Fitter (constructional).
Fitter (drivers petrol steam).
Fitter (motor boat).
Fitter (armourers).
Fitter (motor boat coxswain).
Fitter (millwright).
Fitter (jig and tool maker).
Instrument maker and camera repairer.
Moulders.
Pattern maker.
Turner (2).
Wireless operator (mechanic).

(1) Not to be promoted beyond sergeant unless qualified as both coppersmith and tinsmith.

(2) Not to be promoted beyond the rank of Flight-sergeant unless qualified as both machinist and turner.

All boys (trained in the Service) will be advanced to leading aircraftman on satisfactory completion of training.

TECHNICAL—GROUP II.

			Over 3 years.		Over 6 years.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*
Sergeant-major, Class I ..	12	6	rising by 6*d.* a day a year to 15*s.*			
Sergeant-major, Class II ..	11	6	—		—	
Flight-sergeant	10	0	10	6	11	0
Sergeant	8	6	9	0	9	6
Corporal	6	8	7	0	7	4
Leading aircraftman	5	2	5	6	5	10
Aircraftman I.	4	6	4	9	—	
Aircraftman II.	3	9	—		—	
Boy	1	6	—		—	

Applicable to the following trades and occupations :—

Acetylene welder.
Balloon basket maker.
Camera repairer.
Electrician.
Machinist.
Carpenter.
Coach painter.
Photographer.
Rigger (aero).
Rigger (airship).
Sheet metal worker.
Tinsmith.

Wireless operator.

TECHNICAL—GROUP III

			Over 3 years.		Over 6 years.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*
Sergeant-major, Class I. ..	11	0	rising by 6*d.* a day a year to 15*s.*			
Sergeant-major, Class II. ..	10	0	—		—	
Flight-sergeant ..	8	6	9	0	9	6
Sergeant	7	0	7	6	8	0
Corporal	5	10	6	2	6	6
Leading aircraftman	4	6	4	10	5	2
Aircraftman I.	4	0	4	4	—	
Aircraftman II.	3	6	—		—	
Boy	1	6	—		—	

Applicable to the following trades and occupations :—

Driver (petrol) (3).
Motor boat coxswain.
Driver (steam).
Driver (winch).
Motor cyclist (1).
Cook and butcher.
*Shoemaker.
*Tailor.
*Musician.
Hydrogen worker.
Vulcaniser.
Motor boat crew (2).

* So long as present conditions of free repair continue, permanent bands only.

Stoker (not to be promoted beyond corporal).
Fabric worker.
Upholsterer.

(1) Not to be promoted beyond Corporal unless qualified as driver (M.T.).
(2) See under non-substantive pay, etc., as to hard lying money.
(3) Not to be promoted beyond sergeant unless qualified as fitter.

ADMINISTRATIVE—GROUP IV

	s. d.	Over 3 years. s. d.	Over 6 years. s. d.
Sergeant-major, Class I. ..	11 0	Rising by 6*d.* a day a year to 15*s.*	
Sergeant-major, Class II. ..	10 0	9 0	9 0
Flight-sergeant	8 0	7 0	8 0
Sergeant	7 0	6 2	6 0
Corporal	5 10	4 10	5 2
Leading aircraftman	4 6	4 4	—
Aircraftman I.	4 0	—	—
Aircraftman II.	3 6	—	—
Boy	1 6	—	—

Applicable to the following occupations:—

Clerk (general). Clerk (stores).
Clerk (pay). Clerk (Q.).
Meteorologist.

NON-TECHNICAL—GROUP V

	s. d.	Over 3 years. s. d.	Over 6 years. s. d.
Sergeant-major, Class I. ..	10 0	—	—
Sergeant-major, Class II. ..	9 0	—	—
Flight-sergeant	8 0	8 6	9 0
Sergeant	6 6	7 0	7 6
Corporal	5 0	5 4	5 8
Leading aircraftman	4 0	4 4	4 8
Aircraftman I.	3 4	3 8	—
Aircraftman II.	3 0	—	—
Boy	1 6	—	—

Applicable to the following trades and occupations:—

Aircraft hand { Batman.
(G.).
(P.T.I.)
(G.I.).

See under "Non-substantive pay," etc., as to addition to substantive pay for the performance of specific duties.

Non-substantive Rates of Pay, etc.

	s. d.
Gunnery instructor	1 0
Physical training instructor—	
1st Class	1 0
2nd Class	0 8
Aerial gunner	0 6*
Interpreter	Naval rates, 1*s.* per hour, with a maximum of 5*s.* a day; days of employment only.
Schoolmaster (to men not of Schoolmaster Branch).	8*d.* (days of employment only).
Crew pay	Coxswain 4*s.*, other members of crew 2*s.* a day continuously whilst borne on the establishment of a squadron for service in aircraft.

* In addition to crew pay of 2*s.* per day whilst employed on the authorised establishment of a squadron.

Hard lying money .. .. To be paid at Naval rates and under Naval conditions to the Marine Branch of Royal Air Force.

GOOD CONDUCT PAY.

As for the Army.

PENSIONS

1. The minimum qualifying period will be 24 years from the date of attestation at the age of 16½ years.

2. The numbers allowed from time to time to re-engage for pension will be determined by the requirements of the service and will in any case be restricted to men who have reached N.C.O. rank.

3. The pension will be granted on the basis of a daily rate for each complete year of service in each rank, with proportionate amounts for completed months. The daily rate will be uniform for all branches.

The daily rate for ranks other than warrant officers is as follows:—

	d.
Aircraftman	1½
Corporal	2
Sergeant	2½
Flight-sergeant	3

4. *Warrant Officers.* The scale for warrant officers will remain as at present, namely:—

For each completed year prior to warrant rank, £3.

For each year as warrant officer:—

(*a*) If retired as warrant officer, Class II, £4.

(*b*) If retired as warrant officer, Class I, £5.

The above scale is subject to maxima rates as follows:—

Warrant officers, Class II	£120
Warrant officers, Class I	150

5. All men discharged to pension will thereupon become members of the R.A.F. Reserve.

6. If after 24 years' service a man continue to serve, he will draw the pay of his rank and his time will count for increased pension.

7. *Commutation.*—Commutation of pension will be allowed *where it would be a distinct and permanent advantage to the pensioner,* always provided that a minimum of 2*s.* a day is left uncommuted.

▣ ▣ ▣ ▣

Roll of Honour

PUBLISHED AUGUST 4

Previously reported Missing, now reported Killed

Tucker, Sec. Lieut. D. C., R.F.C.
Webb, Capt. N. W., M.C., R.F.C.

Accidentally Killed

Annis, Lieut. W. F., Cent. Ont. Regt., attd. R.A.F.
Munro, Lieut. J. W., N.S. Regt., attd. R.A.F.

Died

Ferguson, Lieut. J. F., Can. Rly. Troops, attd. R.A.F.
Price, Lieut. J. W., Can. Art., attd. R.A.F.

The Seabird Flies to Spain

LEAVING its aerodrome at Acton at 7 a.m. on July 31, "The Seabird," the aeroplane constructed to fly the Atlantic by the Alliance Aeroplane Co., flew to Madrid, making the journey of nearly 900 miles in 7¾ hours. Capt. W. R. Curtice was the pilot, Mr. J. A. Peters, the designer of the machine, was observer. The machine, which is fitted with a 450 h.p. Napier Aero engine, carried only 350 gallons of petrol, although the full capacity is 500 gallons. "The Seabird" carried a gold cup for presentation to the Queen of Spain as a memento of the occasion, also a letter from Princess Beatrice to her Majesty, as well as a parcel of newspapers.

R 34 Over London

ON her way from Pulham to her station at East Fortune on July 31, the R 34 made a detour to pay a surprise visit to London. She left Pulham at 5 p.m., and arrived over the Metropolis just before 7 p.m. At a low altitude she came from the east to Westminster, circled over the Houses of Parliament, and went off in an easterly direction. She reached East Fortune at 6.5 a.m. the next morning.

From Norway to Denmark

THE British flying-boat, F 5-4044, which as noted in our last issue, recently flew from Dundee to Norway, arrived in Copenhagen on July 29. She left Christiania the previous day but slight engine trouble necessitated a stop at Horten. She made a re-start at 11 the next morning and alighted at the naval flying station near the Danish capital at 2.15 p.m. On Sunday the machine flew to Stockholm.

An Aerodrome for Hull.

A COMMITTEE of Hull Corporation has met Lieut.-Col. Beatty, of the Air Ministry, for the purpose of investigating, on the spot, proposals for a new aerodrome at Hull. Col. Beatty stated that it seemed to be fairly certain that Scandinavian and Dutch traffic would come to Hull.

Sheffield to London by Air

A NUMBER of officials connected with Messrs. Vickers, Ltd., who were required in London on July 29, were brought from Sheffield by aeroplane. Leaving Sheffield at 3.20 p.m., they flew to Hounslow, and were taken to the centre of London by motor car, arriving at their destination at 5.50 p.m. The party included Colonel J. H. Leslie, a director of Messrs. Vickers; Miss Joan Leslie, Mr. R. G. Blake, Maj. J. Wortley, Maj. E. W. Wilkinson, Capt. F. H. Wilkinson, Capt. H. G. Howson, Capt. H. R. Vickers, Mr. F. D. Wild, and Maj. A. J. Gainsford. The machine also carried a pilot and two mechanics.

The aeroplane used was a Vickers-Vimy passenger-carrying commercial machine, which is of similar construction to the aeroplane which flew the Atlantic. It has two Rolls-Royce "Eagle" mark engines.

Aerial Mails in India

"A DETAILED scheme for an inland aerial postal service in India is being considered by the Government of India," says Mr. H. G. Perry, the *Daily Express* correspondent at Bombay. "A beginning will be made very shortly with a Bombay-Karachi seaplane service, in which the Governor of Bombay is taking a very lively interest. A service will probably be in full swing early next year. It will link up Delhi, Simla, Bombay, Calcutta, Karachi, Poona, Lahore and Madras. I understand that the Government has definitely decided on a State service."

Over the Andes

ON July 30 the Italian "ace," Lieut. Antonio Locatelli, crossed the Andes from Mendoza to Valparaiso, having taken 2 hrs. and 5 mins. to fly the 156 miles. The maximum altitude reached was 20,000 ft. Lieut. Locatelli started from Buenos Aires on July 23, but had to stop at Mendoza owing to bad weather over the mountains.

SOME DEVELOPMENTS IN AIRCRAFT DESIGN AND APPLICATION DURING THE WAR

By the Right Hon. LORD WEIR OF EASTWOOD, P.C., Honorary Fellow of the N.E. Coast Institution of Engineers and Shipbuilders.

(Concluded from page 1016)

PART III.—*Progress in Engine Design*

BEFORE 1914 it may be said that aero engine design had merely reached the stage of sufficient reduction of weight-power ratio to enable aeroplanes to fly. Beyond this, practically no special adaptation to aeroplane requirements had been attempted. The development of the aerial arm in the War, however, speedily emphasised the importance of other factors. The extension of the range of operations and the losses of machines, due to engine failure, raised insistent demands for greater reliability, whilst the necessity for easier maintenance called for engines of greater all-round accessibility.

The rapid progress of flying skill and the adoption of aerial acrobatics in fighting created a demand for engines of short length and quick controllability.

The desirability of carrying out reconnaissance untroubled by enemy attack or anti-aircraft fire focussed attention on the necessity of increasing the ceiling or maximum height of operation. Coping with this most important requirement again produced an improvement of the weight power ratio, and the ceiling of approximately 7,000 ft. in 1914 was increased to nearly 30,000 ft. by the beginning of 1919. It must be remembered also that the diminished density at great height decreases the amount of oxygen taken into the engine, and therefore, the power which the engine can deliver. At 15,000 ft., for instance, a 300 h.p. engine can only deliver about 200 h.p.

The extension of bombing activities at long ranges emphasised the importance of the study of the fuel consumption which, for a flight of six hours, amounts to a large weight per horse-power. The question of the thermal efficiency had, therefore, to be studied in conjunction with the weight/power ratio, so that engine speeds increased whilst the aerodynamic requirements of the machine demanded reduced propeller speeds.

Long before the end of the War the power requirements of some aeroplanes and seaplanes had far outstripped the possibilities of any one engine, so that machines possessing two, three, four, or even more engines were in service or being built.

An important factor affecting aero engine development is the time which is required to produce a new design. Generally about eighteen months would have to elapse between the commencement of the design and a useful flow of reliable production engines. During most of this period no useful practical experience can be obtained as to the qualities or defects of the new design, and by the time bulk experience of its behaviour in service is available, it is necessary to supersede it by another more advanced type. Less than half the time is required for the development and trial of an aeroplane design, so that the aeroplane is generally well ahead of the engine for which it is designed.

In 1914 our aercraft engine position was by no means satisfactory, and we depended for a large proportion of our supplies on other countries, principally on France, whose Gnome and Renault engines were pre-eminent. Great efforts were immediately made to extend our sources of design and supply, and by the end of the War British engines had gained foremost place in design, and were well up to requirements as regards supply.

Many of the earlier designs were considerably influenced by previous automobile engine practice, but a wide divergence of design and detail soon took place due to the entirely different nature of the conditions to be faced. In automobile practice silence and good carburation over a wide variation of speeds and loads were the most important features, whereas those points are of small importance for an aircraft engine. The task of the aero engine designer was still further complicated by the fact that the order of importance of the various features of the engine is different according to the class of machine for which the engine is being designed. Certain entirely novel conditions had to be met and their attendant difficulties overcome. For example, an aero engine must have the ability to function in practically any position and, for a time at least, when completely inverted. This requirement has had a far-reaching effect on the lubrication system of aero engines, as it practically precludes the carrying of oil in the crankcase.

The shape of the engine is a matter requiring careful consideration for aircraft, as head-resistance, accessibility and small moment of inertia are all features of considerable importance dependant on the shape. The wide ranges of temperature and pressure through which an aeroplane may pass affect the carburation, the cooling system, the lubrication system, and even the ignition to a very serious degree. An aeroplane may undergo a very rapid change of as much as 75 deg. F. in temperature, combined with the maximum difference in moisture content of the air. With water-cooled engines, therefore, it has been found necessary to put a thermometer in the circuit and fit the radiator with blinds operated by the pilot, and even with such accessories the maintenance of the water at a constant temperature has often been a matter of great difficulty, and has thrown a heavy responsibility upon the pilot. At the same time evaporation losses must be reduced to a minimum, as the amount of water lost on long journeys is an important feature, so much so that it is true to say that the Atlantic could not be flown to-day with any of the water-cooling systems that were deemed sufficient at the outbreak of War.

The intense vibration due to the conditions of high speed and lack of rigid support under which aero engines must work impose new and sever conditions mechanically on every part. The violent and varying slip stream from the propeller also imposes a new problem as regards carburettor intake conditions, where again the seriousness of fire risk has to be taken into account and avoided. Probably no detail of the whole engine process has received more expert and prolonged attention than the ignition, and much of the increased reliability and efficiency of the modern engine undoubtedly results from this work.

The very severe centrifugal and inertia effects which are experienced in aerial fighting, coupled with the necessity under such conditions of immediate response to the throttle, have necessitated careful design of the petrol supply system to ensure a constant and adequate supply of fuel.

In addition, the length and ramifications of the fuel system have increased considerably with the growth in the size of machines and in the number of engines. Fig. 39 shows a typical lay-out of petrol system for a large modern multi-engined machine. The main tanks are numbered 1, 2, 3, 4, 5 and 6, and have a combined capacity of 1,800 gallons of petrol. These six tanks feed by gravity to the main collector which is situated in the engineer's cabin. In each of the pipes between the collector and tanks is fitted a non-return valve to obviate any possibility of the petrol running from the top tanks into the bottom, as these six tanks are not all on the same level.

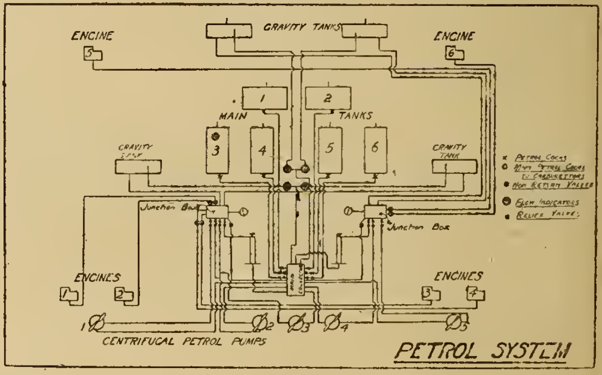


Fig. 39.

From this collecting box the petrol is lifted by five centrifugal pumps, which are shown below, into the junction boxes, which feed the engines. These centrifugal petrol pumps are driven by airscrews which are placed in the slip stream of the propellers in order that the petrol shall be pumped up whilst the machine is stationary. If these pumps should fail to act the petrol can still be lifted to the junction boxes by the hand pumps shown one on each side just above the collector.

The two distributors or junction boxes feed the engines;

that on the left feeding the four bottom engines, whilst the other supplies the two top engines. As the petrol supplied to these distributors is more than that used by the engines, the extra amount passes up to four small gravity tanks which will be seen in the illustration, and which are situated in the planes. These hold about 15 gallons each. As the excess of petrol continues the gravity tanks overflow through return pipes into the main collector. In these pipes flow indicators are fitted in order that the engineer may see that the system is properly working. After the main tanks are empty and no more petrol is supplied to the distributors, the petrol flows from the gravity tanks into the junction boxes, which ensure a further 60 gallons. The two junction boxes are fitted with indicators to show the pressure or head of petrol supplied. They are also fitted with relief valves discharging back into the collector. The collector is also fitted with a large filter, through which all the petrol passes on its way to the engine.

A great deal of progress has been achieved in the general arrangement of the engine and its cylinders so that the most effective use is made of all the material. With cylinders in line the deadweight loss per horse-power will rapidly decrease after the first cylinder, but after about four cylinders the economy to be gained by adding more cylinders practically ceases owing to the increased size of crankshaft and bearings required to resist torsion. This naturally leads to grouping the cylinders in two rows in V form working on a common crankshaft with two connecting-rods to each crank pin. Many such engines have been made with two rows of either

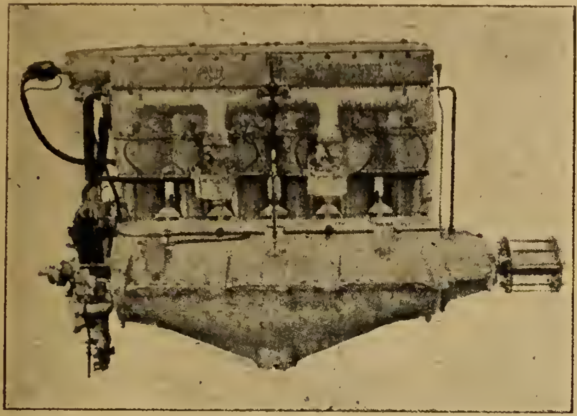


Fig. 40.—230 " Puma " (Siddeley).

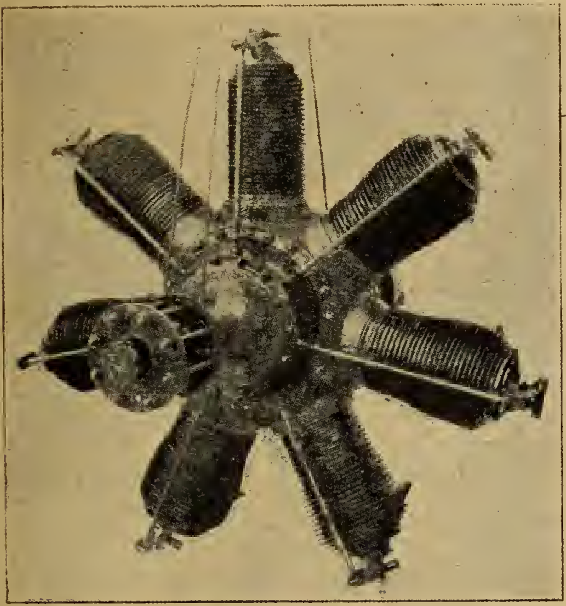


Fig. 41.—80 Gnome.

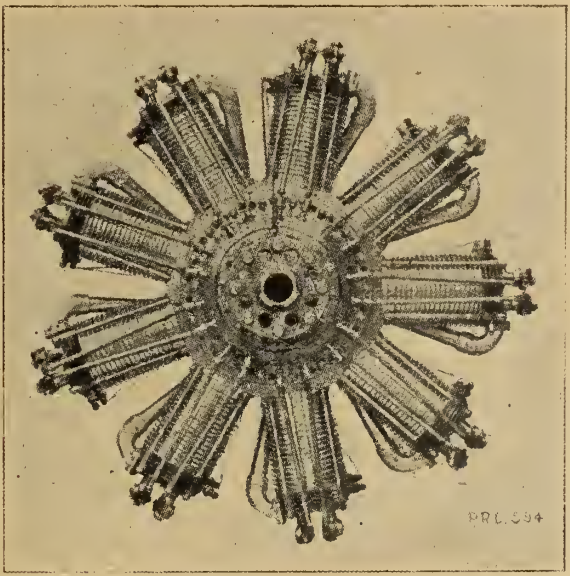


Fig. 42.—Bentley rotary.

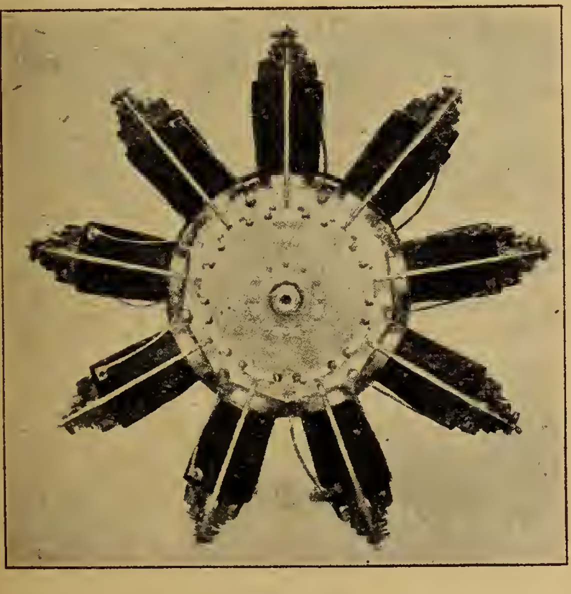


Fig. 43.—A.B.C. Dragonfly.

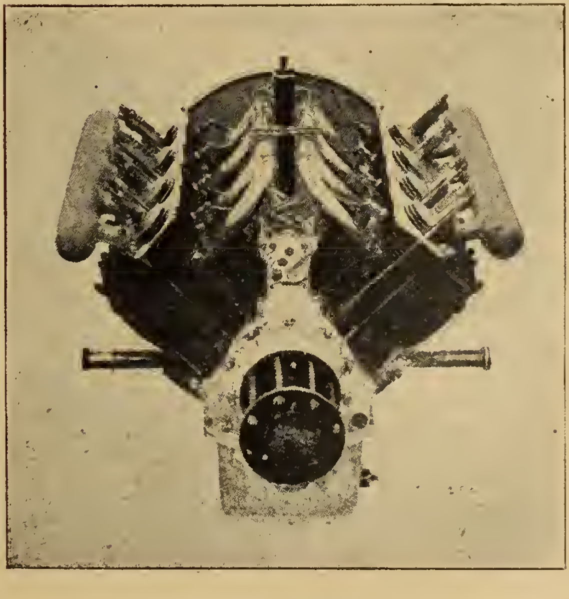


Fig. 44.—80 Renault.

four or six cylinders each. Further extension of this principle has enabled Messrs. Napier to produce a 12-cylinder engine of 450 h.p. with three rows of four cylinders (three connecting-rods to each crank-pin) and weighing only 1·86 lbs. per horse-power dry weight.

In addition to placing cylinders in line, designers have from the earliest days of aero engines been attracted by the scheme for mounting all the cylinders radially around a common crank. By this arrangement the length of crankshaft and crankcase is, of course, reduced to a minimum, and there have been engines with three, five, six, seven, nine, ten, and fourteen cylinders in one or two planes. Of this type the Cosmos Co. have produced a 450 h.p. 9-cylinder air-cooled radial engine which weighs only 1·47 lbs. per horse-

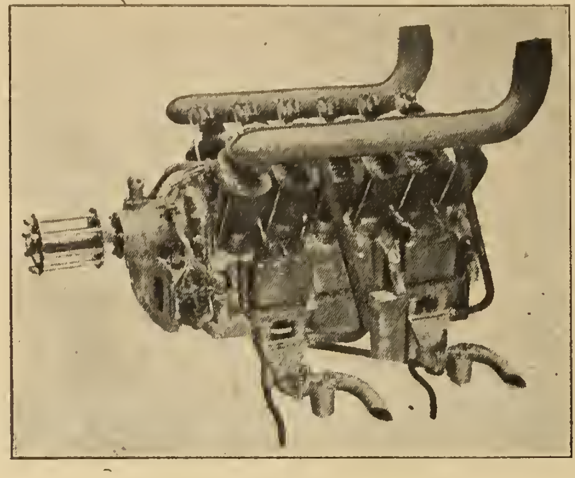


Fig. 45.—140 R.A.F. 4a.

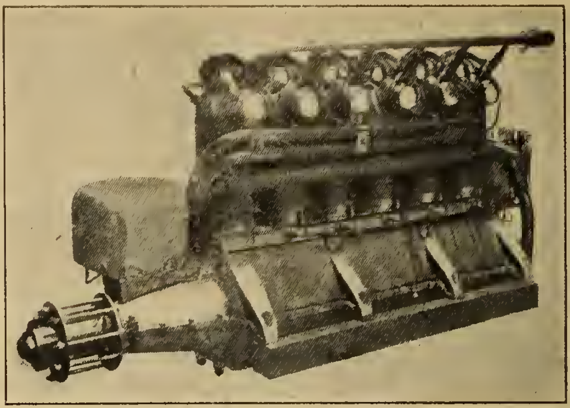


Fig. 46.—160 Beardmore.

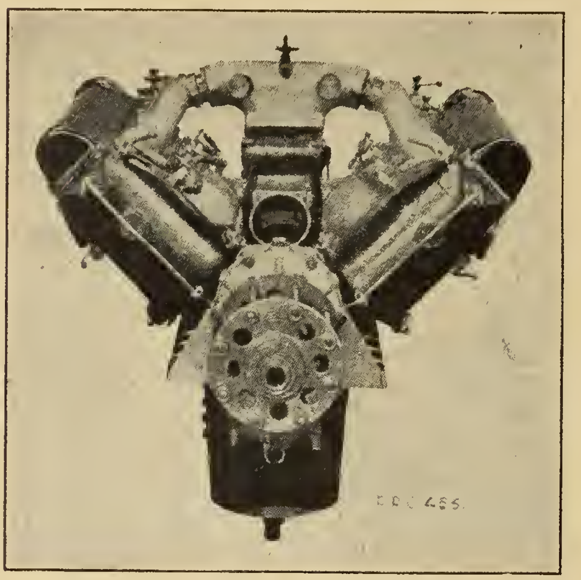


Fig. 47.—Hispano-Suiza.

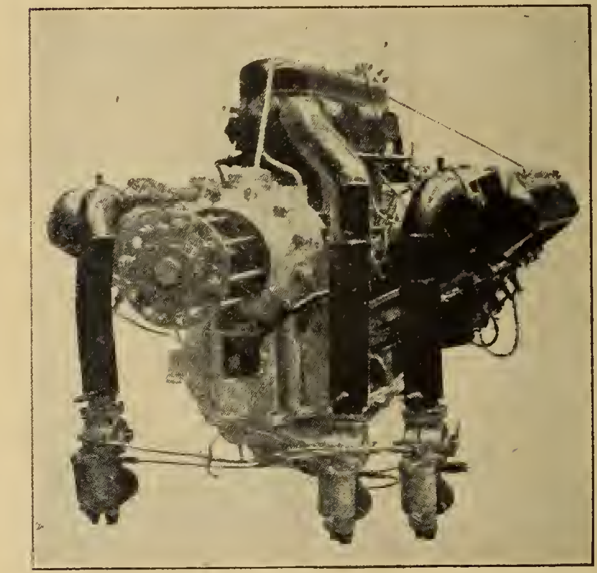


Fig. 48.—Napier Lion.

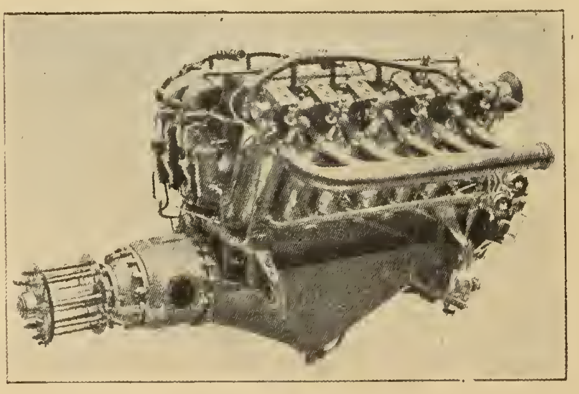


Fig. 49.—350 Rolls-Royce Eagle VIII.

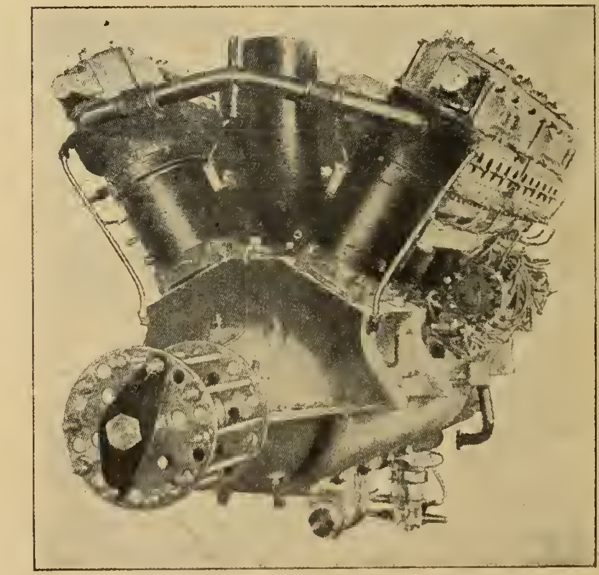


Fig. 50.—550 Galloway Atlantic.

power, or less than one-third the weights of similar type French engines of 1914-15.

Radial engines include those of the rotary air-cooled type, and progress in this type can be best indicated by taking the French 80 h.p. Gnome of 3·26 lbs. per b.h.p., and comparing it with the British Bentley engine of 230 h.p. weighing only 2·165 lbs. per h.p., a reduction of about 30 per cent., in spite of the tremendous increase in the centrifugal load. With radial engines of large size, however, the increased head resistance is a serious objection, and it is not likely that this method of arrangement can be extended indefinitely as regards size.

A saving in weight and great improvement in mechanical efficiency have been obtained by eliminating the valve tappet rods and substituting overhead camshafts operating directly on the valves. Further economies have been effected by the employment of aluminium for the cylinders fitted with either steel or cast-iron liners. Pistons are now universally made of aluminium, and the gain in mechanical efficiency has been of even greater importance than the saving of weight. Hundreds of other details have also been the subject of most exhaustive study and improvement.

The question naturally arises, how is it that such results have been obtained in such a short time and in face of so many difficulties with regard to labour and material. In the first place, the result has been obtained by the free use of money; the question of expense could naturally not be allowed to stand in the way of progress in this all-important matter. Money has been spent on research, on steels and other materials, processes of manufacture, inspection organisations, etc., and the amount of scrapping of material and parts not up to standard has been on a scale that no commercial firm could adopt and live. The greatest credit is due to the steel manufacturers for the manner in which they collaborated with the Government on the evolution of special steels and the preparation of standardised specifications.

The table below gives the principal particulars of some of the leading engines of to-day.

Part IV.—*Navigation and Meteorology*

Although great strides have been made during the last year in the development of scientific navigation, the weather still remains the dominating factor in all flying operations.

During the War the whole of our aerial work was controlled by weather conditions, although in the later phases a vast amount of successful operations were carried out in weather which, before the War, would have been considered far too bad to allow of any flying at all. The problem of flying in anything like a thick fog or ground mist remains unsolved, and if flying in this country is to be a real commercial proposition much solid research in this direction will be necessary.

When the War started navigation was dependent mainly on map reading. Our machines were fitted with compasses, but these were of indifferent design, and could not be relied on unless the course could be frequently checked by a direct view of the ground below. The design of an aeroplane compass presents special problems, and the errors involved in using a compass of the type used on ships had not been realised before the War. These problems were successfully investigated by the late Keith Lucas, who evolved a satisfactory aeroplane compass. This compass and subsequent types based on its design were standardised. Even with the improved compass, navigation in unfavourable weather conditions still presents great difficulties.

The very great advantages, especially in long distance bombing operations, of being able to fly for considerable distances through clouds were clearly realised, and a special research was undertaken to make this a practical proposition. Excellent results were obtained, chiefly due to the introduction of an instrument called the Turn Indicator. When flying in a cloud or a fog-bank the pilot loses all sense of direction, but this instrument used in conjunction with the compass enables him to steer a straight course, even in these circumstances.

At the time of the signing of the Armistice we were training pilots in large numbers in the use of these instruments, and there is no doubt that the Germans would have had some unpleasant surprises a few months afterwards, when formations of bombing aeroplanes would have suddenly emerged from the clouds over their objectives when the inhabitants below might reasonably have considered themselves safe. Before any attempt could be made to attack them our aeroplanes would have been back in the clouds again and on their way home.

Navigation by dead reckoning is, of course, dependent on meteorological observations and for us, therefore, a good meteorological service was a *sine qua non*. It must be remembered that on the Western Front we had always this important disadvantage, that the prevailing wind was blowing from West to East, thus tending to drift our aeroplanes away from our lines and reduce their chances of getting back when in difficulty. In spite of this the vast majority of air fighting took place well on the German side of the lines, and, even allowing for the German raids over England, the amount of reconnaissance and bombing we carried out over German occupied territory was far greater than that attempted by them on our side of the line. Although, of course, the credit for this is mainly due to the magnificent spirit of our personnel, the effectiveness of our meteorological service had some effect in establishing our ascendancy.

A few words may be added about the use of directional wireless for navigation. The Germans used this method for directing their Zeppelins in the raid over England, but the system they used involved the sending out of frequent signals

Particulars of Representative British Aero Engines of Each Type. May, 1919

Type.	Method of Cooling.	No. of Cylinders.	Bore (mm.).	Stroke (mm.).	Compression Ratio—to 1.	Piston Speed (ft. per min.).	b.h.p.		Speed.		m.e.p.		Normal Propeller Speed.	Dry Weight in lbs.	lbs. per h.p.		Petrol lbs. per Normal h.p. Hour.	Oil lbs. per Normal h.p. Hour.
							Normal.	Max.	Normal r.p.m.	Max. r.p.m.	Normal.	Max.			Dry.	Wet.		
Bentley, rotary 2	Air ..	9	140	180	5·26	1,536	230	234	1,300	1,360	92	—	1,300	498	2·165	—	·63	·088
A.B.C., fixed radial, Dragonfly	Air ..	9	139·7	165·09	4.42	1,787·5	320	350	1,650	1,750	110	—	1,650	635	1·98	—	·585	·028
Straight six, Siddeley, Puma ..	Water	6	145	190	5	1,558	250	266	1,400	1, 500	115	123	1,400	645	2·58	—	·6	·062
2 rows of 4 V. at 90°, Sunbeam, "Arab" ..	Water	8	120	130	5·3	1,707	212	220	2,000	2,100	112	—	1,200	550	2·6	3·24	·486	·039
2 rows of 6 V. at 60°, Rolls-Royce, Eagle 8 ..	Water	12	114·29	165·09	5·3	1,950	359	368	1,800	1,900	127·2	131·4 at 1,500	1,080	926	2·58	3·23	·5	·025
2 rows of 6 V. at 60°, Galloway, "Atlantic" ..	Water	12	145	190	5·4	1,872	550	575	1,500	1,600	126·3	—	1,500	1,150	2·09	2·74	·504	·045
2 rows of 6 V. at 60 °Rolls-Royce, "Condor" ..	Water	12	139·69	190·5	5·1	2,187·5	610	656	1,750	2,000	129	129·4	971	1,350	2·21	2·86	·495	·0225
3 rows of 4 V. at 60°, Napier, "Lion" ..	Water	12	139·69	130·17	5·55	1,708	450	468	2,000	2,100	122	126	840	1,318	1·86	2·51	·495	·0225

from the airship to be picked up by the German wireless stations. The latter would then send out signals to the airship indicating its exact position. This system had the great disadvantage that we also could pick up the airship's signals and thus locate its position. So we always knew where they were coming from, and arranged our defence accordingly. Our own system was for the aircraft to carry the directional coils, and by picking up signals from home stations, to locate its own position. Our apparatus was only perfected late in the War, but we counted on using it effectively in the projected raids over Berlin, to which I have already referred. With further research and development there are good prospects that directional wireless will be of the greatest value in the long distance navigation of commercial aircraft in the future.

Future Developments.—Any reference to the future of aviation must necessarily be very brief and purely general in character. The rapid and quite abnormal growth in the technique and application of aircraft under the stress and artificial conditions of War-time must now give place to the more sober rate of development of peace-time.

Our peace-time Royal Air Force, as I visualise it, will become a relatively small organisation of remarkable efficiency with the highest ideals and with the keenest *esprit de corps*. Its matériel should represent the last word in technical progress such as can only be achieved by considerable expenditure. Quality must be the keynote of its policy not only in matériel but also in personnel.

An outbreak of war must see us with the very best designs of engine and aircraft, tried and tested, and with a manufacturing nucleus on which war production may be readily expanded.

In regard to civil aviation, one is naturally unhappy at the necessity of adopting the prophetic rôle, but one factor is clear and definite. Our Government must accept the heritage of war experience, and by action, support, and sympathy, encourage and develop its translation into the new channels of peace requirements.

The more immediate problems of international and domestic aerial legislation have now been provisionally solved by the International Aerial Convention and by the Civil Aviation Act, and it is very gratifying that in both these directions Great Britain has taken the lead and shown the way.

In another direction much remains to be carried out quickly. Our great mercantile marine in all its technical perfection would avail but little without our harbours, docks, lighthouses, charts, and navigational instruments. We possess fleets of aircraft of reliability and of great performance possibility, but our navigational facilities are still almost non-existent, and herein lies one of the main fields of action of our new Department of Civil Aviation.

In all considerations for the future of civil aviation, the two qualities of outstanding merit appertainable to the new form of transport are speed and independence of action as against land transport requiring roads or rails. These constitute the only assets for any commercial future. Speed in transport is associated with high cost, and speed will always command a high value. Early action should be taken in regard to a few main routes, especially in countries with equable weather conditions, and especially in new countries backward in rail development. Two such main routes would be Egypt to India, and Egypt to South Africa.

Another early development with immediate possibilities will be the use of large flying-boats for inter-island and coastal traffic, for example, in the West Indies and New Zealand. The independence of the flying-boat in regard to costly aerodromes, and its higher degree of safety in regard to landing-places is a factor of great immediate importance. The Government and the large existing transport companies, shipowners, and railways might well collaborate in their early efforts, as the initial financial results will not be healthy enough for entirely new enterprises.

Another aspect must not be neglected—the encouragement of the sporting and popular use of aircraft—and it would appear essential that the great number of War aeroplanes surplus to Air Force needs should be distributed at a low price and as early as possible to the many small enterprises and even to individuals so that the community at large may have their present enthusiasm and interest in aviation maintained and encouraged.

In technical development of design our Air Ministry must spend money by development contracts, as private enterprise will not be able to support the developments for some considerable time. This applies in particular to engine development. Attention should also be devoted to improvements in landing-carriages and landing problems, also the reduction in fire risks.

In conclusion, it would appear that the future rate of development will depend almost entirely on the permissible rate of expenditure and on the efficiency of the outlays.

I have to express my regret that lack of time has prevented this paper from becoming more than a series of somewhat disconnected notes, but it is hoped that these may prove to record some of the more outstanding factors in one of the many great wonders of the World War.

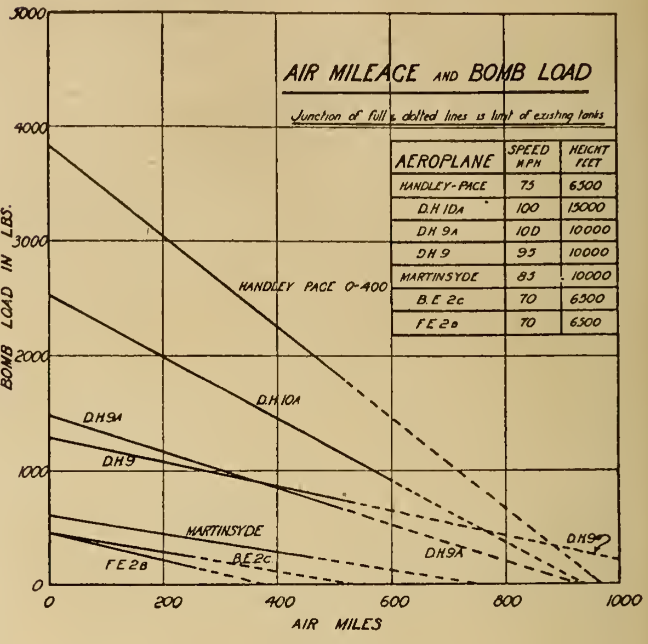


Fig. 51.

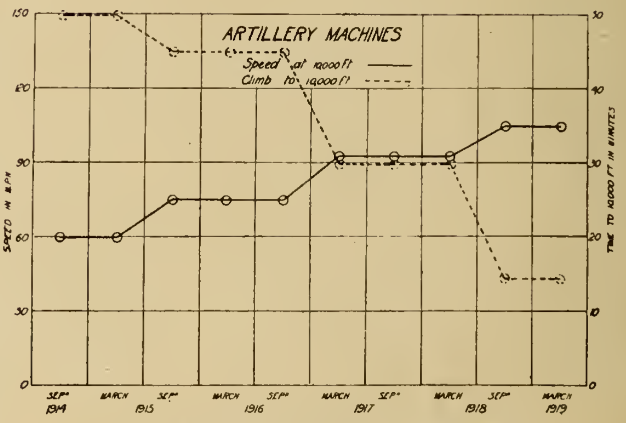


Fig. 52.—Performance increase.

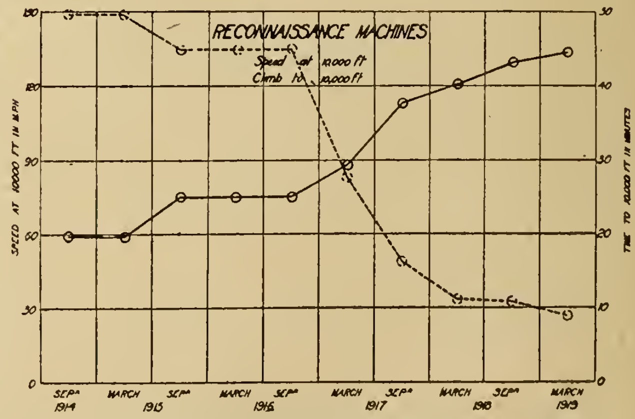


Fig. 53.—Performance increase.

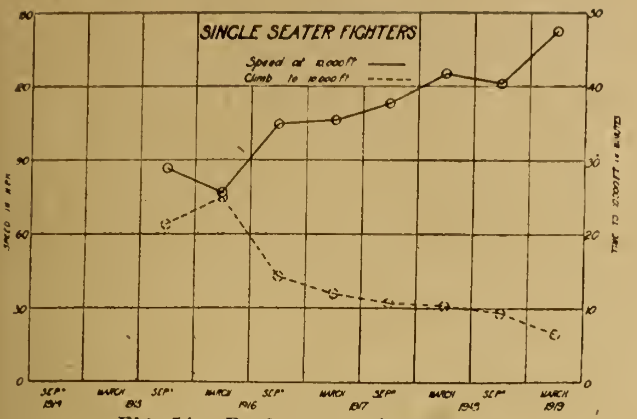


Fig. 54.—Performance increase.

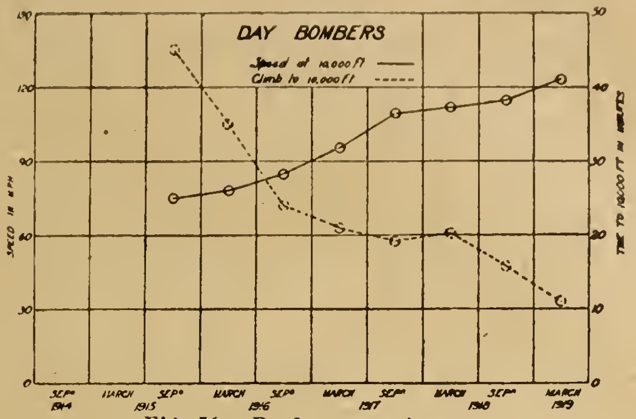


Fig. 56.—Performance increase.

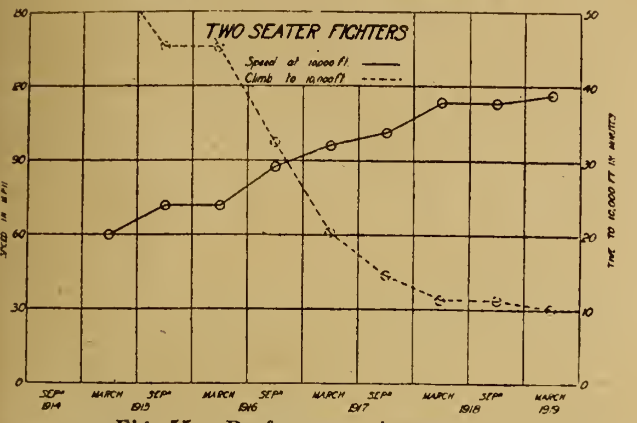


Fig. 55.—Performance increase.

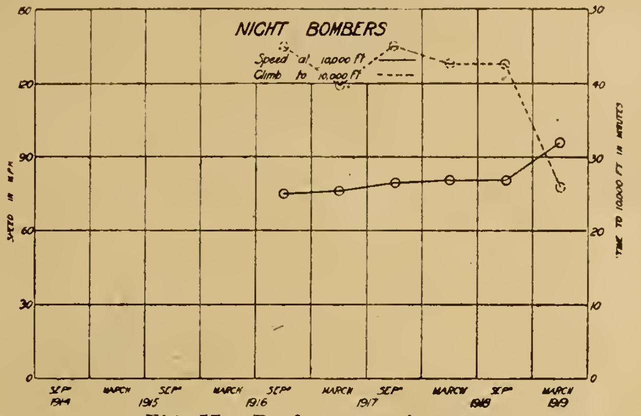


Fig. 57.—Performance increase.

I have to express my deep debt of gratitude to Lieut.-Col. Ogilvie and his partners, Messrs, Bristow, Pippard, and Watts, for their invaluable assistance in the preparation of the paper, also to Gen. Seely, Under-Secretary of State for Air, for permission to use the photographs of the different machines, and finally to the different aeronautical contractors for permission to use the photographs of the different machines.

◆ ◆ ◆ ◆

Fatal Accidents

When leaving Cranwell aerodrome for Liverpool on July 31, a machine, piloted by Sec. Lieut. W. A. Roberts, during a steep bank, side-slipped and crashed to the ground. The pilot and passenger, Sec. Lieut. E. Ireland, were killed.

A verdict of "Accidental Death" was returned at the inquest on Lieut. Lupinsky, a Russian flying officer, who, on July 26, was struck by a propeller and killed on the Doncaster aerodrome when preparing to return to Tadcaster.

Triple Fatality at Hendon

On July 18 Lieut. R. C. Cain, D.F.C., Corpl. J. Gammie, 1st Aircraftsman H. T. Griffiths, were killed at Hendon. They had started off on a D.H. 10, and when the machine was turning, at a height of 150 ft., it dived to the earth. The accident was ascribed to an error of judgment on the part of the pilot, and the jury returned a verdict of "Accidental Death."

The Lost N.S. 11

On July 28 a body was washed up at Salthouse, on the Norfolk coast, and later identified as that of Sergt. C. H. Lewry, the second coxswain of the wrecked airship N.S. 11. At the inquest at Cromer, no fresh evidence was forthcoming as to the cause of the disaster, and the coroner's verdict was "Found dead on the beach after being washed ashore from the wrecked airship."

British Officer Killed in Italy

A British aeroplane, described as Caproni F 304, proceeding from London, via Marseilles to Egypt, fell into the sea off the coast of Italy, about a mile from Monterosso, near Cape Mesco, on the evening of July 26, apparently owing to motor trouble.

Lieuts. Adams and Collings, and Sergts. Ascolis and Banour, were on board, and, with the exception of Lieut. Collinge, were able to free themselves from the machine and kept afloat. Unfortunately, the pilot, Lieut. Collinge, was fastened in the machine, and though he was eventually released by the efforts of his companions, he was greatly exhausted, and, despite all assistance, expired soon after being taken ashore.

The Caproni Disaster

So far no definite information has been received as to the cause of the crash of Caproni machine at Verona on August 2, but from stories of eye-witnesses something went wrong with the wings, which appeared to flutter and then to collapse. Several of the passengers jumped, but everyone on board was killed. It is believed that the total number of persons on board was 14, including two pilots, Lieut. Luigi Ridolfi and Lieut. Marco Resnati; five prominent journalists, Sig. O. Cipriani, T. Zanghieri, Bruni, Bisi and Morgagni, and seven mechanics from the Caproni works. The machine, a large biplane, was fitted with three 200 h.p. motors. It left the Taliedo aerodrome, near Milan, at 7.30 a.m., and landed at Venice at 9.22. The return journey was started at 5 p.m., and when the disaster occurred the machine was flying over the Verona aerodrome at a height of 3,000 ft.

Memorials to Vedrines

A committee has been formed in Paris to erect memorials to Vedrines at Villacoublay and at St. Rambert-d'Albon, where he met his death. It is also proposed to raise a fund for the benefit of Vedrines' children.

Kronstadt Bombed

Word comes from Helsingfors that eight British aeroplanes flew over Kronstadt at 3.15 a.m. on July 30 and bombed the forts. All the batteries replied, the firing lasting 40 minutes. At 8.15 a.m. two more aeroplanes flew over the fortress and also met with a hot reception.

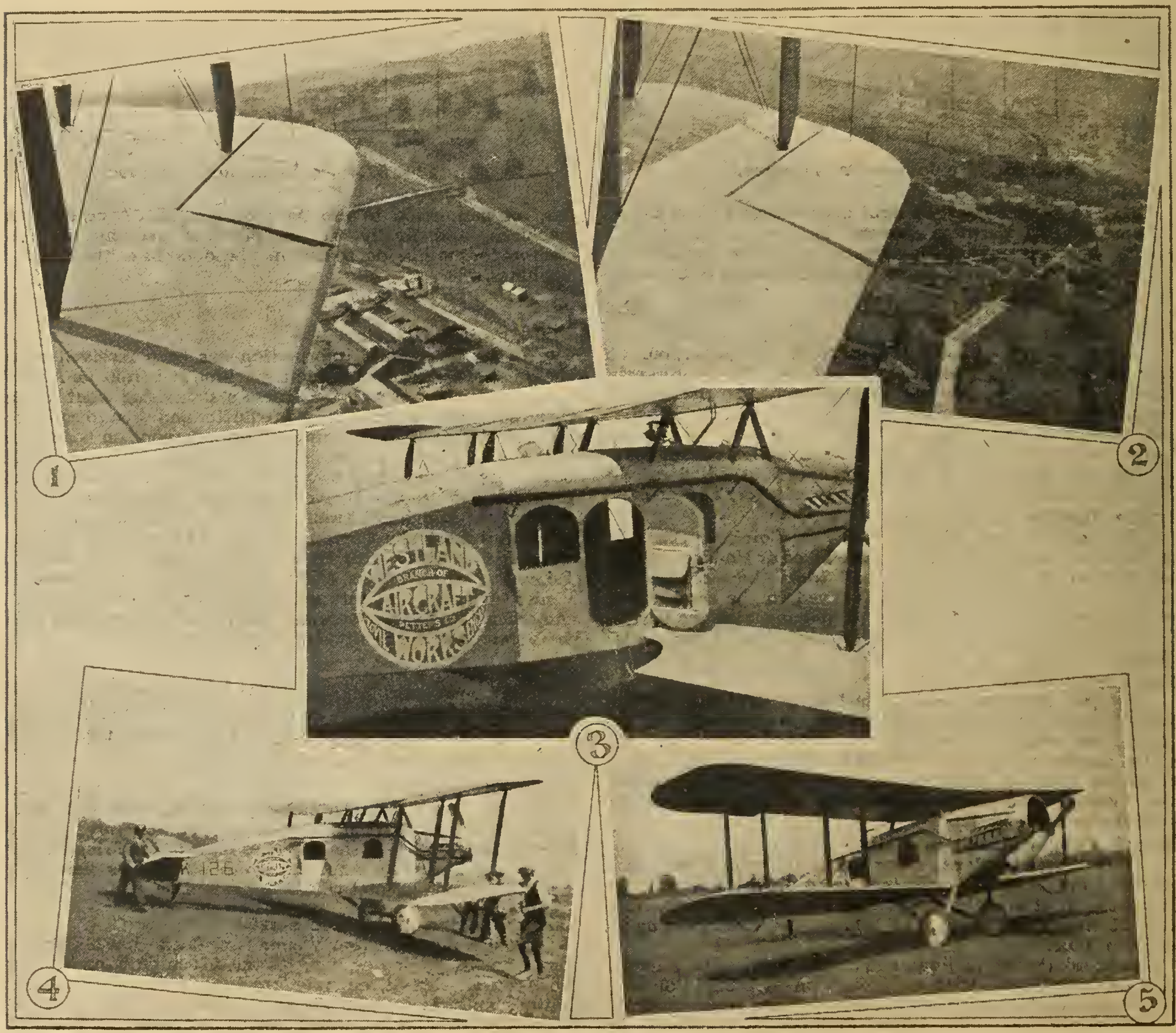
Large German Aeroplane Seized

From a message from Vienna it appears that a German aeroplane—R 39—on arriving at the Aspen aerodrome, near the Austrian capital, on July 31, was seized by the Allied military authorities, who placed it under the charge of the Italians. The machine, which carried 22 passengers, is stated to belong to a German aerial navigation company, and to have flown from Kamenet-Podolsk (Ukrainia), a journey of about 480 miles.

"WESTLANDS" OF YEOVIL

Yeovil, before the War, was chiefly associated in the minds of most people with the manufacture of oil engines, the name Petters being a household word in this connection. During the War Yeovil has become known for something besides oil engines—still in connection with the old name of Petters it might be pointed out. Always alive to the possibilities of the times, those responsible for the management of Petters, Ltd., foresaw, quite early in the War, that there would be a great demand for aircraft, and consequently an aircraft branch was founded, with a separate management, but on which Mr. P. W. Petter and Mr. R. A. Bruce were joint directors. The aircraft branch of Petters, Ltd., became known as the Westland Aircraft Works, and for a start machines were constructed to other people's designs. However, it was not very long before it was decided to produce original machines, for the design of which Mr. A. Davenport became responsible, and two types which resulted will be familiar to most people in touch with the aviation industry, the "Wagtail" and the "Weasel." Nor are these two the only types which have emanated from the Westland Aircraft Works, although they are, perhaps, those best known.

Last week we had, in company with representatives of the technical press, an opportunity of inspecting the Westland works at Yeovil, and to see the new commercial aeroplane which has been designed and built since the Armistice. The party was met at Paddington station by Lieut.-Col. Meares, who is now associated with the London end of the firm. On arrival the visitors were introduced to Mr. R. J. Norton, commercial manager of the firm, and to Mr. F. Chandler, who is works manager. The party, which also included Capt. A. S. Keep, M.C., late R.A.F., having by motor reached the works and aerodrome, a tour of the works revealed the fact that a great factory has been built during the War, in which the most up-to-date machinery is running at full pressure, producing, among other machines, Vickers-Vimy bombers, of which a large order is being completed. One also noted several Airco (de H.) biplanes, while the large and well-organised drawing-office was busy with the designs for several post-War commercial machines, one of which is already in production, the first machine of the batch being in flying trim on the day of the visit. This machine, which is known as the Westland "Limousine," has been designed to combine the qualities of a luxurious motor and a yacht. As the accompanying illustrations will show, the "Limousine" has a totally enclosed cabin, with seating accommodation for pilot and three passengers. The pilot occupies the rear port seat, which is raised above the floor of the cabin so as to bring his head above the roof, in which there is a cockpit for the pilot, whose head is protected from the wind by a screen. One of the passengers sits next to the pilot, but a little lower so as to be right inside the cabin. The two remaining seats are placed near the front wall of the cabin, the occupant of the port seat facing forward, the other passenger sitting with his back to the cabin wall. This object of this placing was not clear at first, but was explained when Mr. Norton took his seat in the machine, the other front seat being occupied by a shorthand typist, who calmly placed her typewriter on a little hinged table attached to the front



THE WESTLAND LIMOUSINE: 1 and 2, A couple of snaps through one of the starboard windows. 3, The cabin is entered through a door in the side as comfortably as on a motor car. 4, Three-quarter rear view of the Westland limousine. 5, Three-quarter front view of the Westland limousine

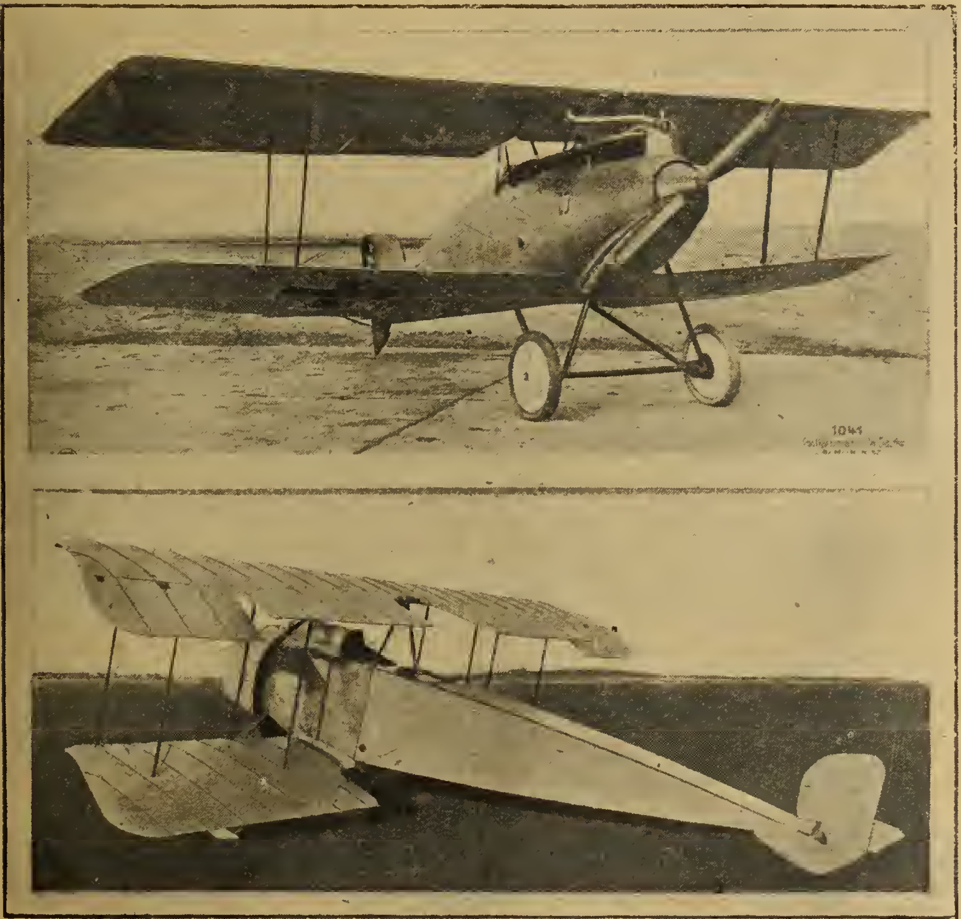
wall of the cabin. The writer of these notes was requested to take the remaining seat so as to be in a position to testify that a message was dictated by Mr. Norton during the trip, was first taken down in shorthand, and was then transcribed on the typewriter. When Capt. Keep had taken his seat the party was complete, the chocks under the wheels were taken away, and the machine commenced to taxy along the ground. When the far side of the aerodrome had been reached the pilot swung the machine around into the wind, and opened the throttle. The Rolls-Royce Falcon commenced its roar—at least one presumes it did, since inside the cabin the noise was no more than that of an engine running well throttled down, and in a few seconds we were in the air. But what a difference to the ordinary open aeroplane. There was no more noise than in a railway carriage, and as for draught, there simply wasn't any. At the same time the ventilators in the roof prevented the air from getting at all stuffy. There we sat, as comfortable as if we had been at rest on the ground, and yet we were travelling along at over a hundred miles per hour. Mr. Norton's voice could be heard as he dictated his letters, while below a lovely panorama was unrolled, the beauty of which one could enjoy undisturbed by any rush of wind or by any unpleasant noise. The day was hot, and consequently there was a number of heat bumps; but for the latter one had little sensation of movement. As we climbed higher the bumps grew less, and finally appeared practically to cease. By now Mr. Norton had finished his dictation, and the typist commenced to transcribe. As it happened, however, that particular letter was not destined to be typed in the air, for the typewriter had been so fixed that while it worked quite well where small letters were concerned, it was too close against the upholstery on the cabin wall to permit of writing caps. As Mr. Norton refused to have the letter written entirely in the lower case he called to the pilot to descend. After a short glide we landed without incident. The writer of these notes was quite satisfied as to the cause of the difficulty and would willingly testify to the practicability of both dictating and typing during flight, but Mr. Norton insisted upon having the matter put right, and in a subsequent flight, when the typewriter had been moved out from the wall, the experiment was repeated and succeeded without any hitch.

It will, therefore, be seen that in the Westland limousine one has a machine in which it will be quite feasible for a Cabinet Minister, or the head of a large commercial undertaking, or anybody else whose time is valuable, to travel from one place to another, faster than is possible by any other means, while at the same time doing it in greater comfort. Further to save time it will be possible for the owner of such a machine to dictate correspondence and to have it typed out *en route*, ready for posting as soon as the machine reaches its destination.

That it will be more expensive than going by train may be granted, but to the busy man, whose time is worth a lot of money, the saving in time which the aeroplane can effect will more than compensate for the extra cost.

It is not, however, to the business man only that a machine like the Westland limousine will appeal. The wealthy man on pleasure bent could not wish for a more comfortable, nor for a more entertaining way of touring either at home or abroad (when the authorities open the barrier to international flying). There is no doubt that once the charms of flying in the modern comfortable aeroplane are realised by those whose means of transport or for pleasure—and it would be idle to pretend that it is at present within the reach of the poor—this mode of travel will become increasingly popular. The three old-time enemies of comfortable air travel—noise, wind and oil—are absent in the modern limousine of the air, and when this fact has once been well established we shall soon see great numbers of these machines in frequent use by their private owners.

After a number of joy-rides had been made by the visitors, the party was taken to tea, when Mr. P. W. Petter, in a few brief words, outlined the policy of the Westland Aircraft Works. The firm, it is gratifying to learn, intends to remain in the aviation industry, those responsible for its management being firm believers in the future of aviation, and being ready to face the difficult times which the industry will have to pass through before flying comes into its own. We should have liked to have given this week a more detailed description of the Westland limousine, but space calls a halt, and we hope to record the fuller description in next week's issue.



Two of the lesser-known Hun fighters, that on the top being the Friedrichshafen single-seater scout, and below the Gotha short span two-seater.

THE AMSTERDAM EXHIBITION

After sundry postponements, mainly due to trouble in getting the aerodrome into going order, the first Dutch Air Exhibition was officially opened on August 1 by M. Koenig, Minister for Public Works. Although at that time the whole of the British exhibits had not arrived, this section made a good show, including a Vickers-Vimy commercial type, Handley Pages, both the four and twin-engined models, a number of Avros, a F 5 flying-boat built by the Gosport Aircraft Co., B.A.T.'s, Blackburns and Aircos. There is also a good British display in the accessories section. As a sample may be mentioned the stand of the Farringdon Propeller and Engineering Co., Ltd., on which there are samples of their propellers and windmills, as well as the Walker Boring jig. France has also a good display of Farman (including a Goliath), Caudron, Breguet and other machines, while Holland is represented by Fokker, Spyker and Picus. There are also exhibits from Italy, Sweden and Spain. German firms are debarred from showing, but there is a Friedrichshafen bomber in the Dutch Navy section.

Several of the British machines have crossed to Holland by the aerial way, including a small circus of Avros, comprising a two-seater, two three-seaters and a five-seater, under the command of Capt. W. G. R. Hinchcliffe, D.F.C., A.F.C., a V 1500 Handley Page, piloted by Lieut.-Col. Douglas, and the Gosport F 5 flying-boat, fitted with two 350 h.p. Rolls-Royce, which on July 30 made the trip of 340 sea miles from Southampton to Amsterdam in under five hours. The F 5 was in charge of Lieut.-Col. R. Hope Vere, A.F.C., and carried Dr. Bisschop, the legal representative of the Dutch Government in England, Mr. M. N. Volk, the general manager of the Gosport Co., Mr. J. W. Nicholson and a mechanic. Capt. Sir John Alcock visited the exhibition on August 3, and was given a most enthusiastic reception.

Unfortunately the opening was marred by a fatal accident. A Dutch naval seaplane, while trying to alight on the water, fouled the roof of the Hillens machine works. Lieut. Bakker, the pilot, escaped with a broken leg, but the mechanic, Sergt. Kroege, was killed.

FLYING TO HOLLAND PERMITTED

The Air Ministry announces that, pending a definite agreement on the basis of the Air Convention, and in order to enable Dutch and British aircraft to visit England and the Netherlands, should they so desire during the exhibition, arrangements have been made with the Netherlands and Belgian Governments for the temporary opening of civil communication by air between the Netherlands and Great Britain.

In view of the distance of the sea passage from the east coast of England to Holland, seaplanes only may cross by this route, and aeroplanes will proceed to Holland *via* the Straits of Dover, France and Belgium. Arrangements have been made, by the courtesy of the Belgian authorities, for a refuelling base at Evere, near Brussels. Aeroplanes proceeding to Holland by this route may cross the Belgian frontier at any point which may be suitable.

The following is the text of the agreement with Holland:—

(*a*) Except in emergency, both seaplanes and aeroplanes entering Holland must land at Amsterdam.

(*b*) Except in emergency, aircraft entering England must land at :—(i) Seaplanes, Felixstowe; (ii) Aeroplanes, Lympne or Hounslow.

(*c*) Seaplanes will cross the Dutch coast between Scheveningen and Ymuiden. Aeroplanes entering Holland *via* Belgium may cross the Belgian frontier at any point which may be suitable.

(*d*) Seaplanes will cross the English coast between Orfordness and the Naze; aeroplanes between Folkestone and Dungeness.

(*e*) All machines and pilots taking advantage of these facilities must be provided with and carry such documents as may be required by their respective Governments, or by the competent authority.

(*f*) Passports will be carried by both passengers and crews, but such passports will not require the Dutch visa on leaving the United Kingdom if the period of stay in Holland does not exceed two days.

(*g*) No goods must be carried, either on the outward or return journey, without Customs formalities being observed.

(*h*) If aviation material is destined definitely for Holland, Customs dues must be paid.

(*i*) No photographic apparatus for use during the voyage may be carried.

(*j*) A manifest of goods carried under *g* and *h*, and a full list of passengers under *f*, will be carried by the pilot in charge of the machine.

The forms referred to in (*g*), (*h*), and (*j*) are as follows:—

Aircraft report and description of cargo, Form 150.
Notice of intended departure with goods, Form 151.
Manifest of general declaration of cargo, Form 152.
Pilot's declaration and clearance (outwards) without goods, Form 153.

Pilots intending to fly to Amsterdam will be afforded all available information in regard to aerodromes and including aerial route directions, etc., and copies of the above forms on application to the Controller-General of Civil Aviation, Room 521, Kingsway, W.C. 2.

Resettlement

There are many officers and men of the R.A.F., who are demobilised or are about to be demobilised.

In order to assist those who are undecided or are seeking advice as to their prospects in civil life, the Editor has arranged for an expert, with wide experience of service, industrial and educational conditions, to give advice to those who may solicit it through the medium of this Journal.

Applications, which must be in writing, should be marked *Resettlement*, and addressed to the Editor, Flight, 36, Great Queen Street, Kingsway, W.C. 2. They will be dealt with in these columns, as far as possible, in rotation.

S.W.S. and other Ex-Cadets.—As you are still at a unit your demobilisation officer should furnish you with full particulars *re* "Honorary Commissions for Ex-Flight Cadets."

Instruction in Aeronautical Engineering

The East London College (University of London) is arranging for two courses of instruction in Aeronautics, commencing in September next. The first course is of one year's duration, and is suitable for those who have some knowledge of engineering and science subjects. The second is a three-years' course in Engineering and Aeronautics for the B.Sc. (Engineering) Degree of the University of London, and will be conducted by Mr. N. A. V. Piercy, B.Sc., a recognised teacher of Aeronautics of the University. Experimental wind tunnel work will form an important part of the course, and facilities for research will be available. Particulars of these courses may be had on application to Mr. E. J. Wignall, Registrar of the College.

No Peace Flying Over London

In response to enquiries received the Air Ministry made it known that during Peace Celebrations there would be no relaxation of the General Safety Provisions (para. 5, Air Navigation Regulations) in regard to flying over town areas or populous districts, either for the purpose of taking photographs or for any other purpose.

On Saturday, July 19, the date of the Procession, no flying whatever was permitted over London within a circle of four miles radius from Charing Cross.

Factory for Sale

The American aircraft factory at Shaw, near Oldham, is for sale by private treaty. The land and factories section of the Disposal Board of the Ministry of Munitions states that it covers six acres of land, and that its buildings are mainly of brick construction with concrete floors and timber roofs covered with ruberoid. Water and gas are supplied from the public main, and arrangements can be made, regarding the electric power. Sidings connect the factory with the Lancashire and Yorkshire Railway.

Sales of Surplus Government Property

The latest official figures of sales of surplus Government property show that the sum realised is now over £141,000,000. The figures include sales amounting to £32,800,000 which were completed after the date of the Armistice and prior to the setting-up of the Disposal Board of the Ministry of Munitions. The total of £141,000,000 carries the sales up to July 12, and includes £76,000,000 for sales on trading account and £65,000,000 for other surplus stores.

A Blériot Omnibus

The French Blériot works have been busy on a new passenger-carrying machine which should be ready for its trials in about a month. It is fitted with four motors aggregating 1,200 h.p., the span of the machine is 29 metres, and the lifting surface 150 square metres. It has been designed to carry 28 passengers and to make flights of six hours' duration.

CIVILIAN FLYING

HENDON

From a spectacular point of view the cross-country race at Hendon last Saturday was sowewhat disappointing, only three out of six entries actually starting, after a long delay. Rain also started simultaneously with the race, so that the progress of the machines was difficult, if not impossible, to follow.

The starters in the cross-country race were Lieut. G. R. Hicks, D.F.C., Maj. R.-H. Carr, A.F.C., D.C.M., and Capt. D. H. Robertson, A.F.C., all on Avro biplanes, 110 h.p. Le Rhone engines. Carr got home first, and Robertson was second, their handicap times being respectively 18 mins. 35 secs. and 20 mins. 26 secs. The course was over the Hendon-Bittacy Hill-Hendon circuit. Among the visitors were a party of eight Soudanese chiefs—who are on a mission to England—four of whom enjoyed the thrills of flying.

On Monday there was a race to Bittacy Hill in which there were four starters, Maj. Carr (Avro), Capt. P. R. T. Chamberlayne (G.-W. Bantam), Lieut. Hicks (Avro), and Capt. C. R. Vaughan (Bat Baboon). Maj. Carr, who received 39 secs., was the winner in 16 mins. 29 secs., securing the London Flying Club Trophy and £20, while Capt. Chamberlayne, who was only beaten by 10 secs,. took the London Flying Club Medal and £10. Lieut. Hicks was in trouble with his engine, and Capt. Vaughan was a lap behind and did not continue. The other event of the afternoon was a double parachute descent by Mr. Newell from a height of 1,500 ft. "Flips" were in great demand, and 200 passengers were taken up.

HOUNSLOW

During last week a good many cross-country trips were made on Avro machines. Sir Hari Singh, of Kashmir, flew to Swanage and back on Sunday. Another machine was taken for the week-end and visited Cowes and Dover, while other bookings were to Crewe, Southampton, Margate, Bristol and Worcester. On Saturday Mrs. Leon Errol, who had arrived at Southampton in the *Aquitania* from New York, flew in an Avro from Hamble, arriving at Hounslow at 10.15 a.m.

BLACKPOOL AND SOUTHPORT

During the past week the Avro pilots at Blackpool have been kept busy, and we understand that the ten thousandth passenger was taken up, which is remarkable considering that the flying there did not start until the middle of May. There has been no accident during the period, with the exception of one machine which landed in the sea, owing to the high-tension lead dropping off; the Avro motto of "Safety First," which is painted on large notice boards all round the aerodrome, being well maintained. So confident are the public nowadays that they turn up for flights in any weather—rain, blow or hail—whereas when the show started, they would not look at a machine if there were the semblance of a wind. Several days last week regular passenger flying was carried out in winds of between 30 and 40 m.p.h. One day the wind was so strong that it lifted several machines 5 ft. from their sandbag moorings on the beach. Several five-seater machines, fitted with 160 h.p. B.R. 1 engines are now in commission.

Southport is proving a good second to Blackpool, and among the passengers taken up was the Mayor, Alderman J. Wood, who enjoyed looping and spinning. Quite half the passengers have been ladies, and six of them have asked to be allowed to go through a course of lessons. One man arrived at Southport a few days ago about 9 p.m.—when it was blowing a gale and the clouds were low—and offered £200 for a flight to the Isle of Man, explaining that he wanted to give his wife a surprise.

NEW AVRO STATIONS

The Preston Aerodrome has been granted a temporary licence, but requires a certain amount of levelling. Negotiations are well under way for opening landing grounds at Kendal, where there is only one R.A.F. aerodrome within 50 miles, and near Llandudno on the Moorfa, a splendid central station for all North Wales, but the proximity of the Snowdon range and the Great Ormes Head will make the flying there somewhat bumpy. A station at Rhyl in North Wales was opened last week, flights being made by Maj. McMinnies, A.F.C., Capt. E. Maitland-Heriot, D.S.C., and Lieut. Hudson.

Lieut. Moxon has been busy all the week on a small stretch of sand on the beach at Douglas, Isle of Man, where he receives many enquiries as to when the cross-channel service is to start.

AT OTHER CENTRES

Two Avro machines, which arrived at Swansea on July 26, have taken up more than 200 passengers, the ball being set rolling by Councillor George Henning, in the unavoidable absence of the Mayor.

At Margate last week-end 107 passengers were carried in Avro machines. The record at Brighton last week was 168 passengers, and one party made a cross-country trip to Chichester for the races at Goodwood.

◆ ◆ ◆ ◆

"The Limes," in fir-land.—The C.O.'s quarters at an R.A.F. "Station."

U.S.A. NAVY F-5-L FLYING BOAT

(*Concluded from page* 1026)

The hull is built up around four *longerons*, as is a land plane, and has in addition a keel and a planked V-bottom that is flared out to present more landing surface. The flared out portions are called fins, and in this place are an integral part of the hull structure, and are continued aft, and streamline into the hull sides. This is not the case in many previous seaplanes, namely, the H-12 and the HS-1 and 2, where the fins are stopped abruptly about one-third the hull length aft from the bow, and the advantage is increased strength and better streamline form.

Before entering into a detailed description of the hull construction, it may be well to define some of the terms used. The following defines them roughly, and is the order in which they enter the hull construction :—

Keelson.—A wide thin plank extending from near the bow to the stern, above the keel.

Keel.—The bottom-most longitudinal member forming the backbone of the hull.

Floor Frames.—The transverse planks jointed at right angles to the keelson.

Longerons.—All longitudinal members extending from the bow to the stern with the exception of the keel.

Fin Edges.—The two outside longitudinals of the fins.

Stringers.—The longitudinal strips connecting the floor frames on the bottom and the strips on the fins.

Bulkheads.—All transverse veneer structures dividing the hull framing.

Transverse Bracing.—The central structure connecting the hull to the two wing beams extending through the hull.

The keelsons are ½-in. basswood, built in not more than five sections, having at least a 9-in. scarf at the joints and held together with copper rivets. To this the floor frames, also ½-in. basswood, are notched and securely riveted by two corner stringers. Throughout it will be noted that built-up members are used, permitting the use of readily available material.

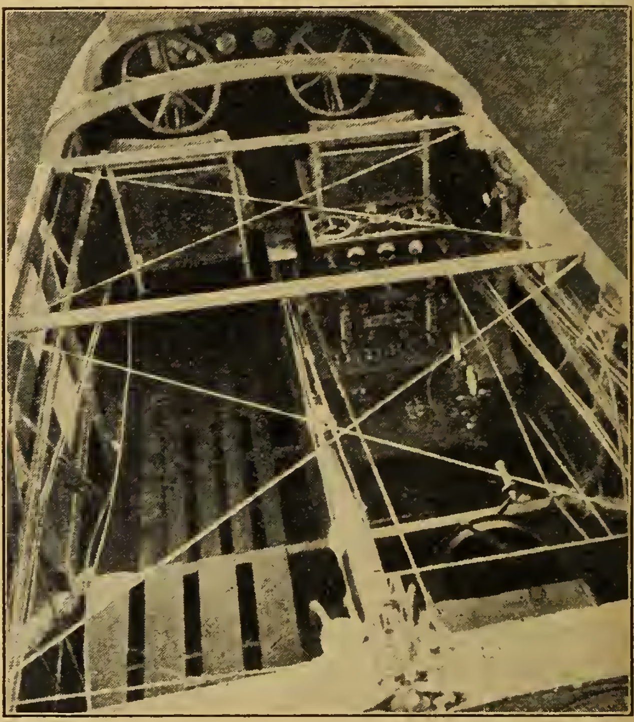
White ash is used for keel, *longerons*, fin edges and the bent ends of the stringers. These two may be built up or spliced, but not more than four sections may be used. The scarfs in the keel must be at least 18 ins. long, and are copper riveted. Formerly a straight scarf was used, as it was considered a better production proposition, but now a stepped scarf is used, as it was found that the time saved in making the straight scarf was lost in assembly.

Similar methods of splicing are used in the case of the *longerons*, fin edges and stringers, and here the joints are served and doped. Care is taken in the location of all splices in longitudinal members, so that a number of splices will not occur in any one section, causing a weak section and failure. For example, not more than two *longeron* splices may appear in any one bay, and these must both appear in either the upper pair—to balance each other. By this method of splicing ash longitudinals, and the careful location of joints, short lengths of ash can be used. And this is important, as airplane ash under any condition is not easy to secure. All ash members are steam bent to assembly shape before assembly on the hull forms. This bending and the splicing of the complete longitudinals are done in a separate part of the shops. Likewise the keelsons and floor frames, stringers, bulkheads, posts, struts, braces, etc., are sub-assembled, and when delivered to the hull erection floor are ready for assembly but with little fitting. This idea is carried out even to the bottom planking, which is delivered in amounts sufficient for one hull. But a detailed description of this sub-assembly is too involved for comment here.

Throughout the hull construction all parts are tied together by metal fittings—and concerning these metal fittings three points are noteworthy as aiding increased production. The first is a choice of material used. One generally considers the steel entering into airplane construction as being the best possible, and heat-treated to the greatest strength. But fittings on this plane are in general soft or mild carbon steel. The reasons for this are that such steel can be procured almost anywhere, is easily worked and welded, and loses little of its strength through abuse in brazing, welding or forming. The second point to be noted in the fittings is that, with few exceptions, they are built up from flat patterns bent and brazed or welded. This eliminates drop forgings, which were so difficult to secure, and permitted production to go ahead without waiting on the construction of dies. The third feature of the fittings is the use of identical fittings in many places. For example, throughout the hull, the junction of the posts and the *longerons*, the point of attachment of the floor frames to the *longerons*, and the plates covering the joints of the hull bracing—fittings differed only slightly at the different stations.

However, originally each similar fitting differed slightly, necessitating a separate template, a separate print, part number, operations, etc., throughout the whole construction. But a study was made, and an "average fitting" produced that would suffice for several similar stations. The fact that such fittings did not exactly fit anywhere, or had lugs that were not needed in other places, amounted to less than they saved time in production. And they were structurally as good.

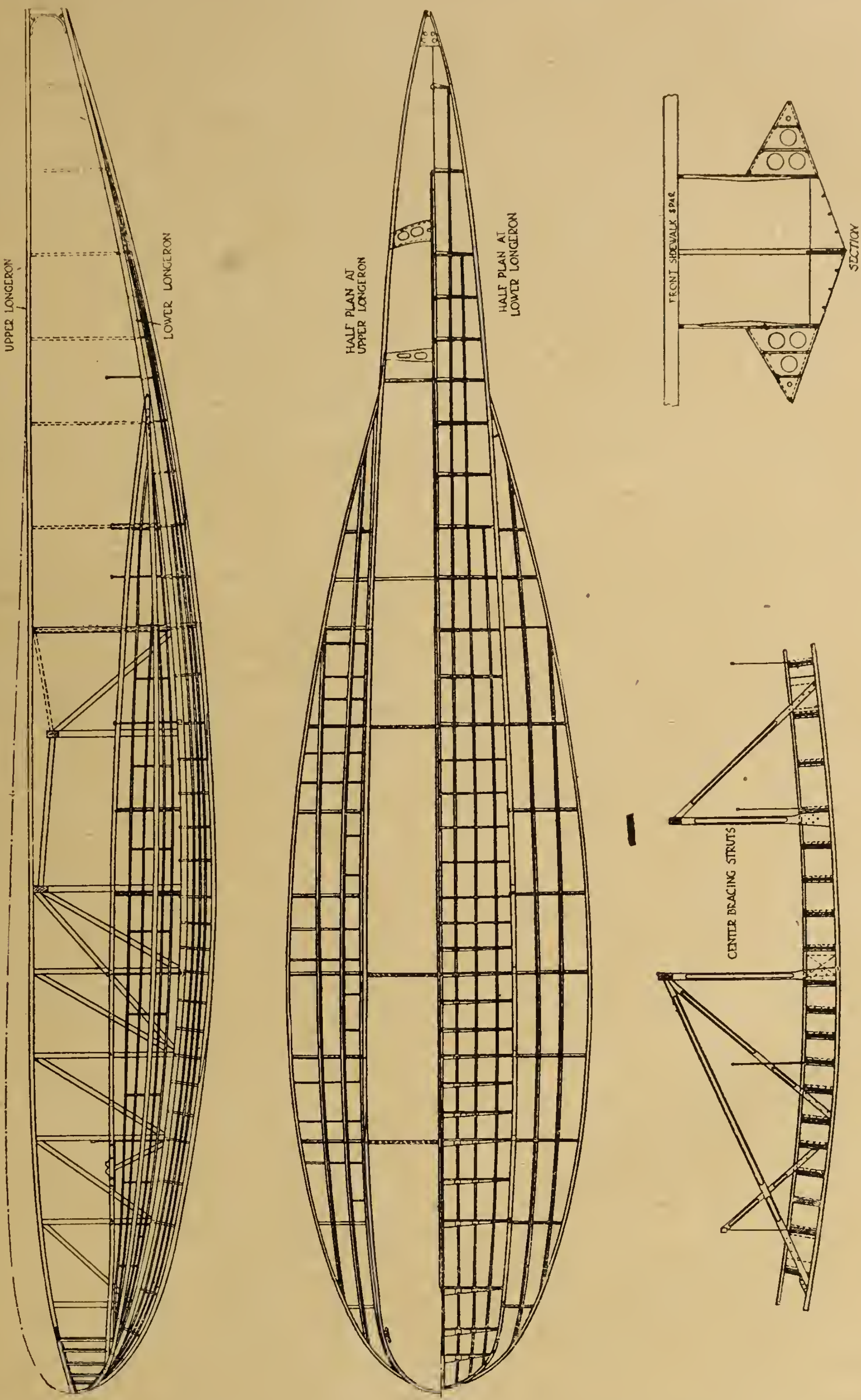
A further difference in the construction of this hull and that of similar hulls of its predecessors is to be noted. On previous models, riblets were used to connect the keel with the fin edge stringers. These riblets were about ½ in. by ½ in. ash, spaced at distances varying from 9 to 15 ins. transversely across the boat bottom. To bring their bottom surface flush with the stringers, lower *longerons* and fin edges, it was necessary to notch keel, stringers, *longerons* and fin edges that they might be set in. And it was a slow, tedious job. On this unit, the riblets are omitted, though several ash-tie strips are used to connect the keel with the fin edges. It is considered that these, together with the planking, provide transverse strength in abundance. Another feature in the construction is the extensive use of steel tubing as struts and posts in the body bracing. This is particularly noticeable in the tail, where the parts are under no great strain, and are not used for the attachment of other parts. Steel tubing is readily procured, and ready for use by simply cutting to length.



View of the pilot's and wireless operator's quarters on the F-5-L flying-boat

The central or transversal bracing unit is a complete unit in itself, and is set up as a separate assembly previous to installation in the hull. This differs from the usual construction and permits the use of templates to assure accuracy. The transverse bracing connects the hull to the wings and the hull may be said to be built around this unit. By making all transverse bracings identical, any set of F-5-L wings, engine mountings, etc., may be more readily installed. It is also to be noted that the wing spars passing through the hull are spliced at the centre. These spars, styled the sidewalk spars, as they carry a short veneer covered wing section at each side of the hull that is used as a sidewalk for the mechanics to reach the engine, may be removed when the hull is packed for shipment, permitting the use of a much smaller shipping crate.

Hull Construction Plans of the F-5-L Navy Flying Boat



THE U.S.A. NAVY F-5-L FLYING-BOAT. Drawings of the hull

The bottom planking comprises an inner and an outer skin, each of $\frac{3}{32}$-in. cedar. The inner skin is placed at right angles to the keel, differing from usual practice wherein both layers are at an acute angle to the keel. As riblets are eliminated, the right-angled inner planking tends to replace them as strength members. This inner planking is either Port Oxford or Spanish cedar in random widths of from 4 to 10 ins. The outer planking is placed at an angle of 45 deg. to the keel, the acute angle being on the aft side. All pieces are from 4¾ to 5 ins. wide, Spanish cedar, and are screwed to all longitudinals. The two layers of planking are secured together by brass clinch nails. Courtrai, a special fabric, is laid in marine glue between the two layers of planking, and is used extensively in rendering all joints tight. All planking is laid with a slight clearance to allow a go-and-come resulting from moisture changes.

The bottom steps are secured in place after the hull is planked. They are two layers of $\frac{7}{32}$-in. mahogany planking, fabric and marine glue between, screwed and clinch-nailed together, and secured to the hull bottom by copper rivets, being separated from it by triangular ash strips. The forward ends of these steps are scarfed and set into the hull planking, a thick brass strip being set in flush over the joint. For the rest of the hull $\frac{1}{8}$-in. three-ply waterproof veneer is used.

The top plane is built up in five sections, comprising a centre section of 13 ft. 6 ins. span (108 sq. ft.), two intermediate, 27 ft. span (216 sq. ft. each), and two outer extensions, 15 ft. 11 ins. span (95 sq. ft. each). The lower plane is in four sections, consisting of two centre sections (or sidewalks) mounted one on each side of the hull, giving the same overall span as the top centre section and having a combined area of 66 sq. ft. The balance of the lower surface consists of port and starboard wings, 30 ft. 5 ins. span (240 sq. ft.) each. Vertical "non-skid" fins are mounted above the top planes at each outermost interplane strut.

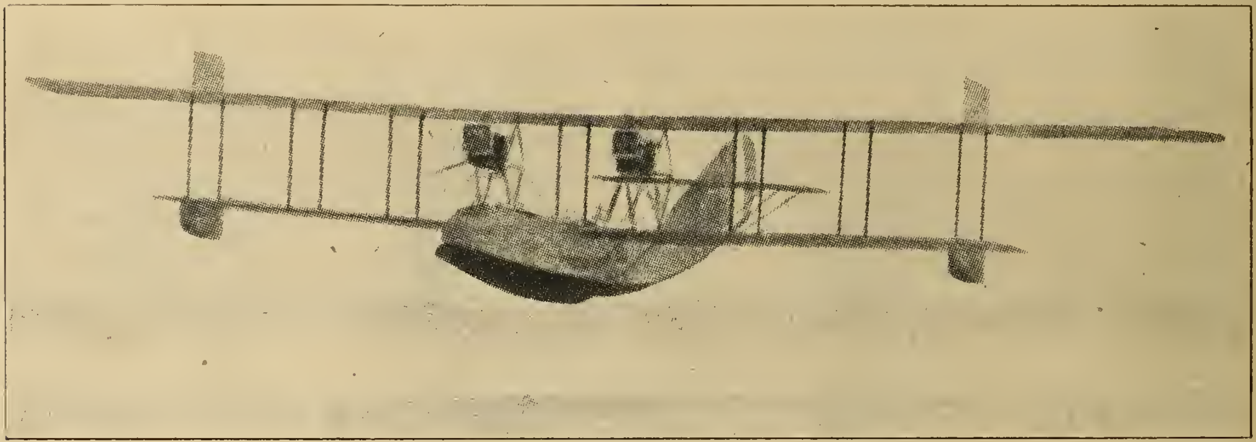
An extended technical description of the panel, strut and tail construction could be expanded to many volumes. But the outstanding features of these are laminated spars, simple strap type wing and strut fittings and laminated uniform section struts.

At one time laminated or spliced spars were not in favour, but the shortage of long spruce necessitated the use of laminated and spliced spars, and it is found that the laminated spar is better than the unlaminated one. Outside of the economy of material, the ease of drying pieces of small cross section and the resulting dependability of built-up spars more than off-sets any additional expense in manufacturing. Two types of laminated spars are used—the two-piece and the three-piece. The former is simply two pieces placed back to back, and glued together. The two halves are of equal thickness, and are lightened as was the solid spar except at splice positions. Scarfed splices are used, and staggered in the two halves. The two-piece is used in the following places: all front spars (except engine section), horizontal stabiliser spars, and rear *aileron* spars. The three-piece spar comprises a thin piece sandwiched between two thicker outside pieces, glued together, and lightened similar to the solid spar, except at splices. This construction is used in the sidewalk and engine section, or for rear spars. Of the two types, the two-piece is considered stronger, and hence the above distinction of their use.

The idea of using strap fittings and the elimination of forgings and machined fittings extends to the strut and wing fittings. Here also mild carbon steel is used, cut from flat patterns and bent to shape. The base wing fitting is a U-strap, bent around and bolted to the spar. From it lugs are bent for interwing wiring, and the interplane side has a cloverleaf extension for the attachment of the struts and wire terminals. These are reinforced by washer plates to provide bearing for the bolts. Roughly, the spars are secured to the strut ends by a bolt passing through the central cloverleaf and the strut end, and the usual strut socket is eliminated. In detail, the strut end is squared down, drilled to mate with the central cloverleaf hole, and a steel tube fitted in the end to give greater bearing and prevent the strut end from being crushed when the through-bolt is tightened. The through-bolt has a standard eye head, permitting the attachment for the drift and anti-drift wires, where a single wire is used. When double drift wires are used, the through-bolts holding the flying and landing wire clevises are made with an eye. Bearing for the strut ends on the spar is secured by means of a thin bearing plate between the strut and the spar.

It was observed that considerable time was lost in shaping the tapered streamline section struts, and furthermore, these being in two-piece construction, required thick material that was difficult to obtain. Hence, a three-piece uniform section strut was chosen. As stated, this strut is three-piece, and all the lightening is done in the central portion. In the rough it is a flat board, the length and width of the strut, with a series of oval holes cut out of the central portion on a vertical spindle shaper. The cheek pieces are then glued on each side, and the strut rough-machine planed to a streamline section. It is then finished to the desired section by hand.

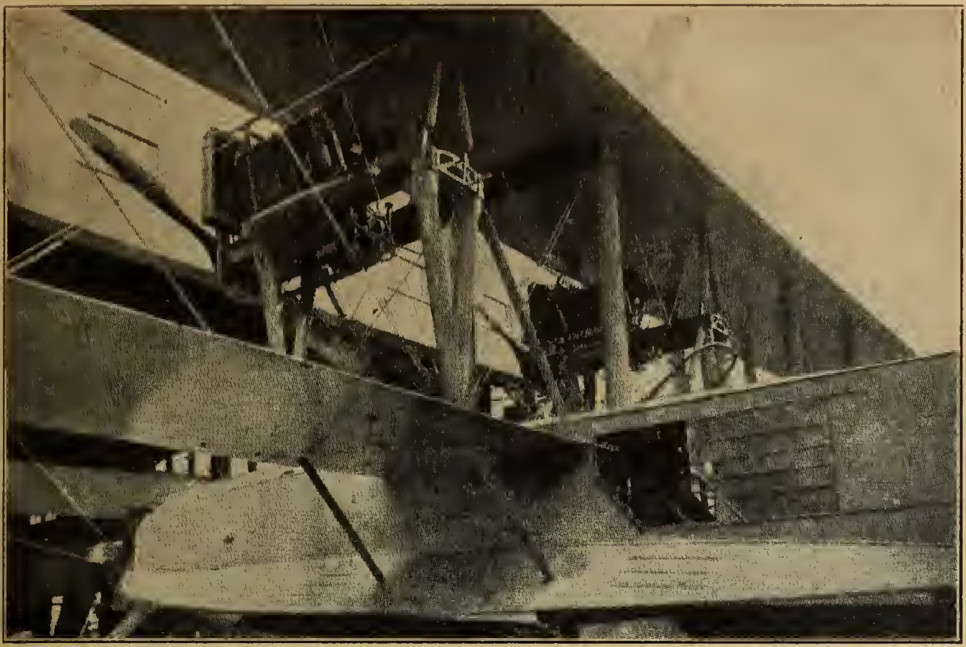
Two Liberty engines comprise the power plant. These engines are identical with the engines used by the Army, with the exception of the pistons, which pistons are given more clearance, so that the compression pressure is reduced. The result is a slight reduction in maximum horse-power, but greater engine life. This is advantageous because in seaplane service long patrols place a premium on dependability and a seaplane does not habitually frequent high altitudes or require the maximum available horse-power.



The F-5-L flying-boat in flight

In the main, the engine mounting differs only slightly from the mounting of the Liberty engines in the Curtiss H-12 and H-16 seaplanes. Horizontal laminated engine bearers are carried on wooden V-struts over each main wing hinge fitting, and are attached to the upper panel by tubular A-struts. The radiator is carried on a bracket at the front, and the oil supply in streamlined tanks at each side of the bearers. However, in details, the F-5-L mounting is simplified and made a better production-proposition. The first step was the elimination of drop forgings. Strap fittings built up and brazed together are used for attachment of bearers to V-braces, and the upper attachment of the A-brace to the engine section is also a strap fitting. This attachment is strong and simple. The ends of the tube are first fitted with a tubular sleeve, and then formed to a U-section. In addition to the simplicity of construction, this end is extremely rigid. The A-braces are attached to the spar fitting through a universal joint bearing plate. This is also a built-up fitting. The forward A-brace is bowed to clear the engine cylinders, and the halves are tied together by a cross-tube and through bolt. This brace must be removed before the engine can be taken from the plane, and the removable cross-tube and through bolt permit this to be done. Differing from previous construction, the engine bearers are carried forward so that a straight radiator bracket may be used. Previously, the bearers were cut off by the front engine flange and arched brackets used. However, the straight bracket is simpler to construct, and is possible on Liberty installations.

In an installation of this nature, it is, of course, impossible to start the engines by hand cranking on the propeller.

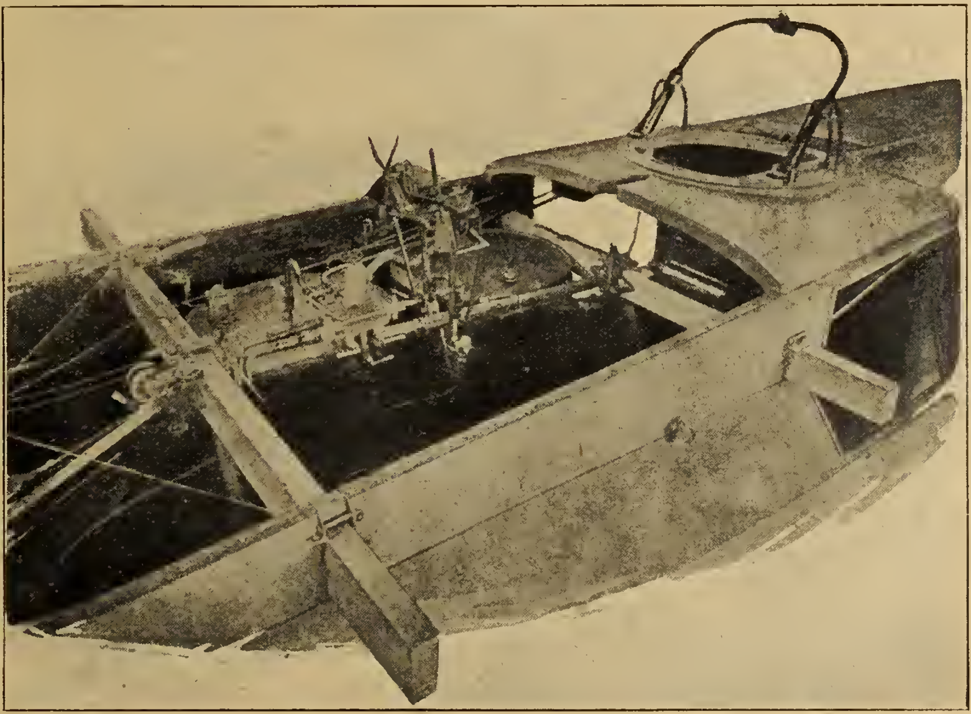


Detail view of the F-5-L flying-boat, showing the engines and rear " cabin "

For this reason a rear hand starter, comprising a reduction gear and clutch engaging the crankshaft is used. One man can readily turn the engine over, though two are generally used. As stated, the oil tanks are streamlined, cylindrical, and mounted at each side of the engine bearers. The total capacity per engine is 17 galls., and the two tanks are connected by a manifold, the division simply being constructional. In later planes the side oil tanks are being superseded by one streamlined tank mounted between the engine-bearers and behind the engines. This serves to clean the installation up to a marked extent. A long-distance thermometer bulb is installed in the oil return line, and the gauge is mounted in the mechanics' compartment by the tanks. The oil-pressure gauge is installed on the pilots' instrument-board. A water thermometer gauge likewise is in the mechanics' cockpit. This location of the thermometers is because engine temperatures are of enough importance to demand quite frequent attention.

The petrol supply is carried in five tanks placed amidships in the hull. There are two large cylindrical vertical tanks, one fore and aft horizontal tank, and two transverse horizontal tanks. The latter two were originally consolidated, but the single tank could not be removed without taking the plane to pieces. All have a total capacity of approximately 498 galls. As these tanks are below carburettor level, a header or gravity tank is necessary. This is located in the upper wing, between the two engines, and carries about 20 galls. The petrol is pumped from the hull by a double-barrelled windmill pump, and forced into the gravity tank sump. From the sump leads are taken to the two engines, and the surplus over this (amount flows through small holes in the sump sides into the gravity tank. When the gravity tank becomes full, an overflow pipe carries the excess back through a sight box into one of the tanks. This overflow serves to show the mechanic that petrol is being pumped, and that the gravity tank is full. The construction of the gravity sump is noteworthy. It will be noted that the base of the sump is somewhat below the bottom of the tank, and that the two are only connected through small holes at the sump sides. Hence if the gravity tank be shot away, the supply of petrol pumped may be shut down to the amount used, with the base of the sump alone serving as a header tank. A semi-rotary hand pump is used to fill the gravity tank when the windmill pumps are inoperative. This pump is an English design, and a similar pump is also used for bilge water.

The leads from all the supply tanks are consolidated into one manifold, and by regulating the valves petrol may be pumped from any tank into the gravity tank. However, it all returns into the starboard forward vertical tank, and in flight petrol is pumped alternately from this tank and each of the other tanks in rotation. It is necessary to pump from the tanks in rotation in order to trim ship, and a separate manifold would be necessary to return the overflow petrol to any tank. It is to be noted that the manifold incorporates a filler-valve piped to a union at the hull sides. This serves for the attachment of a pipe-line from a supply boat or tank that the seaplane tanks may be filled by petrol under pressure. Though this method of filling is not much used, it is stated all the tanks may be filled thus in a few minutes, whereas the funnel and measure method takes from a half to one hour.



The petrol tanks and windmill pumps on the F-5-L flying-boat, which are located in the centre of the hull

There are few other points of interest in the petrol system, standard sumps being used to prevent water and dirt from reaching the engine and dial gauges being used on the tanks to show the gasoline supply at hand. Throughout the system all pipe-line connections are through olive joints, and the features here are ease of connection, flexibility, and the fact that full flow of petrol is permitted. As an aid to starting, a small hand primer permits raw petrol to be pumped into the intake manifold.

The outstanding features of the flying controls are the laminated-yoke dual elevator and *aileron* control mounting, and the adjustable rudder bar installation. The yoke itself is built-up of ⅛-in, laminations of ash, glued and riveted together, making a strong and light construction. Each end is extended to form the elevator throw, and the *aileron* control wheels are mounted on brackets at the top. These wheels are connected by an endless chain, from the middle of the lower part of which are taken the *aileron* control wires. The cross-tube is integral with the yoke, and the whole swings on bearings at the hull sides. In addition to lightness of construction, rigidity, and simplicity of wiring, this control affords a maximum amount of room for passing from the front to the rear cockpit, and does not interfere with the legs of the pilots as does a post-type control.

Originally, adjustment of the distance between the pilot and the rudder-bars was effected by shifting the seat. But this also brought the control wheel closer, and the installation was complicated. Adjustment on this plane is effected by shifting the rudder-bar bodily fore and aft the required amount. The rudder-bar is carried between two straps that are supported on a tubular framework in front of the pilots. These straps have a series of holes, and the rudder-bar may be set to swing on a pin passed through any one of these. A similar adjustment permits the outer end of the bar to be set properly in connection with the rudder-cable. As these pins are set in place by a small brass cotter, any desired setting can be made quickly.

Under severe flying conditions, or in the case of tail or nose heaviness, it is sometimes necessary for the pilot to exert a continuous pressure on the controls. On the elevator or rudder controls, this continuous pressure may be applied at will, in any desired amount through rubber cords, called "bungies." The complete bungy is simply two pieces of rubber cable, connected by a small chain, and having both ends secured to the hull sides. The chain passes adjacent to the control it governs, and is hooked to it at will with a snap-hook. The pressure is applied to the control by extending the rubber cable before the attachment of the chain. All control cables are carried on brass ball-bearing sheaves, and the sheave-housings are fitted with guards to prevent the cables from coming off. With the exception of the point where the *aileron* cables pass through the upper wing, all control cables are open to inspection.

PERSONALS.

Casualties

Lieut. Feray Vulliamy Devonshire, 7th Hussars, attached R.A.F., who was killed on July 20, 1919, at the age of 28, on the Afghan frontier, was the only son of Robert and Henriette Devonshire, of Heston, Middlesex, and Maadi, near Cairo.

Married

Lieut. Sir Arthur Whitten Brown, K.B.E., R.A.F., only son of Mr. and Mrs. A. G. Brown, of Manchester, was married on July 29 at the Chapel Royal, Savoy, to Marguerite Kathleen, elder daughter of Maj. and Mrs. D. H. Kennedy, of Ealing.

Maj. James Lee Jackson, M.C., R.A.F., and The Connaught Rangers, elder son of the Rev. Canon Jackson and Mrs. Jackson, The Rectory, Belmullet, co. Mayo, was married on July 23, in Dover Castle Chapel, to Rosamond Tudor, second daughter of Edward Slade, Esq., and Mrs. Slade, The Tudor, Boston, U.S.A., and the Lake House, Quebec.

Capt. George Reginald Pollard, R.A.F., youngest son of Sir George H. Pollard, and Lady Pollard, Sundown, Southport, was married on July 31 at St. Martin's Church, Brighouse, to Sarah Dorothy, youngest daughter of Mr. and Mrs. John A. Cheetham, Oaklands, Brighouse.

Capt. C. C. Snow, D.F.C., R.A.F., only son of Mr. and Mrs. C. Snow, South Kirkby, Wakefield, was married on July 29 at St. Jude's, Southsea, to Gladys Burton, eldest daughter of the late Gen. Colwell, C.B., Royal Marines, and Mrs. Colwell, Claremont Lodge, Southsea.

Lieut. J. A. Somers-Marshall (late R.A.F.) was married on July 22 at St. Mary Magdalen's, Brighton, to Winefride Mary Neale.

Lieut. Philip H. S. Tozer, R.A.F., was married on July 30 at St. Peter's, Parkstone, to Margaret E. H., younger daughter of the late Edward Davies, Machen House, Mon., and of Mrs. Davies, Bruffe Lodge, Parkstone.

To be Married

The engagement is announced between Lieut. William Henry Eastoe, R.A.F., Cape Town, South Africa, son of the late N. W. Eastoe, "one of the Six Hundred," of Leyton, Essex, and Florence Mary, youngest daughter of Walter Hadderton Meire, of Brundall, and granddaughter of the late Thomas Lockley Meire, Eyton-on-Severn, Salop.

The marriage of Frederick W. Lanchester, of 41, Bedford Square, London, and Dorothea, daughter of the Rev. Thomas and Mrs. Cooper, of Field Broughton, Lancashire, will take place at St. Peter's Church, Field Broughton, on September 2, at 2 p.m.

Items

The will of Sec. Lieut. St. John Salmon Backhouse, R.A.F., Sunbury-on-Thames, killed in aerial combat in Bulgaria, aged 28 years, has been proved at £788.

◆ ◆

The Age-long Glory of Paris

Paris has been honoured once more by the following "citation" in a recent Army Order :—

"The capital, splendidly worthy of France, animated by a patriotic faith which never failed, bore with firm and smiling courage numerous bombardments by aeroplanes and by long-range guns. It added, from 1914 to 1918, imperishable deeds to its age-long glory."

Training for Paris-Cairo Flight

By way of training for his proposed flight from Paris to Cairo, Commandant Vuillemin spent three days in cross-country flying. His first stage was from Paris to Marseilles, the 700 kiloms. being covered in 3 hrs. 10 min. The next day he flew to Cazan, the 570 kiloms., including a stop of a few minutes at Agen, being covered in 4½ hours. His longest trip was on the third day to Landau, 925 kiloms. in 7 hours. His mount was a Breguet, with a 300 h.p. Renault motor, and a mechanic was carried throughout the whole 2,200 kiloms.

Flying Regulations for Switzerland

In the Bill for the temporary regulation of aerial navigation, which has been approved by the Swiss Federal Council, it is stipulated that foreign aeroplanes and pilots will only be admitted to Switzerland in exceptional circumstances by a special permit from the Military Department. It will also be necessary for insurances covering third-party risks up to 15,000 francs (£600) to be taken out for each aeroplane, while pilots must not fly over large towns at an altitude of less than 1,000 metres and over other towns at less than 500 metres. "Stunting" is expressly forbidden.

Wrecked by a Windstorm

Considerable havoc resulted from a windstorm at the Mineola aerodrome, near New York, on July 28, the damage apparently being partly due to the unsubstantial nature of the hangars. Three giant machines, a Martin bomber, a Handley Page, and a Caproni were wrecked as well as a number of small machines. It is believed the hangars were first struck by lightning.

AIRISMS FROM THE Four Winds.

That there is vitality in the administration of the R.A.F. is fairly apparent from the several important official announcements we are able to publish this week, as to the future of the Force. There should be, under the new conditions, no lack of recruits to the *personnel*, both officers and other ranks. There is just one more thing to wait for—the scheme for the Territorial Section of the Force.

* * *

That the name of Air Vice-Marshal Sir Hugh Trenchard, K.C.B., D.S.O., Commander of the Independent Air Force 1918, should be down for a baronetcy and grant—and a goodly one, although we should have liked to have seen it nearer the £25,000 mark—in recognition of special services during the War, will be a source of satisfaction to all those who have had the honour of serving under him. It was the glorious I.A.F. which really brought home most directly to the German people the hopelessness of their sacrifices at the bidding of the military machine, with the natural sequence in the collapse of that tyrannical caste.

* * *

A chance of a life-time now offers to acquire non-rigid airships of the Coastal, Coastal Star, and S.S.Z. types, direct from the Admiralty. Moreover, suitable sheds, of the portable variety, for housing purposes, and other necessary "bric-a-brac" attaching to these sailors of the air, are also available from the same source. For more detailed information touching upon these "blimps" enquirers should address themselves to the Director of Contracts, Branch 10a, Room 81, West Block, Admiralty, S.W. 1.

* * *

"Sea Pie" 1919 Summer Number, to the forthcoming publication of which we recently drew attention, duly materialised last week. And a very rich pie it turns out to be, as we anticipated. Some eight pages in colour by such men as W. Barribal, Charles Dixon, W. Smithson Broadhead, etc., are alone worth double the money charged for the whole publication, whilst the letterpress does not lag behind in equal merit, amongst others the names of Keble Howard, W. Pett Ridge, E. F. Benson and H. de Vere Stacpoole standing out as contributors. Black-and-whites are scattered profusely through the book's pages, and these, almost without exception, have a rich humour of their own which we have failed to discover in so many annuals of this character. Any profits go to the Naval Charities, and with all sincerity we are prepared to guarantee that, for the 1s. 6*d*. charged, every purchaser will not only have real value for his outlay, but have the satisfaction of knowing he is helping forward as good a cause as stands in the name of the British Empire. Therefore, hurry up and get a copy at the nearest bookstall lest you miss it altogether.

* * *

Apropos the race for the trying out of competitors for the Jacques Schneider International Trophy, to be held at Bournemouth on September 10, under the control of the Royal Aero Club, and the selection, upon the offer of the R.Ae.C. by Messrs. S. E. Saunders, Ltd., the world-famous yacht and aircraft constructors of Cowes, I.o.W., of their premises for the accommodation of the competing machines, a correspondent writes us as to its great suitability as follows: "Cowes Harbour and the Medina are natural air and sea harbours, and no better place could possibly be imagined for the purpose. During the last four years many hundreds of seaplanes passed in and out of Cowes Harbour when it has been choked with transport, and there has never been an accident of any kind. In regard to the distance to Bournemouth, it is only a matter of a few minutes when the machine is actually in the air. It might be noted that the Air Board officials from the very beginning of the War have used the Solent and the Medina as one of the most suitable places for marine work, and only very recently removed some of their F 2A flying boats from Hamble to Saunders' erecting shops."

* * *

It was a graceful idea for R 34 to so time her visit to London on Wednesday evening last week as to be able to manœuvre over Charing Cross Station at the moment when Marshal Foch was taking his departure for France after the Visit of Honour to London he had just concluded. Our Atlantic airship was sufficiently low to render her huge size appreciable, and when she later steered for a parallel course with Marshal Foch's departing train, the Marshal and his staff must have had an imposing view of the airship.

* * *

On the plea that the expense of maintaining an Air Force Police would not be justified at present, General Seely, at the same time, states that adequate precautions have been taken to ensure that breaches of the Air Regulations are reported to the Controller-General of Civil Aviation. So the Bolshies behind the police strike will not have to devote their time trying to make more victims by pulling the air police out of their machines.

* * *

As was announced in Flight many moons ago, "The National Roll of the Great War" is being compiled with the object of providing a permanent register of the names and brief biographies of every one who, in various capacities, fought or worked for the Empire during the War. So great is the preparation of this work of reference, we learn, that collecting branches are being opened in the large centres of the Kingdom and in the Colonies, and the work when completed it is hoped, will be a *real* National Roll.

* * *

In addition to soldiers, sailors and airmen, the Roll will contain in special sections the names of nurses, members of the V.A.D., W.A.A.C., W.R.A.F., W.R.N.S., special constables and munition workers whose records are approved by the Advisory Committee of which Brig.-Gen. C. O. Shipley, C.B., is the President. The Joint Editors are Lieut.-Col. W. J. M. Hill, D.S.O., and Capt. S. N. Pike, D.F.C., and the offices are at 1, York Place, Baker Street, London, W. 1.

"Flight" Copyright.

Sir A. W. Brown weds Miss Kennedy at the Chapel Royal, Savoy, on July 29. A snap immediately after the ceremony.

THE ROYAL AIR FORCE

London Gazette, July 25.

Administrative Branch.

Lieut. G. D. Daly to be Lieut. from (A.); June 30 (substituted for notification in the *Gazette* of July 1).

The following are granted temporary commns. as Sec. Lieuts.:—

C. H. Gauntlett, C. H. Haward, P. G. Whittle; July 21.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. (actg. Lieut.) A. V. Hastings (Lieut., R. Dublin Fus.); Feb. 10. Lieut. H. Hemingway (Lieut., Middx. R.); Feb. 17; Lieut. (Hon. Capt.) J. E. A. O'Dwyer (Capt., Notts and Derby R.); July 25.

(Then follow the names of 19 officers who are transfd. to the Unemployed List under various dates.)

The rank of Lieut. T. S. Millar is as now described, and not as stated in *Gazette*, April 1.

The notification in *Gazette*, May 13, concerning Sec. Lieut. G. H. Lilley is cancelled.

Technical Branch.

Sec. Lieut. (Hon. Lieut.) T. Thomson to be actg. Capt. whilst employed as Capt., Grade (B.), from Dec. 2, 1918, to April 30.

Sec. Lieut. (Hon. Lieut.) T. Thomson to be graded for purposes of pay and allowances of Capt. whilst employed as Capt., Grade (B.), from May 1 to June 30.

The following relinquish their commns. on ceasing to be employed:—Major C. A. Shove, O.B.E. (R.N.); July 1. Lieut.-Col. A. D. Carden, D.S.O. (Major, R.E.); July 11.

(Thirteen officers transfd. to Unemployed List.)

Medical Branch.

Capt. R. L. Roe to be actg. Major whilst employed as Major; July 4.

T. C. Backhouse (Capt. A.A.M.C.) is granted a temp. commn. as Capt.; July 1.

(Three officers transfd. to Unemployed List.)

Memoranda.

(Then follow the names of 526 Cadets granted Hon. Commns. as Sec. Lieuts.)

Temp. Hon. Capt. J. C. Pape relinquishes his commn. on ceasing to be employed; May 1.

(Two officers transfd. to Unemployed List.)

The notification in the *Gazette* of July 11 concerning Lieut.-Col. J. A. Houison-Craufurd, C.M.G., C.B.E., is cancelled.

London Gazette, July 29.

The following temporary appointments are made:—

Staff Officers, 3rd Class (Air).—Capt. V. A. Watson, A.M.; July 1. (Q.).—Sec. Lieut F. A. Holmes; July 21 (from S.O. 2).

The following temporary appointments are made:—

Staff Officer, 1st Class (Air).—Lieut.-Col. R. P. Mills, M.C.; July 26.

Staff Officers, 3rd Class (P.).—Capt. F. L. J. Shirley, M.C.; April 27. Lieut. C. H. Tancred; May 27, vice Lieut. J. C. Watson.

Flying Branch.

Major R. J. Bone, D.S.O., to be actg. Lieut.-Col. while employed as Lieut.-Col. (A. and S.); July 11.

Major (actg. Lieut.-Col.) E. R. C. Nanson, D.S.C., A.F.C., to be Major (S.) from Group Commander, and to relinquish actg. rank of Lieut.-Col.; July 16.

Capt. R. Collishaw, D.S.O., D.S.C., D.F.C., to be acting Major while employed as Major (A.); June 13.

Lieut. W. Dancy to be graded for purposes of pay and allowances as Capt. while employed as Capt. (A.); May 1.

Sec. Lieuts. to be Lieuts.:—E. K. W. Denton, P. J. Dowell; April 2, 1918. J. P. Jones; April 5, 1918. A. M. Diamant; May 13, 1918. E. M. Bates; May 17, 1918. (Hon. Capt.) H. J. Bullock; May 25, 1918. (Hon. Capt.) J. L. Wilmot; May 26, 1918. G. Robinson; May 27, 1918. H. J. Clark; May 31, 1918. G. M. Ashmore; June 8, 1918. J. B. Edwards; July 5, 1918. T. L. Lovell; July 16, 1918. B. P. Springett; July 17, 1918. J. Montgomery; Aug. 9, 1918. H. R. Gunner; Aug. 16, 1918. V. C. Hemsley, V. R. W. Owens; Sept. 1, 1918. H. J. Russell; Sept. 13, 1918. (Hon. Capt.) J. L. McLennan, M.C., T. Large; Sept. 23, 1918. E. O. Rutherford; Oct. 3, 1918. T. I. Phillips; Oct. 14, 1918. S. Tweedie; Oct. 16, 1918. W. F. Robertson; Oct. 20, 1918. J. R. Bartlett, M.C.; Oct. 23, 1918. F. E. L. Elliot, C. H. Harwood, G. S. Scott, J. Cafferkey; Oct. 26, 1918. R. J. Read, A. G. L. Sidwell; Nov. 1, 1918. (Hon. Capt.) A. W. Bloy; Nov. 7, 1918. G. R. Bradley; Nov. 10, 1918. F. L. Wheeldon, D.S.O.; Nov. 15, 1918. R. Boyle; Nov. 26, 1918. A. Hill, R. O. Goddard; Nov. 30, 1918. E. Bower, P. G. Clarabut, D. A. Hughes, J. H. Weatherill; Dec. 27, 1918. C. P. King; Jan. 16. D. C. Anderson, H. E. Ford; Jan. 19. L. G. Cunningham; Jan. 23. W. J. Goddard, W. J. Porter, D. Young; Feb. 1. S. Jones, C. S. P. Wallace; Feb. 16. E. Littlejohn; Feb. 22. H. R. Wright; Feb. 26. J. M. Barlow, J. D. Ford, A. F. Harris, L. F. Hodges, S. H. Spencer; March 1. C. V. A. Bucknall; March 12. N. T. North; March 13. S. A. Dismore; March 23. G. A. W. Garland; March 24. T. R. Adair, J. Atkinson, J. H. Mainwaring C. Morries, G. H. Simister, F. J. Tilley, C. B. Wilson; March 26. V. G. Hinds, H. G. Jackson; March 27. J. Stewart; April 1. G. D. Wigley; April 7. P. Bushell, H. Goodwin, B. Reunert; April 11. W. Rowley-Redwood; April 12. S. Braby, F. J. Hunt, R. Pyne; April 25. G. D. Green; April 29. H. V. Alder, J. F, Blick, C. H. Brazier, V. Harmer, H. Hutchinson, J. W. Kembery, R. F. Saunders, R. W. Silk, W. Tinsley; May 1. H. B. Harmsworth, L. Lovatt, A. Shepherd; May 4. B. H. Matthews; May 7. A. Beedie, E. A. C. Britton, W. B. Crouch, R. Henderson, C. N. James, W. S. Jenkins, D.F.C., W. H. Jordan, A. D. Kiernander, H. W. Matthews, T. H. Mercer, F. R. Oddy, T. G. Reed, J. W. Sole, A. G. B. Whittaker, L. A. Williamson; May 8. E. Grayson; May 13. R. C. Creamer, E. S. Farrand, J. F. Higgins, F. J. Letzer, O. H. P. Lloyd, W. Marsden, G. F. Shreve, J. M. Walker, F. L. Wraight, A. Wroot; May 17. H. E. B. Holden; May 22. W. R. Christian, F. W. Osman, W. Thornton; May 23. W. V. Pegden; May 24. W. Campbell; May 27. G. W. Armstrong, L. B. Duggan, J. C. Fitzmaurice, J. Glover, C. A. Morris, H. L. Page, J. B. Sanders, S. P. Scott; May 28. W. J. Cairns. C. C. A. Leppan, H. L. Lomberg, G. L. Nicholson, H. S. Sandiford; May 30. J. Marsden; June 2. F. Davison, T. C. Owen, G. Pattinson, R. A. Pearce, D. L. Walker; June 6. A. Grimshaw; June 8. J. F. McNamara, E. T. Treglown; June 13. L. A. S. Harris, T. M. Robertson, R. Walker; June 18. M. B. Lewis; June 19. H. P. Crabb, W. Kinghorn, H. Woodcock; June 20. R. V. Curtis; June 22. A. V. Street; June 30.

Sec. Lieut. (Hon. Lieut.) E. H. Colman to be Sec. Lieut. (Hon. Lieut.) (A.) from (T.); Jan. 2.

S. L. Cannon (Sec. Lieut., Bedford R.) is granted a temporary commn. as Sec. Lieut. (A. and S.); May 16, 1918 (substituted for the notification in the *Gazette* of June 21, 1918).

C. H. Brown (Lieut., King's L'pool R.) is granted a temp. commn as Sec. Lieut. (O.); Oct. 16, 1918, and to be Hon. Lieut.

The following relinquish their commns. on ceasing to be employed:—Lieut. S. J. Lee (Lieut., Sask. R.); May 19. Lieut. H. A. D. Mackay (Lieut., Hants. R.); May 30. Sec. Lieut. (Hon. Lieut.) L. R. McKenna (Lieut., E. Ont. R.); July 3 (substituted for the notification in the *Gazette* of May 13). Capt. R. Hilton, M.C., D.F.C. (Capt., R.G.A.); July 7. Sec. Lieut. (Hon. Capt.) O. Greening (Capt., Can. Engineers), Lieut. W. Henderson (Lieut., Gordon Highrs.); July 8. Lieut. D. J. G. Webb (Lieut., D.C.L.I.); July 10. Sec. Lieut. (Hon. Lieut.) A. C. Pollard, M.C. (Lieut., Brit. Columbia R.); July 15. Lieut. J. H. Wensley (Lieut., Sask. R.); July 20.

Lieut. (actg. Capt.) D. H. D. Bickers is temporarily transferred to the unemployed list; Jan 20.

(Then follow the names of 379 officers who are transfd. to the Unemployed List under various dates. We regret that, owing to pressure on our space, it is impossible to reprint this portion of the List.—ED.)

The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank:—W. F. Hiam (contracted on active service); April 7 (substituted for notification in *Gazette*, Jan. 10). G. M. Duncan (contracted on active service); June 12. K. B. Preston (caused by wounds); July 16. G. H. Nicholson (contracted on active service); July 18.

The following Lieuts. resign their commns. and are permitted to retain their rank:—H. R. S. Birkin (Lieut., R. War. R.), C. W. M. Whitlock (Lieut., Wilts. R.); July 30.

The following Sec. Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank:—S. J. Bolitho; June 15 (substituted for notification in *Gazette*, July 1). W. L. Vennell; July 12 (substituted for notification in *Gazette*, April 11). F. E. King (contracted on active service), T. V. J. Nicholas; July 18.

The rank of Lieut. W. G. Millar is as now described, and not "Sec. Lieut.," as stated in *Gazette*, May 30.

The name of Lieut. C. W. E. Browse is as now described, and not "C. W. Browne," as stated in *Gazette*, July 1.

The notification in *Gazette*, Feb. 28, concerning Lieut. J. E. G. Mosby, D.S.O., is cancelled.

The notification in *Gazette*, April 1, concerning Sec. Lieut. J. MacD. Mackinnon is cancelled.

The notification in *Gazette*, April 4, concerning Sec. Lieut. A. R. A. Millar is cancelled.

The notification in *Gazette*, April 4, concerning Sec. Lieut. L. F. Rowsell is cancelled.

The notification in *Gazette*, April 8, concerning Sec. Lieut. R. R. Parker is cancelled.

The notification in *Gazette*, April 11, concerning Sec. Lieut. R. S. Payne is cancelled.

The notification in *Gazette*, April 29, concerning Sec. Lieut. D. Morford is cancelled.

The notification in *Gazette*, June 6, concerning Sec. Lieut. A. A. Moir is cancelled.

The notification in *Gazette*, June 24, concerning Major F. E. Sandford, A.F.C., is cancelled.

The notification in *Gazette* of July 8, concerning Lieut. H. R. Owen is cancelled.

Administrative Branch.

Major R. B. B. Colmore, O.B.E., to be Major., from (S.O.); May 12.

Capt. J. A. M. Lang, O.B.E., to be Capt., from (S.O.); May 15.

Lieut. S. J. Stocks to be Lieut., from (S.O.); May 18.

Sec. Lieut. (Hon. Capt.) R. Alston to be Sec. Lieut. (Hon. Capt.), from (T.), and to be graded for the purpose of pay and allowances as Capt. whilst employed as P.T.O.; May 1.

Sec. Lieuts. to be Lieuts.:—A. G. Buxton, F. W. Day (Hon. Capt.), W. C. Green, M.C., J. W. Harling, G. H. Heys, S. W. Lewis; April 2. S. F. R. Hulbert; April 17, 1918. G. E. Blake; June 15, 1918. J. B. Martin; Sept. 17, 1918. H. T. Evans; Oct. 10, 1918. T. Whitaker; Oct. 13, 1918. T. Gill; Oct. 15, 1918. W. Lee; Nov. 9, 1918. A. E. Holton; Nov. 30, 1918. G. Oliver; Jan. 31). G. Waugh; Feb. 2. S. R. Payne; Feb. 28. S. Sprenger; March 1. J. Pell; March 2. H. T. H. Copeland; March 4. R. R. Trout; March 7. H. G. Hooker, A. H. Redfern; March 26. J. A. Elliott; April 11. H. J. Payne; April 18. E. N. Allott; April 25. G. Dolley; May 8. K. Drago; May 11. R. J. Bright, E. A. Burridge; May 16. (Hon. Capt.) D. R. Thomas, H. West; May 17. H. Cooper, M.C., G. H. Blake, D.C.M.; May 21. A. J. Somers; June 3. G. R. La Cecilia; June 5.

Sec. Lieut. W. J. Collins to be graded for purposes of pay and allowances as Lieut. whilst employed as Lieut.; May 1.

Sec. Lieut. L. E. Pocock to be Sec. Lieut., from (A.); April 17.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in rank as Sec. Lieuts.:—W. Lee; Nov. 8, 1918. Sec. Lieut. P. A. Stallard, March 4. (Substituted for the notification in *Gazette*, June 17). R. W. Hyde; June 11.

Sec. Lieut. H. T. Robinson is confirmed in his rank as Sec. Lieut; Feb. 20.

The following relinquish their commns. on ceasing to be employed:—Lieut. H. Hemingway (Lieut., Midd'x R.); Feb. 17. Sec. Lieut. L. J. Scott (R.A.O.C.); May 6. Lieut. R. H. S. Waley (Lieut., R.F.A.); May 24. Lieut. R. C. Joynson-Hicks (Lieut., R. W. Surr. R.); May 30. Lieut. J. P. Sheridan (Lieut., L. N. Lancs. R.); July 2. Major R. M. R. Lamb, D.S.O. (Major. North'd. Fus.); July 4. Lieut. T. G Beale (Lieut. Dn. Gds.). Lieut. R. T. Robbins (Lieut., Linc. R.); July. 9

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—J. R. Maloney (caused by wounds); Jan. 11 (substituted for notification in *Gazette*, Jan. 10). C. G. Merryweather; June 12. J. T. Andrew; July 14.

(Then follow the names of 49 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. W. H. Dibben relinquishes his commn. on account of ill-health and is permitted to retain his rank; July 16.

Sec. Lieut. B. J. Crewe (Oxf. and Bucks. L.I.) relinquishes his commn. on account of ill-health contracted on active service; July 23.

Sec. Lieut. N. F. Hoxie is dismissed the Service for absence without leave; Jan. 26.

The initials of Sec. Lieut. T. L. Price are as now described, and not "T. R.,' as stated in *Gazette*, May 13.

The notification in *Gazette* of April 29, concerning Capt. (Hon. Major) (actg. Lieut.-Col.) H. B. Nutting is cancelled.

The notification in *Gazette* of May 2 concerning Sec. Lieut. (Hon. Lieut.) P. R. Cook is cancelled.

The notification in *Gazette*, May 30, concerning Lieut. A. R. Porter is cancelled.

The notification in *Gazette*, July 11, concerning Lieut. D. Miller is cancelled.

Technical Branch.

Lieut. C. E. A. Moore to be actg. Capt. while employed as Capt., Grade (A), from Aug. 27, 1918, to April 30 (substd. for notification in *Gazette*, Oct. 11, 1918).

Lieut. H. Cooke-Smith to be graded for purposes of pay and allowances as Capt. while employed as Capt., Grade (A.); May 1.

Lieut. F. J. Cooke to be graded for purposes of pay and allowances as Capt. while employed as Capt., Grade (B.); from May 1 to June 30.

Lieut. G. W. M. Whitton relinquishes the grading for purposes of pay and allowances of Capt; July 18.

Sec. Lieut. B. Cheeseman to be graded for pay and allowances as Lieut. while employed as Lieut., Grade (A.); May 1.

Sec. Lieuts. to be Lieuts.:—H. St. C. Roy, M.C.; April 2, 1918. D. Barron; June 12, 1918. P. H. Morrish; Nov. 9, 1918. E. S. Baker; Jan. 27. A. G. Ridgon; Feb. 28. N. B. Hemsley, M.B.E.; March 17. N. F. Burch; April 9. O. N. H. Watson, A. H. Scaife; April 23. W. E. Townsend; April 24. H. Davis; May 1. F. C. Lyne; May 3. C. G. Whitmore; May 4. G. H. J. Stein; May 26. J. G. Peacock; June 6. R. P. Graham, without pay and allowances prior to July 16, 1918. L. A. Sturrock, without pay and allowances, prior to June 16, 1918. (Hon. Capt.) C. Shears, without pay and allowances prior to July 1, 1918. H. H. Williams, without pay and allowances prior to Dec. 6, 1918; April 2, 1918. C. B. Dick-Cleland; April 5, 1918, without pay and allowances prior to Sept. 18, 1918. G. E. Bower April 6, 1918, without pay and allowances, prior to June 1, 1918. E. G. A. Jones; May 26, 1918, without pay and allowances prior to Aug. 1, 1918. J. Bullock; June 14, 1918, without pay and allowances, prior to July 1, 1918.

Sec. Lieuts. to be Lieuts. without pay and allowances of that rank:—D. D. Cormack, M.C., W. E. Cowie, E. H. Bramwell, H. V. Bevis, J. H. Ferguson, M.B.E., F. H. Jefferis, C. L. Lahhart, H. D. Patterson, J. J. Page, M. R. Preece, H. S. Royffe, E. L. Rhodes (Hon. Major) A. H. W. Saunders-Knox-Gore; April 2. S. K. D'A. Ferrars; April 5, 1918. J. O. Cooper; April 12, 1918. A. H. Varian; June 2, 1918. C. B. Hudson; Sept. 10, 1918. E. C. Ponking; Sept. 14, 1918. W. H. Hoile; Jan. 12. J. D. Graham; Jan. 16. J. E. Kingham; Jan. 27. G. S. Crowther; Feb. 4. F. W. G. Ticehurst; Feb. 12. W. J. Harries; Feb. 24. H. J. Kihhle; Feb. 28. L. F. W. Stone; Mar. 1. R. H. Nicol; Mar. 6. A. Bolton; Mar. 8. W. J. Cleashy; Mar. 12. M. J. Curtis, T. H. Malthy; Mar. 21. W. Massey; March 24. J. McKeown; April 8. A. R. Conder, C. H. Greenhouse, H. B. Long, G. Spurgin; April 19. B. Freeman; April 23. M. L. Dobbin; April 25. N. D. Bryce; April 30. G. C. Kemp; May 1. E. A. Gater; May 3. F. A. Bracher; May 11. W. A. Mansfield, A. E. Fallon; May 12. W. E. Critchley, G. Johnson, J. A. Leonard, A. Ward; May 13. H. W. Baylis, C. W. Bentley, H. J. Dann, E. T. W. Nockold, H. G. Smith, B. P. K. Walsh; May 16. A. L. Flaws, E. M. Ling, C. Mansfield, E. V. Soloman; May 26. F. Simpson, A. C. Tinkler, F. C. Worton; May 28. A. B. West, A. Wilkins; June 1. A. V. Baker, H. Berridge, W. F. Chauncey, H. S. Given, V. S. Lord, W. R. Tuddenham, L. H. Vernon; June 3. H. Barnes-Moss; June 8. W. R. Day, J. E. C. Hammond June 10. E. Whitmore; June 12. E. L. Hocking; June 15. A. M. R. Nicholson; June 18. C. Rapley; June 21. A. H. Knight; June 27. F. S. Hetherington, F. W. Martyn; June 28.

Sec. Lieut. A. W. Whistlecroft to be Sec. Lieut., Grade (A.) from (Ad.); Dec. 1, 1918 (substituted for notification in *Gazette* of Feb. 4).

Sec. Lieut. (Hon. Lieut.) F. McGuffie to be Sec. Lieut. (Hon. Lieut.) from (S.O.); March 5.

Sec. Lieut. (Hon. Capt.) W. C. Green, M.C., to be Sec. Lieut. (Hon. Capt.), Grade (B.), from (Ad.); July 1.

Sec. Lieut. F. A. Osborn to be Sec. Lieut., Grade (B) from (Ad.); June 3.

Sec. Lieut. S. E. White to be Sec. Lieut., from (Unemployed List); July 14, with precedence next below Sec. Lieut. J. S. Viner.

Lieut.-Col. Lord A. R. Innes-Ker, D.S.O. (Capt., R. H. Gds.), relinquishes his commn. on ceasing to be employed.

(Then follow the names of 30 officers who are transfd. to the Unemployed List under various dates.)

Lieut. (Hon. Capt.) C. S. Willmott relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Capt.; June 10 (substituted for the notification in the *Gazette* of June 27).

Sec. Lieut. F. Boult relinquishes his commn. on account of ill-health, and is permitted to retain his rank; May 14.

The notification in the *Gazette* of July 22 concerning Sec. Lieut. S. King-Smith is cancelled.

Medical Branch

Major E. M. W. Hearn (Lieut.-Commander, R.N.) relinquishes his commn. on ceasing to be employed; May 30.

The rank of Lieut.-Col. H. Pritchard is as now described, and not Major, as stated in the *Gazette* of July 4.

(Three officers transfd. to Unemployed List.)

Memoranda.

Lieut. J. W. Harling to be Hon. Capt; Sept. 1, 1918.

Sec. Lieuts. to be Lieuts.:—H. K. Fairbrother; Sept. 9, 1918. A. E. Hale Mar. 16. H. F. Wehh; Mar. 21.

(Then follow the names of 150 Cadets granted Hon. Commns. as Sec. Lieuts.

Temp. Hon. Lieut. G. A. Hopper relinquishes his commn. on ceasing to be employed; July 16.

(Two officers transfd. to Unemployed List.)

Dental Branch.

(One officer transfd. to Unemployed List.)

Capt. H. A. Foldham (Lieut., North'd. Fus.) resigns his commn. and is granted the rank of Major; July 30.

The notification in the *Gazette* of July 8 concerning Major H. A. Moore, C.B.E., M.C., is cancelled.

The notification in the *Gazette* of July 8 concernng 522564 Cdt. E. B. Saunders is cancelled.

The notification in the *Gazette* of July 18 concerning Lieut. J. E. Pike is cancelled.

London Gazette, August 1.

The attention of the officers named in this *Gazette* is directed to the Air Ministry Weekly Order, now in course of issue, relating to the grant of permanent commissions, and to the new rates and conditions of pay and other emoluments.

The following are granted permanent commissions in the R.A.F. in the ranks stated (Aug. 1):—

Major-Generals.

Sir H. M. Trenchard, K.C.B., D.S.O.
Sir G. M. Paine, K.C.B., M.V.O.
Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O.
J. F. A. Higgins, C.B., D.S.O., A.F.C.
E. L. Ellington, C.M.G.
Sir W. G. H. Salmond, K.C.M.G., C.B., D.S.O.

Colonels.

A. V. Vyvyan, C.B., D.S.O.; P. W. Game, C.B., D.S.O.; O. Swann, C.B., C.B.E.; F. R. Scarlett, C.B., D.S.O.; C. L. Lamhe, C.B., C.M.G., D.S.O.; J. M. Steel, C.M.G., C.B.E.; C. A. H. Longcroft, C.M.G., D.S.O., A.F.C.; T. F. Wehb-Bowen, C.B, C.M.G.; L. E. O. Charlton, C.B., C.M.G., D.S.O.; D. le G. Pitcher, C.M.G., D.S.O.; R. M. Groves, C.B., D.S.O., A.F.C.; E. A. D. Masterman, C.M G., C.B.E., A.F.C.; J. H. W. Becke, C.M.G., D.S.O.; E. L. Gerrard, C.M.G., D.S.O.; H. P. Smyth-Oshourne, C.M.G.; F. C. Halahan, C.M.G., D.S.O., M.V.O.; P. R. C. Groves, C.M.G., D.S.O.

Lieutenant-Colonels.

C. R. Samson, C.M.G., D.S.O., A.F.C.; R. H. Clark-Hall, D.S.O.; T. C. R. Higgins, C.M.G.; A. M. Longmore, D.S.O.; I. M. Bonham-Carter, O.B.E.; P. L. W. Herbert, C.M.G.; J. G. Hearson, C.B., D.S.O.; E. R. Ludlow-Hewitt, C.M.G., D.S.O., M.C.; U. J. D. Bourke, C.M.G.; C. L. N. Newall, C.M.G., A.M.; A. E. Borton, C.M.G., D.S.O., A.F.C.; A. Fletcher, C.M.G., C.B.E., M.C.; R. Gordon, C.M.G., D.S.O.; C. R. J. Randall, C.B.E.; A. G. Board, C.M.G., D.S.O.; F. V. Holt, C.M.G., D.S.O.; K. G. Brooke, C.M.G.; P. B. Joubert de la Ferté, C.M.G., D.S.O.; W. R. Freeman, D.S.O., M.C.; N. D. K. MacEwen, C.M.G., D.S.O.; P. H. L. Playfair, M.C.; R. P. Mills, M.C.; F. T. Courtney, O.B.E.; G. B. Hynes, D.S.O.; Hon. J. D. Boyle, D.S.O.; P. K. Wise, C.M.G., D.S.O.; W. . MacNeece, D.S.O., D.F.C.; A. B. Burdett, D.S.O.; W. G. S. Mitchell, D.S.O., M.C.; H. le M. Brock, D.S.O.; G. F. Pretyman, D.S.O., O.B.E.; E. F. Briggs, D.S.O.; C. E. Risk, D.S.O.; C. I. Courtney, C.B.E., D.S.O.; C. E. H. Rathhorne, D.S.O.; A. W. Bigsworth, C.M.G., D.S.O.; R. P. Ross D.S.O. S. A. Hehden; G. F. Carmichael, D.S.O.; J. A. Chamier, C.M.G., D.S.O., O.B.E.; L. W. B. Rees, V.C., M.C., A.F.C.; C. R. S. Bradley, O.B.E.; N. J. Gill, C.B.E., M.C.; H. A. Williamson, C.M.G.; D. A. Oliver, D.S.O.; F. W. Bowhill, D.S.O.; E. D. M. Rohertson, D.F.C.; J. T. Cull, D.S.O.; H. M. Cave-Browne-Cave, D.S.O., D.F.C.; A. L. Godman, C.M.G., D.S.O.; A. J. L. Scott, M.C., A.F.C.; A. V. Bettington, C.M.G.; J. H. A. Landon, D.S.O.; R. A. Cooper, D.S.O.; R. G. Cherry, M.C. J. C. Halahan, C.B.E.; A. E. Cairnes, D.S.O.; C. D. Breese, A.F.C.; R. G. D. Small; C. S. Burnett, D.S.O.; N. Goldsmith; J. B. Bowen, O.B.E.; W. H. C. Mansfield, D.S.O.; A. H. Measures, O.B.E.; M. Spicer; R. G. Blomfield, D.S.O.; S. Grant-Dalton, D.S.O.; C. G. S. Gould; P. F. M. Fellowes, D.S.O.; W. H. Primrose, D.F.C.; C. F. Kilner, D.S.O.; H. R. Busteed, O.B.E., A.F.C.; I. G. V. Fowler, A.F.C.; M. G. Christie, C.M.G., D.S.O., M.C.; H. Blackhurn; J. Mead, M.C.; R. C. M. Pink; G. C. St. P. de Dombasle, O.B.E.; R. A. Bradley, C.M.G.

Majors.

L. A. Strange, D.S.O., M.C., D.F.C. (A.); A. S. Barratt, C.M.G., M.C., (A.); J. R. Smyth-Pigott, D.S.O. (A.); L. I. Allen, (S.O.); J. W. Cruikshank, O.B.E. (T.); H. A. Van Ryneveld, D.S.O., M.C. (A.); A. Shekleton, D.S.O. (A.); E. L. Gossage, D.S.O., M.C. (S.O.); J. E. A. Baldwin, D.S.O. (A.); C. H. K. Edmonds, D.S.O., O.B.E. (A.); G. R. Bromet, D.S.O., O.B.E. (S.O.); F. E. T. Hewlett, D.S.O., O.B.E. (A. and S.); R. E. C. Peirse, D.S.O., A.F.C. (A. and S.); A. C. Winter, O.B.E. (S.O.); J. T. Babington, D.S.O. (A. and S.); E. Osmond, C.B.E. (A. and S.); W. L. S. Sanday, D.S.O., M.C. (A.); R. B. Ward (A. and S.); R. F. Stapleton-Cotton (T.); E. L. Conran, M.C. (A.); G. Blatherwick (Ad.); L. L. Greig, M.V.O. (Ad.); A. H. S. Steele-Perkins, O.B.E. (S.O.); T. G. Hetherington, C.B.E. (S.O.); R. H. Howell (S.O.); A. B. Gaskell, D.S.C. (S.); R. L. G. Marix, D.S.O. (S.); T. O'B. Hubhard, M.C., A.F.C. (A.); E. R. C. Nanson, D.S.C., A.F.C. (S.); F. K. Haskins, D.S.C. (A.); A. ap Ellis (S.O.); P. Bahington, M.C., A.F.C. (A.); L. A. Pattinson, M.C., D.F.C. (A.); R. J. Bone, D.S.O. (A. and S.); S. Smith, D.S.O., A.F.C. (A.); B. F. Moore (A.); H. R. Nicholl (A.); A. T. Whitelock (A.); P. C. Malthy, D.S.O. (S.O.); Hon. L. J. E. Twistleton-Wykeham Fiennes (A.); A. Cleghorn (T.); C. M. Murphy (A.); E. M. Murray, D.S.O., M.C. (A.); A. H. Jackson (A.); O. T. Boyd, M.C. (A.); B. E. Smythies, D.F.C. (A.); F. H. Unwin (S.O.); G. Laing, O.B.E. (T.); A. Levick (T.); T. S. Impey (A.); J. C. Quinnell, D.F.C. (A.); G. P. Grenfell, D.S.O. (T.); F. C. V. Laws, O.B.E. (T.) C. G. Smith, O.B.E. (T.); C. E. Maude (S.O.); J. H. Lidderdale (S.O.); L. Tomkinson (A. and S.); E. T. Newton-Clare, D.S.O. (A.); A. Corbett-Wilson (T.); H. Stanley-Adams, D.S.C. (A.); D. C. S. Evill, D.S.C. (A. and S.); V. Gaskell-Blackhurn, D.S.C. (S.O.); F. C. Williams, O.B.E. (S.O.); A. W. Tedder (A.); F. F. Minchin, D.S.O., M.C. (A.); J. H. Herring, D.S.O., M.C. (A.); A. A. Walser, M.C., D.F.C. (A.); J. H. S Tyssen, M.C. (A.); G. Henderson (A.); R. F. S. Morton (A.); R. J. F. Barton, O.B.E. (S.O.); G. R. M. Reid, D.S.O., M.C. (A.); E. H. M. O'Farrell (A.); S. W. Smith (A.); C. C. Miles, M.C. (A.); V. O. Rees (T.); C. S. Danhy, M.C. (A.); M. G. Lee (A.); A. R. Stanley-Clarke M.C. (A.). W. J. Ryan, C.B.E. (S.O.); G. G. A. Williams (A.); T. L. Leigh Mallory (A.); V. A. A. Alhrecht, M.C. (A.); Sir N. A. R. D. Leslie, C.B.E. (S.O.); N. M. Martin (S.O.); G. H. Padley (T.); H. F. A. Gordon (S.O.); B. L. Huskisson. D.S.C. (A.); J. A. G. de Courcy M.C. (A.); C. F. Portal, D.S.O., M.C. (A.); J. T. Wittaker, M.C. (A.); N. F. D. Buckeridge (T.); A. F. A. Hooper, O.B.E. (T.); C. H. B. Blount, M.C. (A.); A. W. H. James M.C. (A.); C. W. Anstey (A.); H. E. M. Watkins (A. and S.); T. W. Elsdon (A. and S.); E. V. S. Wilherforce, A.F.C. (S.); R. Whitehead (A. and S.); T. H. England, D.S.C. (A. and S.); F. J. Rutland, D.S.C., A.M. (A. and S.), G. S. Trewin, A.F.C. (O.); R. J. Mounsey, O.B.E. (A.); E. W. Norton, D.S.C. (A.); C. E. Bryant, D.S.O. (A.); S. J. Gohle, D.S.O., O.B.E., D.S.C. (A.); L. T. N. Gould, M.C. (A.); A. R. C. Cooper (S.O.); W. L. Welsh, D.S.C. (A. and S.); R. H. Peck (A.); J. B. Graham, M.C., A.F.C. (A.); W. D. Long, O.B.E. (S.O.); A. G. R. Garrod, M.C. (S.O.); R. A. Chalmers, O.B.E., A.F.C. (A.); T. W. Mulcahy-Morgan, M.C. (A.); W. J. Y. Guilfoyle, M.C. (A.); A. L. Neale, M.C. (A.); A. C. Wright (A.); J. McCrae, M.B.E. (T.); C. H. Nicholas (A.); G. W. M. Green, D.S.O., M.C. (A.); W. J. Shields (Ad.); W. V. Strugnell, M.C. (A.); J. O. Archer (A.); C. G. Tucker (T.); J. V. Steel (A.); J. Sowrey, A.F.C. (A.); L. F. Forbes, M.C. (A.); E. H. Johnston, O.B.E. (A.); H. J. Newton-Clare, O.B.E. (S.O.); C. W. H. Pulford, O.B.E., A.F.C. (A. and S.); B. E. Sutton, D.S.O., O.B.E., M.C. (A.); S. G. Hodges, M.C., A.F.C. (A.); F. J. Roberts (A.); K. R. Binning, M.C. (A.); J. Kemper (T.); R. E. Saul, D.F.C. (A.); F. W. Stent, M.C. (A.); E. L. Miller, M.B.E. (A.); P. A. O. Leask (A.); A. G. H. Carr (T.); R. P. Burchall (T.); H. G. Dean (A.); W. G. Sitwell, D.S.C. (A. and S.); E. R. Moon, D.S.O. (A. and S.); J. S. Mills, D.S.C. (A. and S.); R. M. Field (S.O.); G. F. Breese, D.S.C. (A.); J. C. P. Wood (A. and S.); T. V. Lister (A. and S.); R. B. B. Colmore, O.B.E. (S.O.); B. P. H. de Roeper (A.); K. C. Buss (A. and S.); F. E. Sandford, A.F.C. (A. and S.); C. W. Nutting, D.S.C. (T.); J. Kilner-Wells (T.); A. E. Pettingell (T.); A. J. Currie (S.O.); E. Powell, O.B.E. (T.); E. A. B. Rice, M.C. (A.); A. T. Harris, A.F.C. (A.); F. Sowrey, D.S.O., M.C., A.F.C. (A.); T. Bullen, O.B.E. (T.); E. R. Manning, M.C. (A.); M. G. P. Copeman (A.); F. G. D. Hards, D.S.C., D.F.C. (S.); E. R. L. Corhallis, D.S.O. (S.O.); G. W. Williamson, M.C. (T.); H. A. Michelf (S.O.); A. J. Butler, M.C. (A.); F. B. Binney (A.); A. C. Maund, D.S.O. (A.); P. C. Sherren, M.C. (A.); D. R. McLaren, D.S.O., M.C., D.F.C. (A.); R. Leckie, D.S.O., D.S.C., D.F.C. (A. and S.).

Captains

A. A. B. Thomson, M.C. (S.); W. B. Hargrave (A.); J. R. Howett (A.); R. S. Maxwell, M.C., D.F.C. (A.); G. Allen (A.); E. M. Pollard (A.); H. V. Champion de Crespigny, M.C., D.F.C. (A.); C. H. Dixon, M.C., D.F.C. (A.); A. S. Morris, O.B.E. (T.); E. R. Pretyman (A.); I. T. Lloyd (A.); E. J. Hodsell (S.); A. J. Capel (A.); J. R. McCrindle, O.B.E., M.C. (A.); H. Cockerell (T.); O. G. W. G. Lywood (T.); J. C. Russell (A.); C. E. H. Medhurst, O.B.E., M.C. (A.); A. R. Arnold, D.S.O., D.F.C. (A. and S.). C. S. MacNab (S.O.); R. H. Kershaw (A. and S.); H. Stewart (S.); N. S. Douglas (Ad.); J. E. B. Maclean, D.S.C. (S.); A. S. Redfern (A.); W. Thomas, M.C. (T.); R. Collishaw, D.S.O., D.S.C., D.F.C. (A.); C. T. MacLaren, O.B.E. (A.); F. P. Holliday, D.S.O., M.C. (A.); E. J. L. W. Gilchrist, M.C., D.F.C. (A.); H. E. F. Wyncoll, M.C. (T.); R. Grahame, D.S.O., D.S.C., D.F.C. (S.); C. H. C. Smith, D.S.C. (A. and S.); D. S. Jillings, M.C. (T.); V. A. H. Robeson, M.C. (A.); G. H. Bowman, D.S.O., M.C., D.F.C. (A.); C. G. Burge, O.B.E. (A.); N. B. Tomlinson (T.); H. S. Powell, M.C. (A.); W. G. P. Young, O.B.E. (S.O.); A. H. Stradling (S.O.); L. Auker, O.B.E. (T.); C. A. Ridley, D.S.O., M.C. (A.); F. W. H. Lerwill (T.); R. B. Munday, D.S.C. (A.); G. C. Pirie, M.C. (A.); J. H. D'Albiac, D.S.O. (A.); R. J. O. Compston, D.S.C., D.F.C. (A.); G. Somers-Clarke (T.); C. F. Gordon, O.B.E., M.C. (O.); C. E. Wardle, (S.O.); T. E. Longridge (S.O.); H. W. Stratton (Ad.); D. S. K. Crosbie (A.); T. L. Stevens (Ad.); W. R. Read, M.C., A.F.C. (A.); G. T. Porter (A.); H. L. Reilly, D.S.O. (A.); C. C. Darley (A.); T. G. Bowler (Ad.); E. O. Grenfell, M.C., A.F.C. (A.); E. C. Perrin, O.B.E. (S.O.); F. E. Hellyer (Ad.); D. R. Hanlon (A.); C. E. H. James, M.C. (A.); B. D. S. Tuke (S.O.); A. McR. Moffatt (S.O.); S. C. W. Smith (T.); J. W. Woodhouse, D.S.O., M.C. (A.); M. Henderson, D.S.O. (A.); E. A. Jackson (T.); W. J. B. Curtis, O.B.E. (T.); E. L. Oliver, M.C. (Ad.); C. H. Elliott-Smith, M.C. (A.); R. B. C. M. T. de Poix (S.O.); E. A. Beulah (S.O.); L. H. T. Sloan (A.); W. W. Hart, M.B.E. (T.); E. B. Beauman (A. and S.); E. R. Whitehouse (S.O.); G. B. Dacre, D.S.O. (S.); R. C. L. Holme, M.C. (A.); E. R. Vaisey (A.); F. W. Trott, O.B.E., M.C. (S.O.); F. H. Songhurst, M.B.E. (T.); J. H. Simpson (A.); C. J. W. Darwin, D.S.O. (A.); A. C. Bolton, M.C. (S.O.); P. G. Scott (A.); C. B. Cooke (A.); G. W Robarts, M.C. (A.); G. H. Hall, A.F.C. (A.); C. Porri (T.); R. B. Mansell (A.); F. L. Robinson, D.S.O., M.C. (A.); L. J. Bayly, M.C. (A.); C. E. H. C. Macpherson (A.); P. B. Hunter (T.); C. Cooper (A.); R. C. Hardstaff (A.); W. D. Budgen, G.B.E. (S.O.); J. J. Breen (S.O.); G. C. Bailey, D.S.O. (A.); A. Fitz. R. P. H. Somerset-Leeke (T.); P. Huskinson, M.C. (A.); A. S. Ellerton (S.O.); A. P. V. Daly (A.); C. E. W. Foster (A.); D. Iron (S.O.); A. S. Maskell (A.); C. H. G. Woollven, M.C. (Ad.); E. de C. Hallifax, D.S.C. (A. and S.); F. P. Don (S.O.); R. S. McClintock, M.C. (A.); S. N. Cole (A.); A. T. Williams (A.); L. G. S. Payne, M.C. (A.); B. E. Baker, D.S.O., M.C., A.F.C. (A.); A. W. Bird, D.S.O. (A.); C. H. Hayward, (A.); E. D. Atkinson, D.F.C., A.F.C. (A.); G. L. Hunting (T.); C. W. Mackey (A.); A. N. Benge (A.); J. C. M. Hay (Ad.); C. R. Cox, A.F.C. (A.); H. G. Hutchinson (S.O.); H. W. G. Jones, M.C. (A.); R. Whitaker, M.B.E. (S.O.); G. H. A. Hawkins (S.O.); J. F. Gordon, D.F.C. (A.); C. J. Q. Brand, D.S.O., M.C., D.F.C. (A.); J. M. Robb, D.F.C. (A.); R. G. Mack (A.); R. S. Lucy (A.); T. H. McDowell (A.); W. E. Reason (T.); F. L. J. Shirley, M.C. (Ad.); N. H. Bottomley, A.F.C. (S.O.); E. B. Mason (A.); S. G. Frost, M.B.E. (T.); H. L. H. Owen, A.F.C. (A.); E. W. Havers (T.); J. Gilmour, D.S.O., M.C. (A.); M. L. Taylor (A.); P. E. M. Le Gallais, A.F.C. (A.); H. A. Tweedie, A.F.C. (S.O.); H. M. Probyn, D.S.O. (A.); E. B. Grenfell (A.); E. E. N. Burney, M.C. (A.); L. L. MacLean (A.); O. H. Frost, M.C. (S.O.); A. Hunter (T.); L. A. K. Butt (S.O.); G. H. Cock, M.C. (A.); L. C. Keeble (A.); F. W. Hudson (A.); D. F. Stevenson, D.S.O., M.C. (A.); F. G. Stammers, O.B.E. (S.O.); T. F. Hazell, D.S.O., M.C., D.F.C. (A.); R. M. Drummond, D.S.O., M.C. (A.); A. W. F. Glenny, M.C., D.F.C. (A.); A. G. Jones-Williams, M.C. (A.); A. C. Randall, D.F.C. (A.); A. P. M. Sanders (S.O.); L. E. Palmer (T.); P. F. Fullard, D.S.O., M.C. (A. and S.); R. A. Courtney, M.B.E. (T.); C. C. Durston (A.); G. E. Livock, D.F.C. (S.); A. F. F. Jacob, D.S.O. (A.); W. H. Dunn, D.S.C. (S.); M. A. Simpson (A. and S.); R. F. S. Leslie, D.S.C., D.F.C. (A. and S.); F. J. Linnell (A. and S.); C. J. Galpin, D.S.O. (A. and S.); C. L. Scott, D.S.C. (S.); H. G. R. Malet (A.); R. B. Maycock, O.B.E. (S.O.); L. D. McKean (A.); W. B. Cushion (Ad.); J. L. Vachell, M.C. (A.); H. H. McL. Fraser (A.); W. P. Groves (T.); H. W. Woollett, D.S.O., M.C. (A.); F. E. P. Barrington (A.); J. Everidge, M.C. (A.); C. H. Darley, D.S.C., D.F.C. (A.); H.R.H. Prince Albert, K.G., Personal A.D.C. to H.M. the King (A.); D. Cloete, M.C. (A.); J. Leacroft, M.C. (A.); H. G. Smart (A.); J. K. Waugh, D.S.C. (S.); A. Durston (S.); G. J. C. Maxwell, M.C., D.F.C., A.F.C. (A.); A. L. Marfarlane (A.); C. S. Morice, M.C. (A.); G. M. Clarke (A.); E. R. Tempest, M.C., D.F.C. (A.); T. E. Salt, A.F.C. (A.); E. L. P. Morgan (Ad.); D. H. M. Carbery, M.C., D.F.C. (A.); W. A. Skeate (A.); A. H. Whistler, D.S.O., D.F.C. (A.); E. H. Hooper (T.); J. S. T. Fall, D.S.C., A.F.C. (A.); G. R. A. Deacon, M.C. (A.); E. A. Fawcus (A.); K. R. Park, M.C. (T.); H. I. Hanmer, D.F.C. (S.O.); A. L. Gregory, M.B.E., M.C. (T.); F. Nuttall, M.C. (A.); R. T. Neville (T.); V. Buxton (S.O.); W. H. Clover (T.); L. J. MacLean, M.C. (A.); C. St. Noble (T.); H. M. K. Brown (A.); A. E. McKrever, D.S.O, M.C. (A.); H. A. Smith, M.C. (A.); J. V. Read, M.B.E. (T.); W. E. G. Bryant (S.O.); J. A. Stone (T.); T. C. Thomson (A.); A. Chapman (T.); L. I. Barker (A.); M. Keegan (T.); F. Workman, M.C. (A.); J. McG. Glen, M.C. (S.O.); W. H. Dolphin (T.); B. J. Silly, M.C., D.F.C. (A.); J. P. Angell (T.); F. O. Sodden, D.F.C. (A.); L. M. Lilley, O.B.E. (T.); A. G. Bond, A.F.C. (A.); W. B. Lawson (A. and S.); E. B. Rice (A.); C. H. Awcock (T.); J. B. Fox, M.C. (A.); G. Donald, D.F.C. (A. and S.); J. P. Coleman, A.F.C. (A. and S.); W. R. Mackenzie, D.S.C. (Ad.); A. N. Gallehawk (A. and S.); F. W. Walker, D.S.C., A.F.C. (S.O.); H. S. Kerby, D.S.C., A.F.C. (A.); A. M. Waistell, D.S.C. (S.O.); N. W. Wadham (A.); E. O. Drudge, M.B.E. (T.); T. Gran (T.); E. V. Longinotto, A.F.C. (A.); P. S. Jackson-Taylor (T.); H. V. German (A. and S.); L. H. Slatter, D.S.C., D.F.C. (A.); R. M. Bayley, D.F.C. (A.); V. R. Gibbs, D.S.C. (A.); W. B. Gallaway (S.); F. N. Halsted, D.S.C. (A. and S.); T. E. B. Howe, A.F.C. (A.); D. G. Donald (A.); E. P. Hardman, D.F.C. (A.); W. S. Newton-Clare (Ad.); F. M. Rope (T.); G. H. Reid, D.F.C. (S.); S. Richardson, M.B.E. (Ad.); A. S. Cheshire, M.B.E. (T.); R. W. Dawes (Ad.); L. J. Killmayer, M.B.E. (S.O.); C. F. Rasmusen (S.O.); R. Young (T.); A. J. Long (T.); J. A. Sadler (A. and S.); H. A. J. Wilson (S.O.); S. Nixon (S.O.); G. M. T. Rouse (A.); E. G. Hopcraft, D.S.C. (A. and S.); R. J. Slade, D.S.C. (O.); E. J. Cuckney, D.S.C. (S.O.); A. H. Pearce, D.F.C. (S.); J. A. Glen, D.S.C. (A.); G. D. Nelson, D.S.C. (T.); E. O'D. Crean (S.O.); C. H. Keith (S.O.); B. A. Malet, D.F.C. (O.); M. O. F. England (O.); H. Leedham (T.); A. G. Bishop, A.F.C. (A. and S.); L. H. Cockey (A.); H; F. Delarne, D.F.C. (A. and S.); J. W. B. Grigson, D.F.C. (S.); W. R. D. Ackland (A.); S. T. Freeman (A. and S.); C. M. Crowe, M.C., D.F.C. (A.); A. Ferris (S.O.); G. E. Wilson (A.).

Lieutenants.

F. Fowler, D.S.C., A.F.C. (S.); D. Gilley, D.F.C. (A.); T. F. N. Gerrard, D.S.C. (A. and S.); F. N. Hudson, M.C. (A.); J. H. Norton, M.C., D.F.C. (A.); H. G. White (A.); C. R. Robbins, M.C., D.F.C. (A.); J. H. Butler (A.); D. S. Evans (A.); H. F. Bradley (T.); R. S. Sorley, D.S.C. (A.); H. de V. Leigh, D.F.C. (S.); R. G. St. John, D.S.C. (O.); E. B. C. Betts, D.S.C., D.F.C. (O.) F. L. Luxmoore (A.); H. V. Rowley (A.); C. F. Brewerton, D.S.C. (A.); G.W.R. Fane, D.S.C. (A. and S.); F. J. Bailey (S.); W. T. S. Williams, D.S.C. (S.O.); L. A. C. Stafford (T.); D. R. W. Thompson O.); S. S. Benson, A.F.C. (S.); E. P. M. Davis, A.F.C., A.M. (A. and S.); J. R. Swanston, D.F.C. (A.); A. B. Ellwood, D.S.C. (A.); P. C. Wood (A.); C. Chapman, D.S.C. (O.); W. F. Dickson, D.S.O. (A. and S.); D. G. McGregor, A.F.C. (O.); L. Ritson (O.); B. E. Harrison (O.); J. H. Green (P.); A. J. Prince-Cox (T.); E. D. Davis (A. and S.); W. R. Farrington, D.S.O. (T.); R. A. George, M.C. (A.); F. M. I. Watts (T.); T. L. F. Burnett (T.); J. F. Lawson, A.F.C. (A.); F. MacB. Paul (A.); C. S. T. Lavers, D.F.C. (A.); A. B. Wiggins (T.); J. A. Boret, M.C., A.F.C. (A.); G. E. Ransom (A.); A. R. Churchman, D.F.C. (A.); H. P. Lale, D.F.C. (A.); S. B. Collett (A.); W. Deane, M.C. (A.); G. E. Gibbs, M.C. (A.); R. D. Starley, M.C. (A.); P. W. S. Bulman, M.C., A.F.C. (A.); B. McEntegart (A.); P. Warburton (A.); M. Minter, M.C. (A.); G. W. N. R. Haynes (A.); F. G. C. Weare, M.C. (A.); L. D. R. McDonald, M.C., D.F.C. (A.); E. T. Carpenter (A.); W. B. Everton (T.); N. Liddall (T.); D. Dover (T.); T. A. Warne-Browne, D.S.C. (A.); V. S. E. Lindop (A.); F. H. Eberli (A.); A. B. Weir (A.); P. A. Simmons (S.O.); F. Paterson (Ad.); H. V. Pendavis, D.S.O. (A.); W. E. Somervell (A.); D. W. Grinnell-Milne (A.); H. B. Russell (A.); A. H. Goldie (S.O.); K. B. Lloyd, A.F.C. (A.); L. J. Pearson (A.); J. L. M. de C. Hughes-Chamberlain (A.); H. O. Long (Ad.); A. T. Wynward-Wright (S.O.); G. M. Moore, M.C. (A.); W. A. Harvey (T.); F. Beaumont (A.); E. J. D. Townsend (S.O.); J. C. Barraclough (S.O.); F. L. B. Hebbert (A.); D. H. de Burgh, A.F.C. (A.); C. R. Davidson, M.C. (A.); L. Eardly-Wilmot (Ad.); G. T. Richardson (A.); L. G. Wood (A.); B. V. S. Smith, M.C., A.F.C. (A.); L. H. Browning, M.C. (A.); F. H. Isaac (A. and S.); A. G. B. Ellis (A. and S.); G. H. Russell, D.F.C. (A.); G. R. Travis (A.); B. A. S. Lewin (A.); W. H. Longton, D.F.C., A.F.C. (A.); H. V. Puckridge (A.); N. Comper (A.); W. F. Williamson (A.); R. E. Meek (Ad.); D. N. Thompson, M.C. (S.O.); W. L. Fenwick (A.); L. J. Riordan, A.F.C. (A.); W. Sutherland (T.); L. T. Briggs (A.); H. G. P. Ovenden (A.); H. V. Jerrard (Ad.); B. Raymond-Barker (A.); C. E. V. Porter (A.); W. G. Meggitt, M.C. (A.); J. D. S. Denholm (S.O.); C. R. Keary (A.); T. S. Ivens (A.); P. L. Stephens (Ad.); C. S. Fulton (S.O.); H. C. Pyper (Ad.); R. M. Foster, D.F.C. (A.); K. A. Meek (Ad.); C. M. Eatsley (A.); C. Crawford (A.); G. C. Gardner, D.F.C. (A.); P. L. Plant (A.); R. W. Reid, M.C. (A.); R. B. Bourne (A.); J. M. J. C. J. I. Rock (Ad.); H. G. W. Debenham (A.); M. Moore (O.); S. G. Frogley (A.); J. S. Goggin (S.O.); E. Thornton (A.); E. O. L. Bell (Ad.); C. F. Smith (A.); P. J. Barnett, M.C. (A.); J. Potter (A.); F. W. Deane, D.F.C. (A.); C. R. W. Knight (A.); J. H. Q. Campbell (Ad.); F. W. W. Wilson (A).) B. H. Godfrey (S.O.); W. W. Glenn, M.C. (Ad.); D. F. Cox (S.O.); T. G. Poland, M.C. (A.); H. N. Loch (A.); M. H. Coote (A.); C. E. Williamson-Jones, D.F.C. (A.); K. E. Ward (A.); T. Humble (O.); W. H. Date (S.O.); R. C. Jenkins, M.C. (A.); J. H. Rutherford (T.); R. P. M. Whitham, M.C. (A.); H. M. Coombs, D.F.C. (A.); J. Lawson (A.); G. R. O'Sullivan (A.); C. McM. Laing, M.C. (A.); W. G. E. Hayman (S.O.); W. Scott (T.); S. E. Toomer (A.); C. R. Strudwick (A.); C. J. S. Dearlove (A.); W. R. Curtis (A. and S.); F. C. B. Savile (A.); C. Bousfield (O.); C. N. Ellen, D.F.C. (O.); E. S. Ades (S.); R. St. H. Clarke, A.F.C. (A. and S.); G. H. Elliott (O.); F. Leathley, M.C. (A.); M. A. Benjamin, M.C. (S.O.); J. F. Nalder (Ad.); A. W. Symington, M.C. (S.O.); G. G. Banting (A.); K. C. Tilman (A. and S.); R. J. Montgomery-Moore (Ad.); G. M. Carter (A.); F. M. F. West, V.C., M.C. (A.); D. F. Lawson (A.); C. E. W. Lockyer (A.); J. H. Winch (T.); F. Thompson (A.); J. A. W. Binnie (A.); J. Bussey (A.); M. H. Findley, D.S.C., D.F.C. (A.); R. Halley, D.F.C. (A.); G. E. Creighton (A.); D. R. Mullan (Ad.); V. R. S. White, M.C. (Ad.); C. D. Pyne (A.); C. Findlay, D.F.C. (A.); R. L. Sweeny (Ad.); E. L. Ardley (Ad.); A. C. B. Harrison, M.C. (Ad.); H. B. Maund (A.); W. M. M. Hurley (Ad.); C. F. Le P. Trench (A.); H. L. Macro, D.F.C. (S.); N. B. Ward (A. and S.); A. W. Simon (A.); P. J. Gardiner (A.); C. A. B. B. Wilcock (A.); G. M. Knocker (A.); F. R. Openshaw (A.); S. P. Marcus (A.); D. W. Sibley (A.); N. S. Paynter (A.); A. H. G. Dunkerley (A.); E. G. Hilton (A. and S.); C. H. Harrison (A.); C. H. Noble-Campbell, A.F.C. (A.); C. P. Brown, D.F.C. (A. and S.); R. T. B. Houghton (A.); L. W. Jarvis (A.); G. R. C. Oliver (Ad.); H. M. Moody, M.C. (A.); D. Price (A.); E. L. Russell (A.); J. R. Bell, D.F.C. (A.); J. H. Dand (A.); A. A. C. Hyde (A.); W. J. N. King (S.O.); C. J. Brockbank (T.); J. R. M. Simpson (A.); E. N. D. Worsley (Ad.); D. d'H. Humphreys (A. and S.); G. G. Walker, M.C. (A.); J. M. Bell (S.O.); F. Wood (A.); J. G. Western (T.); R. L. Crofton (A.); A. H. Beach (A.); A. W. Beauchamp-Proctor, B.C., D.S.O., M.C., D.F.C. (A.); G. R. Barry (T.); A. H. Paull (A. and S.); J. K. A. Jeakes, D.F.C. (A. and S.); C. R. Godfrey (S.O.); B. G. H. Keymer, D.F.C. (A.); E. J. L. Hope (A. and S.); P. C. Campbell-Martin (O.); J. F. G. Boyle (O.); F. T. McElwee (T.); J. Duncan (S.O.); J. J. Williamson, A.F.C. (A.); G. G. G Graves (A.); D. S. Allan (A.); L. E. M. Gilman (S.O.); G. S. Shaw (A. and S.); R. B. T. Hedges (A.); R. Grice (A.); E. L. Barrington M.C. (A. and S.); N. S. Dewey, M.C. (A. and S.); S. D. Culley, D.S.O. (A. and S.); M. M. Freehill, D.F.C. (A.); C. T. Walkington (A.); W. E. Staten, M.C., D.F.C. (A.); H. O. Prout, A.F.C. (A.); W. E. Windover (A.); E. S. Robins (A.). S. Jones, D.F.C. (A.); C. D. Skinner (A.); A. Sutton-Jones (Ad.); T. Roberts (A.); D. G. A. Batterbury (A. and S.); S. E. S. McLeod (T.); S. C. Strafford (A. and S.); P. J. Murphy (Ad.); J. D. Breakey, D.F.C. (A.); A. E. Lindon (T.); C. W. H. Moller (O.); E. H. Richardson (A.); A. L. Paxton (A.); R. J. Rodwell (A.); A. McGregor, D.F.C. (A.); H. W. L. Saunder, M.C., D.F.C., M.M. (A.); G. H. H. Scutt, M.C. (O.); A. O. Lewis-Roberts, D.F.C. (A.); R. C. B. Brading, D.F.C. (A.); J. W. Baker, M.C, (A.); R. H. W. Empson (O.); B. S. Wilcox, D.F.C. (A.); H. I. T. Beardsworth (A.); C. L. Cox (A.); L. de V. Chisman (A.); J. H. Dale (T.); P. Murgatroyd (A.); J. W. Young (A.); F. N. S. Creek, M.C. (O.); D. E. D. Taylor, M.C. (A.); F. Keith (O.); J. A. Gray (A.); W. A. Duncan (A.); A. W. Franklyn, M.C. (A.); M. G. McL. Gahill-Byrne (O.); J. S. C. Robinson (O.); E. K. Blenkinsop (A.); M. G. S. Burger, D.F.C. (A.); F. H. Ronksley, M.C. (A); H. P. Lloyd, M.C., D.F.C. (A.); W. D. Gairdner, D.F.C. (A.); I. McBain, D.F.C. (A.); A. T. Laing (Ad.); H. W. Clayton (S.O.); E. B. Wilson (A.); G. Verden (Ad.); R. L. McK. Barbour, D.F.C. (A.); E. F. Waring, D.F.C. (A. and S.); E. E. Porter, D.C.M. (Ad.); O. W. de Putron (T.); A. G. Stradling (S.O.); H. E. Forrow (A.); A. Rowan (S.O.); L. M. Nixon (Ad.); W. Elliott, D.F.C. (A.); R. E. Keyes, D.F.C. (A.); J. I. T. Jones, D.S.O., M.C., D.F.C., M.M. (A.); R. Ivelaw-Chapman, D.F.C. (A.); E. E. P. Smith (A. and S.); S. A. Turner, M.B.E. (T.); C. J. Sims, D.F.C. (A.); C. E. H. Allen, D.F.C. (A.); F. F. Garroway (A.); C. R. Pithey, D.F.C. (A.); V. E. Groom, D.F.C. (A.); G. S. Peffers, D.F.C. (A.); J. F. V. Sugars (O.); A. V. Shewell, (T.); K. Lister-Kaye (A.); Cuthbert Harrison (A. and S.); W. Sanderson, D.F.C. (O.); C. A. Hoy, M.C. (T.); F. R. Hockney (A.); E. J. Ffoulkes-Jones (A.); R. H. Hanmer, M.C. (A.); R. M. Davy (T.); R. R. Evans (A.); W. A. Hancock (T.); F. Everett (T.); W. F. Floyd (T.); J. C. Andrews (T.); M. J. James, M.B.E. (T.); H. J. Gilbert (T.); O. S. Waymouth (T.); E. S. Steddy (T.); C. C. Bayzell (T.); H. W. Heslop (A.); W. G. Stafford, M.C., D.C.M. (T.); Hon. M. H. R. Knatchbull-Hugessen, M.C. (S.O.); F. Grave (T.); R. F. Casey, D.F.C. (O.); R. N. Essell (A.); J. C. Belford (A.); E. C. Delamain, M.C. (O.); A. Garrity (T.); H. A. L Pattison (A.); F. Whittaker (Ad.); G. B. Booth (Ad.); C. F. B. Basil (T.); T. L. Jones (O.); W. Myers, M.C., D.C.M. (S.O.); W. F. Wood (T.); V. H. Tait (T.); J. M. McEntegart (T.); J. F. Clark (T.); H. G. Rowe (O.); A. McC. Goddard (Ad.); S. T. Kemp (T.); A. Ledger (T.); M. B. Fitzgerald (T.); R. G. Fussell (Ad.); B. T. Hood (T.); A. J. Elliott (T.); F. J. W. Humphreys (S.O.); J. Bullock (T.); J. A. Allen (S.O.); D. R. Mitchell (T.); N. B. Hemsley, M.B.E. (T.); W. J. Richards (T.); C. J. Poole (T.); C. A. C. Fidler (T.); H. T. H. Copeland (Ad.); R. D. Lambert (T.); M. R. Preece (T.); F. H. Astle (T.); W. R. Day (T.); F. S. Wainscot (T.); C. V

Lacey, A.F.C. (A.); H. Hackney (S.); R. W. Edwards (T.); G. J. Davies (T.); H. Norrington (T.); J. W. Jean, D.S.M. (T.); W. Liniker (T.); J. W. Hosking, M.B.E. (T.); C. Attrill, M.B.E. (T.).

R. L. Hartley (T.); C. F. Chinery (T.); E. H. Rundle (T.); C. H. Potts (T.); H. H. S. Scott, D.S.M. (T.); E. Whittlesea (T.); S. T. Littleton (T.); H. J. Brown (T.); P. Coyle (T.); J. Noonan, D.S.M. (T.); T. S. Jobling (T.); R. D. McE. Hart (T.); R. G. Gore (T.); A. P. White (T.); C. O. Towler (T.); C. E. Whinney (T.); H. W. St. John, D.F.C. (O.); W. A. Coryton (A.); A. G. Quinnell (Ad.); R. Pyne (A.); H. K. Goode, D.S.O., D.F.C. (A.); J. Glover (O.); H. E. King (A.); W. J Millan, (A.); B. S. B. Clarke (A.); G. S. Taylor (A.); C. S. Gray (A.); R. Menzies (A.); J. Bradbury (A.); D. A. Cox (O.); G. A. R. Muschamp (A.); H. G. McKechnie (T.); W. K. Rose (A. and S.); R. A. Whyte (A. and S.); A. E. Gooch (T.); F. A. Skoulding (T.); R. Jones, M.C. (A.); J. E. Kendrick, D.F.C. (O.); I. Whitford (A.); R. H. Haworth-Booth, D.F.C. (A.); J. A. G. Haslam, M.C., D.F.C. (O.); J. S. Harrison (O.); E. G. Gaff (A.); V. Croome (A.); F. G. Prince (A.); J. A. Elliott (T.); O. G. Gregson (A.); C. A. Horn (O.); J. Blackford (A.); J. W. Lissett (A.); W. E. Dipple (A. and S.); H. E. Falkner (O.); F. T. Eades (O.); G. M. Lawson, M.C. (O.); D. S. Robertson (A.); W. S. Allen (T.); B. F. Deane (O.); J. V. Gascoyne, D.F.C. (A.); L. B. Duggan (A. and S.); J. Parsons (T.); H. J. Bradley (A. and S.); J. S. Nichol (O.); R. H. F. de V. S. Somerset (A. and S.); D. Wood (A.); G. W. Birkinshaw (A. and S.); E. Brewerton (A. and S.); G. McCormack (O.); G. P. H. Carter (A.); C. Walker (O.); K. L. Harris (A.); H. Dawes, M.B.E. (S.O.); S. C. Black (A.); R. J. Wilson (O.); J. Cafferkey (A.); M. C. Trench (O.); F. K. Damant (A.); F. J. Smith, M.C., M.M. (O.); C. A. Spence (A.); E. B. Green, M.C. (O.); S. J. Smetham (S.); P. N. Melitus (O.); E. H. Searle (A. and S.); L. Smith (Ad.); A. G. Thackray (S.); C. S. Miller (O.); H. W. Pearson (A.); E. A. Blake (A.); B. A. Foord, M.C. (O.); W. H. Bowden (Ad.); A. G. Pearce (A.); J. C. Foden, A.F.C. (A.); C. B. Dick-Cleland (Ad.); L. H. I. Bell (A.); L. G. Maxton (A.); A. H. E. Lindop (O.); A. S. Thompson (A.); C. R. Fenton (Ad.); C. F. Falkenberg, D.F.C. (A.); R. W. Rayn (A.).

Royal Air Force.

The following temporary appointment is made at the Air Ministry:—

Staff Officer, 1st Class (Air).—Lieut.-Col. A. S. Barratt, C.M.G., M.C.; July 18. Vice Lieut.-Col. G. F. Pretyman, D.S.O., O.B.E.

The following temporary appointments are made:—

Brigadier-General Staff.—Lieut.-Col. C. S. Burnett, C.B.E., D.S.O.; June 18, and to be actg. Brig.-Gen. while so employed; vice Lieut.-Col. (actg. Brig.-Gen.) P. L. W. Herbert, C.M.G.

Staff Officer, 1st Class.—(P.).—Lieut.-Col. R. C. M. Pink; July 25.

Staff Officer, 2nd Class.—(T.).—Maj. W. R. Bruce; Feb. 22.

Staff Officer, 3rd Class.—(Q.).—Capt. G. L. Hunting; Feb. 25.

Staff Officer, 4th Class (Air).—1st Grade.—Lieut. R. J. Slade; May 27.

Flying Branch.

Lieut.-Col. G. F. Pretyman, D.S.O., O.B.E., to be Lieut.-Col. (A.), from (S.O.); July 18.

Maj. F. K. Haskins, D.S.C., to be graded for purposes of pay and allowances, as Lieut.-Col. while employed as Lieut.-Col. (A.) from May 1 to May 25.

Maj. W. Pennefather to be Maj. (Airship) from (S.O.); May 1.

Capt. R. S. Smith, to be graded for purposes of pay and allowances as Maj. while employed as Maj. (K.B.); July 20.

H.R.H. Prince Albert, K.G., Personal A.D.C. to His Majesty the King, to be Capt. (A.) from (Ad.); July 31.

Lieut. P. D. Baker to be graded for purposes of pay and allowances as Capt,. whilst employed as Capt. (A.); May 1.

Lieuts. (O.) to be Lieuts. (A.):—G. F. Fry, C. W. H. Moller; May 20.

Lieut. D. F. Fox to be Lieut. (A.), from (S.O.); July 21.

Sec. Lieuts. to be Lieuts.:—F. D. Kilby; Feb. 1). A. G. Dickinson; June 7.

Sec. Lieut. G. R. Hunter to be Sec. Lieut. (A.), from (O.); July 9, 1918.

The following relinquish their commissions on ceasing to be employed: Lieut. S. B. Kington (Lieut., W. Rid. R.); Feb. 4. Lieut. W. P. Harris (Lieut. W. Ont. R.); March 10. Lieut. S. G. Harman (Lieut., Welsh R.); May 6. Sec. Lieut. T. H. Barry (Lieut., R.G.A.); May 23. Lieut. R. A. P. Johns (Lieut., Hussars); May 31. Capt. C. L. Bath (Lieut., Temp. Capt., Can. M.G.C.); June 11. Sec. Lieut. (Hon. Lieut. W. P. A. Robinson (Lieut., R.F.A.); June 21. Lieut.-Col. F. A. Wanklyn, M.C. (Maj., R.A.); June 24. Lieyt. W. H. Kilby (Lieut., Manitoba R.); July 9. Lieut. L. Dodson, M.C. (Lieut., S. Staffs R.); July 11. Lieut. G. Fielden (Lieut., Hussars); July 30. Lieut. W. R. Curtis is temporarily transfd. to the unempld. list; May 22.

(Then follow the names of 163 officers who are transferred to the Unemployed List under various dates. We regret that owing to pressure on our space it is impossible to reprint this portion of the list.)

The following relinquish their commissions on account of ill-health, and are permitted to retain their rank:—Capt. J. W. Somers (contracted on active service); July 21. Lieut. H. Fenton (contracted on active service), Lieut. E. L. H. Macleod (caused by wounds); July 22. Lieut. C. C. G. Girvan (caused by wounds); July 23. Lieut. M. Andrews (contracted on active service); July 30. (substituted for the notification in *Gazette* March 28). Sec. Lieut. F. T. Mollard; May 23 (substituted for the notification in *Gazette* May 9); Sec. Lieut. G. R. Newton-Bridle (contracted on active service); July 20 (substituted for the notification in *Gazette* April 8); Sec. Lieut. S. C. Ridges; July 26.

Sec. Lieut. M. C. Burt relinquishes his commission on account of ill-health; July 10 (substituted for notification in *Gazette* of June 6).

The initials of Lieut. (actg. Capt.) E. C. Morris are as now described and not "E. E.,'" as stated in *Gazette* of May 9.

The Christian names of Sec. Lieut. Edmund Bernard Saunders are as now described, and not "Edward Bernard," as stated in *Gazette* of Dec. 10, 1918.

The surname of Sec. Lieut. R. Kelley is as now described, and not "Kelly," as stated in *Gazette* of June 24.

The notification in *Gazette* of March 28 concerning Lieut. J. A. Anderson (Brit. Col. R.) is cancelled.

The notification in *Gazette* of April 4 concerning Lieut. I. A. Peers is cancelled.

The notification in *Gazette* of April 8 concerning Lieut. (Actg. Capt.) P. B. Pattisson is cancelled.

The notification in *Gazette* of May 20 concerning Lieut. N. B. Arbuthnot is cancelled. The notification in *Gazette* of May 27 to stand.

The notification in *Gazette* of May 27 concerning Sec. Lieut. (Hon. Lieut.) W. Cooke is cancelled.

The notification in *Gazette* of July 1 concerning Lieut. C. Miller is cancelled.

The notification in *Gazette* of July 8 concerning Sec. Lieut. R. J. Palmer, is cancelled.

Administrative Branch.

Majs. to be Majs., from (S.O.):—R. Honey; July 9. H. E. Day, D.S.O. M.V.O; July 21.

To be actg. Majs. whilst employed as Majs.:—Capt. J. P. H. Hayes, Sec. Lieut. (Hon. Capt.) C. Harvey; May 1.

Capts. to be Capts.:—G. B. McClure, O.B.E., from (S.O.); July 9. H. S. Edgar, from (T.); July 16. A. W. Crombie, from (T.); July 21.

Lieut. E. P. Manson to be graded for purposes of pay and allowances as Capt. whilst employed as Capt., from May 1 to July 1.

Sec. Lieut. (Hon. Lieut.) A. G. Horlock to be Sec. Lieut. (Hon. Lieut.) from (O.), and to be actg. Lieut. whilst employed, as Lieut., from May 30, 1918, to April 30.

Sec. Lieut. F. C. Matten to be Sec. Lieut. from (T.); Jan. 1.

P.F.O. S. S. Russell (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut.; Sept. 7, 1918.

The following are granted temporary commissions as Sec. Lieuts.:—P. A. H. Anderson; July 28. E. F. Elliott; July 30.

The following relinquish their commissions on ceasing to be employed:—Capt. R. J. H. Purcell (Capt., K.R.R.C.); Feb. 27. Sec. Lieut. (Hon. Lieut.) G. H. P. Whitfield (Lieut., R. Irish Rifles); April 1. Lieut. P. L. Hogan (Lieut., L'pool. R.); May 28. Sec. Lieut. (Hon. Lieut.) N. F. Penruddocke (Capt., R.A.S.C.); July 11. Lieut. P. H. Drake-Brockman (Lieut. E., Surrey R.); July 15.

(Then follow the names of 29 officers transferred to the Unemployed List.)

The following Lieutenants relinquish their commissions on account of ill-health, and are permitted to retain their rank:—I. Curlewis, M.C. (caused by wounds), C. D. Taylor (contracted on active service); July 22.

Sec. Lieut. H. C. Thomas relinquishes his commission on account of ill-health and is permitted to retain his rank; July 22.

Sec. Lieut. S. V. Daley to take rank and precedence as if his appointment as Sec. Lieut. bore date May 1.

The notification in *Gazette* June 6 concerning Sec. Lieut. F. B. Morris is cancelled.

The notification in *Gazette* June 17 concerning Lieut. R. T. Kelly is cancelled.

The notification in *Gazette* July 11 concerning Lieut. J. T. Wright (Lieut. R.N.) is cancelled.

The notification in *Gazette* July 15 concerning Capt. G. A. Brown is cancelled.

Technical Branch.

Maj. V. C. Richmond, O.B.E., to be actg. Lieut.-Col. while employed as Lieut.-Col., Grade (A.) (from Aug. 1, 1918, to March 31).

Capt. E. P. Smith to be actg. Maj. while employed as Maj., Grade (A.) (from Aug. 1, 1918, to Feb. 27).

Capts. to be graded for purposes of pay and allowances as Majs. while employed as Majs., Grade (A.):—A. K. Kendal, W. W. Tullis; May 1.

Capt. P. D. Robertson, A.M., to be Capt., Grade (A.), from (A.); April 17.

To be actg. Capts. while employed as Capts., Grade (B.):—Sec. Lieut. E. P. Dempier. from April 1, 1918, to April 30 (substd. for notification in *Gazette* April 30, 1918); Lieut. A. B. Macintosh (from Jan. 27 to April 30)

Lieut. S. W. Davis to be graded for purposes of pay and allowances as Capt. while employed as Capt., Grade (A.); May 1.

Lieut. A. S. Clark to be Lieut., Grade (A.), from (A.); Dec. 31, 1918.

Sec. Lieut. M. Sheriff, D.C.M., to be Lieut.; Feb. 30.

Sec. Lieuts. to be actg. Lieuts. while employed. as Lieuts, Grade (A.), from Aug. 1, 1918, to March 31:—C. Dollery, T. F. Emms.

Sec. Lieut. (Hon. Lieut.) L. A. Sturrock (Lieut., I.A.R.O.) relinquishes his commission on reversion to I.A.R.O.; Aug. 1.

The following relinquish their commissions on ceasing to be employed:—Lieut. C. B. Carr (Lieut., Kent Cyclist Batt.); June 20, 1918). Lieut. T. S. Griffiths (Lieut., R. Welsh Fus.); June 26. Lieut. C. H. Knight (Dorset R.); July 3. Sec. Lieut. (Hon. Lieut.) P. Anderson (Lieut. (T. Capt.), A. and S. Highrs.); July 9.

(Then follow the names of 35 officers transferred to Unemployed List.)

Lieut. C. W. Ware relinquishes his commission on account of ill-health, and is permitted to retain his rank; July 29. (Substituted for notification in *Gazette* April 15.)

Sec. Lieut. C. A. S. Brittenden relinquishes his commission on account of ill-health, and is permitted to retain his rank; July 22.

The notification in *Gazette* July 18 concerning Sec. Lieut. (actg. Capt.) E. P. Dampier is cancelled.

The notification in *Gazette* May 23 concerning Sec. Lieut. J. H. Glew is cancelled.

Medical Branch

Transferred to unemployed list:—Capt. J. L. Whatley; Feb. 29. Capt. H. M. Holt; April 13.

Memoranda.

The following are granted the acting rank stated against their names:—Maj. A. H. C. Kearsey, D.S.O., to be actg. Lieut.-Col.; Capt. H. I. Hanmer, D.F.C., to be actg. Maj.; Capt. A. H. S. Baker to be actg. Maj.; Capt. C. C. Treatt to be actg. Maj.; Lieut. K. A. C. Creswell, M.B.E. to be actg. Capt.; May 1.

Lieut. C. H. Tancred to be actg. Capt.; May 27.

(Then follow the names of 60 Overseas Cadets who are granted temporary commissions as Sec. Lieuts. with effect from Feb. 15 and relinquish such commissions, with permission to retain the rank from the day following the standardised voyage in the case of those claiming immediate repatriation and from the day following demobilisation in England in all other cases.)

(Then follow the names of 130 Cadets granted Hon. Commissions as Sec. Lieut.)

Maj.-Gen. Sir F. H. Sykes, K.C.B., C.M.G., retires on ret. pay; April 1.

Capt. E. G. Knox (Aus. Flying Corps) relinquishes his temp. supplementary commission on ceasing to be employed; July 23.

The following relinquish their commissions on ceasing to be employed:—Lieut.-Col. R. J. Armes, C.M.G. (Maj., (Bt.-Col.), N. Staffs. R.); May 25); Maj. J. St. A. King (Maj., Indian Army); July 7; Temp. Hon. Lieut. H. R. Tidswell; July 31.

Transferred to unemployed list:—Maj. G. P. Myers, from (S.O.); April 11. Lieut.-Col. R. H. Mulock, D.S.O.; May 16. Lieut. H. Hooper, from (S.O.); June 11. Capt. A. E. Illingworth, from (S.O.); July 7.

◇ ◇ ◇ ◇

Fish by Aeroplane

A NEW demonstration of the possibilities of aerial transport was given on August 1, when Mr. A. Bracegirdle left Blackpool with three boxes of fish on an aeroplane. The fish was displayed on his stall in Manchester Fish Market within three-quarters of an hour of its being lifted at Blackpool.

Paris Church Windows being Replaced.

THE famous thirteenth and fourteenth century glass windows which were removed as a precautionary measure from the churches of Notre Dame and St. Chapelle in Paris are again being placed in position.

They were removed to a place of safety when Hun aeroplanes and Big Bertha were so attentive to Paris, and yellow oiled silk did duty for them.

Lieut. Nungessor's New Post

LIEUT. NUNGESSOR, the famous French ace, who is shortly to be demobilised, will, according to *Les Ecoutes*, become the editor of *Eve*, a women's magazine.

AVIATION IN PARLIAMENT

R.A.F. Weekly Half-holiday

Mr. Waterson asked the Under-Secretary of State to the Air Ministry why it is found impracticable to give men at Warsash, Royal Air Force, the half-day on Wednesday in accordance with Air Ministry weekly orders; whether men can only leave the camp every other day, as they are on fire picket alternate days; and who is the camp commandant responsible.

Major-General Seely: The men at Warsash are granted leave from camp on an average of three days out of four, including night leave. There is no Air Ministry weekly order to the effect suggested in the question, but under the arrangements in force at Warsash the men get two free Wednesday afternoons out of three.

Store Buildings, Regent's Park

Sir William Pearce asked the Under-Secretary of State to the Air Ministry when he will be in a position to notify the Disposals Board of the Ministry of Munitions that the air store buildings in Regent's Park are surplus to his requirements?

Major-General Seely: September 1 has been fixed as the date by which the standard stocks for the Royal Air Force will all be removed from Regent's Park and the buildings handed over to the Ministry of Munitions; and every endeavour will be made to work to that date.

Pay of R.A.F. Technical Officers

Lieut.-Col. Sir F. Hall on July 21 asked the Under-Secretary of State to the Air Ministry what amount of technical pay, if any, it has been decided to award to technical officers in Class A of the Royal Air Force; whether the same is to be retrospective from September 1, 1918, and will include technical officers demobilised before the decision has been arrived at; and, if so, whether an officer who would thus be entitled to additional pay can claim the same together with gratuity based on the larger amount of pay?

Maj.-Gen. Seely: As regards the future, the pay of officers of all branches, flying, technical and administrative, will, as I have already indicated, be uniform. As regards the past, the amount of technical pay which has been awarded to officers graded category "A" of the Technical Branch has been according to rank, viz.:—

Second Lieutenant	2s. a day.
Lieutenant	3s. a day.
Captain	4s. a day.
Major	6s. 6d. a day.

The Air Force Agents have been instructed to issue retrospectively from April 1, 1918, or from the date of transfer or appointment to the Technical Branch, if more recent, to those officers who have now been so graded. This will include officers who have been demobilised. Gratuity will not be affected, as it is not calculated upon technical pay.

Norman Thompson Flight Company

Mr. Macquisten asked the Under-Secretary of State to the Air Ministry whether he will now answer the question whether an urgent letter from Mr. Norman Thompson, dated July 20, 1918, addressed to the Air Minister, asking him to redress the situation created by the actions of the Admiralty and other Government Departments, though formally acknowledged, has never been answered; and, if so, what explanation can be given?

Maj.-Gen. Seely: Mr. Norman Thompson's letter of July 20, 1918, was acknowledged on July 22 of last year on behalf of Lord Weir, to whom the letter was addressed, and Mr. Thompson was informed that as the matter was one of aircraft production it has been forwarded to the Director-General of Aircraft Production, Ministry of Munitions.

Mr. Macquisten asked the Parliamentary Secretary to the Ministry of Munitions whether a member of the Contract Claims Department of the Ministry of Munitions, acting for the Lubbock Committee of the Treasury, made a recommendation to the Aircraft Finance Department of the Ministry of Munitions to purchase Messrs. Cox and Co.'s debenture in the Norman Thompson Flight Co. and re-vest the control of the company in Mr. Norman Thompson and his co-directors; why the Government gave orders to the receiver after neglecting to do so to the Norman Thompson Co.; and whether it is an established custom or rule of the Treasury not to give orders to a receiver?

Mr. James Hope: The answer to the first part of the question is in the negative. As to the second part, it was only after the appointment of a receiver that a decision was reached as to the design of the flying boat in question. The Treasury do not issue any orders in a case of this sort During the War, however, the Ministry of Munitions sometimes gave orders to a receiver in cases where there was a reasonable prospect of obtaining supplies which were urgently needed.

Aerodrome at Flookborough

Mr. Tyson Wilson asked the Secretary of State for War whether he is aware that the construction of a large aerodrome was commenced at Flookborough during the War; that railway sidings were laid down and workmen's huts built, but that the same was discontinued owing to the then shortage of steel for constructional purposes; and whether he will consider the advisability of reconsidering this matter with a view to affording Messrs. Vickers, of Barrow, an opportunity of continuing to cater for this trade?

Major-General Seely: The question is for the Admiralty, and perhaps the hon. Member will address that department accordingly.

Cypress Aeroplanes Construction

Mr. Remer, on July 23, asked the Under-Secretary of State to the Air Ministry whether he can now make any further statement as to the serious losses caused in his Department by the sanction of the use of cypress on aeroplanes; whether he has been able to establish the blame for this loss, and whether he is now in a position to make a statement as to his decision to strengthen his advisory committee with practical expert opinion in order to avoid such blunders in future?

Major-General Seely: With regard to the first two parts of the question, I would refer my hon. friend to the answers given to him on the 1st, 21st, and 26th May, and 26th June. In accordance with a suggestion made by my hon. friend the Conjoint Board of Scientific Societies were invited to consider the co-option of representatives of the National Federation of Sawmill Proprietors. The absence of the chairman of that body in America has involved delay, but he has now returned, and I will inform my hon. friend shortly what decision has been come to.

Pension of Disabled Officers

Mr. W. Nicholson asked the Under-Secretary of State to the Air Ministry whether he is aware that Lieut. P. A. Baker, Royal Air Force, has been informed that he is to be gazetted out of the Air Forces; whether Lieut. Baker is still in hospital suffering from severe burns received in a crash in France in September, 1917; whether he has been marked for a further six months' treatment in hospital with daily surgical dressings; whether his pay, as lieutenant in the Royal Air Force, is 14s. per day, with free maintenance; whether, if gazetted out, he will receive pay at the rate of £175 per annum, less 4s. 6d. per day for maintenance; and whether, as Lieut. Baker is incapacitated and unable to earn his living, the action of curtailing his pay and charging him with maintenance is the usual reward to an officer who has received wounds on active service?

Major-General Seely: The answers to the first four parts of the question are in the affirmative; the question of the amount of disability pension to which this officer will be entitled on relinquishment of his commission cannot be stated until the Ministry of Pensions are in a position to examine the case, but the normal rate for a lieutenant of the Royal Air Force who is fully disabled is £175 a year, plus a bonus of 20 per cent. from which a deduction of 4s. 6d. per day falls to be made if the officer is maintained in hospital. This officer has received the utmost advantage and consideration it is possible to give him under the existing Regulations. It has always been accepted that some definite period must be fixed during which an officer can be paid full pay before his case is taken over by Pensions Board. I am informed that that period (eighteen months) has been exceeded by six months in this case.

Flookborough Aerodrome

Mr. Tyson Wilson, on July 28, asked the Secretary to the Admiralty whether he is aware that the construction of a large aerodrome was commenced at Flookborough during the war, that railway sidings were laid down and workmen's huts built, but that the same was discontinued owing to the then shortage of steel for constructional purposes; and whether he will consider the advisability of reconsidering this matter with a view to affording Messrs. Vickers, of Barrow, an opportunity of continuing to cater for this trade?

Dr. MacNamara: The statements in the earlier part of the question are in accordance with the facts. I am afraid it is quite out of the question for us to take up again the construction of this aerodrome. Existing accommodation is fully adequate to meet our needs. But as my hon. friend is probably aware, though we suspended the work on the shed, we did proceed with the housing accommodation, and the scheme is now nearing completion. I may add that we have offered Messrs. Vickers the option of taking over from us, on terms which I do not think are unfavourable, such work for the construction of the aerodrome as had been accomplished before the suspension.

Sutton Aerodrome Discharges

Mr. George Thorne, on July 29, asked the Under-Secretary of State to the Air Ministry whether single women are being discharged from the Sutton Aerodrome, near Hornchurch, while married women whose husbands are in good positions are retained?

Major-General Seely: The inquiries in this case are not yet complete. I will communicate the result to the hon. member at an early date.

German Airships for G.B.

Lieut.-Col. Moore-Brabazon asked the Under-Secretary of State to the Air Ministry how many German rigid airships will be allotted to this country under the terms of Peace; and whether the Air Ministry or the Admiralty will take the same over?

Major-General Seely: Under the Peace terms all German airships are to be handed over to the Allies, but the exact number to be allotted to this country has not yet been decided. The airships will be taken over in Germany by the Royal Air Force Section of the Inter-Allied Aeronautical Commission of Control; and their allotment as between the Admiralty and the Air Ministry will be determined by the decision made on the general question of responsibility for airships.

Airships

Capt. Wedgwood Benn, on July 31, asked whether the Civil Aviation Department has under its control any airships; and, if not, what steps they will take to carry out experiments, in view of the commercial development of this type of aircraft?

Major-General Seely: The Air Ministry has not at present any airships under its control. Valuable experience was gained by the Ministry from the flights of the R 33 and R 34, but these vessels have now been returned to the Admiralty.

Unified Control of Air Services

Captain. W. Benn asked the Prime Minister (1) whether, in view of the proved value of airships for commercial purposes, the control of the airships could be transferred to the Civil Aviation Department of the Air Ministry; (2) whether the policy of the Government was that there should be unified control over the production of all material and the training of personnel for all aircraft whether lighter or heavier than air?

Lieut.-Col. Malone asked the Prime Minister (1) when the construction of airships will be transferred from the Admiralty to the Air Ministry; (2) whether it is intended to divide the Air Service between the Admiralty and the Air Ministry?

Mr. Raper asked the Prime Minister whether he could make an announcement in reference to the transfer of the construction of airships to the Air Ministry?

Mr. Joynson-Hicks asked the First Lord of the Admiralty whether it was the intention of the Admiralty to transfer the manufacture of airships to the Air Ministry; and, if so, when?

Mr. Bonar Law: It has been decided that the lighter-than-air ships shall be transferred to the Air Ministry, and arrangements to carry this into effect are now being made.

Mr. Raper: Will they be transferred immediately or only on completion?

Mr. Bonar Law: The principle has been decided upon; the details are being arranged between the two Departments.

Lieut.-Commander Kenworthy: Will they be available for experiments in commercial work, or are they only for naval and military purposes?

Mr. Bonar Law: I could not be expected to answer that question. That will be for examination. One of the questions says, "Value for commercial purposes" but I was not aware of that.

Lieut. Col. Malone: Will they be transferred for operational purposes?

Major-Gen. Seely: I could not answer that off-hand. When these ships are employed for military purposes they will be under the command of appropriate military authorities, whether of the Navy or Army.

Mr. Joynson-Hicks: When arrangements are made will a statement be published here?

Mr. Bonar Law: We shall certainly make any announcement that we can. Whether it will be necessary to make it when the House is not sitting we will consider.

Air Division of Naval Staff

Mr. Joynson-Hicks asked the First Lord of the Admiralty whether an Air Department is in existence at the Admiralty; and, if so, for what purpose?

The First Lord of the Admiralty (Mr. Long): There is no Air Department at the Admiralty. There is an Air Division of the Naval Staff, which advises as to air operations affecting Royal Air Force units working with the Fleet. This division is manned by Royal Air Force officers lent by the Air Ministry.

Lieut.-Col. Malone asked the First Lord of the Admiralty if he will state for what reasons aircraft, manned by Royal Air Force personnel, are continued under the control of the Admiralty?

Mr. Long: All aircraft which work in conjunction with the Navy are under the control of the Admiralty for operations.

Lieut.-Col. Malone asked the First Lord of the Admiralty whether the airships allotted for work with specific fleets are under the direct control of the Admiralty Air Department?

Mr. Long: No, Sir. Any airships allotted for work with the Fleet are under the direct control of the commander-in-chief.

Air Station, Felixstowe, Dismissals

Lieut.-Col. R. Peel asked the Under-Secretary of State to the Air Ministry whether he is aware that 176 civilian employés at the air station, Felixstowe, received a week's notice to leave on Saturday last without having had any previous intimation that their services were likely to be dispensed with; and whether, in view of the obvious hardship which must occur from displacement at such short notice, he will take steps to make some concession as to time so as to give the employés some reasonable chance of finding fresh employment?

Major-Gen. Seely: The facts are as stated in the question. I deeply regret the hardship that is caused by the dismissal of civilian employés in this and similar cases, but the rapid reduction of the Royal Air Force to a peace basis renders such action unavoidable. Every effort will be made to give sufficient notice to enable men to find other employment, but such notice must in any case be short owing to the great reduction in working required to be done.

Government Policy

Mr. Raper asked the Prime Minister whether the Government adheres to the declaration of policy, made by the Secretary of State for War on February 12, that the integrity, the unity, and the independence of the Royal Air Force will be sedulously and carefully maintained?

Mr. Bonar Law: The answer is in the affirmative.

SIDE-WINDS

Some little time back we referred to the enterprise of the Aircraft Manufacturing Co. in publishing a series of postcards of their machines. The second series is now to hand, and comprises pictures of Airco. types 1A, 2, 3, 4, 5 and 6. They are beautifully clear photographs in each case, and as the six cards only cost 1s. they are very reasonable. Sets can be obtained from the Aircraft Manufacturing Co., Ltd., Edgware Road, The Hyde, Hendon, N.W. 9. Series 3, comprising commercial machines 4A, 16, 17, 18, and 4R will be ready in a few days' time.

- - -

We hear that Lieut. F. T. Courtney, late R.A.F., whose recent work, more especially on the Boulton and Paul "Bourges," will be well known to most readers, is now free to test new designs for other firms, or to make demonstration flights with post-War commercial types. Lieut. Courtney's flying on this machine, on the recent occasion of the aerial reception of Mr. Hawker at Hendon, will still be fresh in mind. It might be mentioned, as being possibly less well known, that Lieut. Courtney was with the Grahame-White Co. before the War, where he learned to fly. On the outbreak of War he went through the ranks of the R.F.C., and has had a lot of overseas experience. Later Lieut. Courtney was engaged at the Royal Aircraft Factory on testing, and he has had a great deal of experience of experimental flying. We need hardly add that for demonstrating the capabilities of an aeroplane, Lieut. Courtney may be relied upon to get the very best possible results. We shall be pleased to pass on any enquiries.

- - -

Another well-known pilot, who is now open to accept engagements for testing and demonstrating machines, is Lieut. J. H. Moore, now demobilised after 3½ years' service in the R.F.C. and R.A.F. During the war he has been kept busy putting various types through their paces for the Air Ministry. He has flown practically every type of land machine built in England during the past five years, including twin-engine types, so he may be counted upon to "tool" any machine entrusted to him with an experienced hand. Mr. Moore is not only willing to fly anywhere in Great Britain, but is open to entertain propositions which would entail flying abroad. We shall be pleased to pass on any communications.

- - -

In both the British and American navies the merits of Triplex are being recognised. The new Navy general specification for aircraft contains the following:—"Cockpits are required to be provided with a suitable windshield preferably of Triplex glass or equivalent." At a conference last week in Washington with some of the Naval aircraft officials, Triplex was specified for instrument dials on aviation instruments.

A couple of snaps on the occasion of the trip up the river of the staff of Messrs. S. Smith and Sons (M.A.), Ltd. Thanks to the attentive work of Mr. Dandie and Mr. Dilley, everyone had a thoroughly happy time. Inset, the Director's Launch.

NEW COMPANY REGISTERED

BY AIR, LTD., 50, Earl Street, Coventry.—Capital £2,000, in £1 shares (1,000 preference). Under agreement with W. R. Johnson, T. T. Laker', J. W. Batchelor, and E. W. Saward, trading as the "Aerial Transport Co.'

◆ ◆ ◆ ◆

PUBLICATIONS RECEIVED

The Best Way to Learn Flying. The London and Provincial Aviation Co., Stag Lane Aerodrome, Edgware.

Punch Summer Number. July 2, 1919. London: Bradbury, Agnew and Co., Ltd. Price 1s.

Heat Treatment Bulletin, No. 12. The Location of Hardening Shop Faults. By Fred. C. A. H. Lantsberry, M.Sc., F.I.C. The Automatic and Electric Furnaces, Ltd., 281-283, Gray's Inn Road, W.C.1.

The Magnetic Sclerometer. Automatic and Electric Furnaces, Ltd., 281-283, Gray's Inn Road, W.C.1.

The North British Rubber Co., Ltd., and the Whitley Scheme: Inauguration of Works Committee. North British Rubber Co., Ltd., Castle Mills, Edinburgh.

The Scrounger. No. 1, July 1, 1919. R.A.F. Detachment, Thetford. Price 6*d.*

Willing's Press Guide, 1919. London: James Willing, Ltd., 125, Strand, W.C. 2. Price 2*s.* net.

Our Atlantic Flight. By H. G. Hawker and Lieut.-Commander K. Mackenzie Grieve, R.N. London: Methuen and Co., Ltd. Price 3*s.* 6*d.*

The New Traffic (Aircraft). By W. H. Berry. London: Hurst and Blackett, Ltd., Paternoster House, E.C. Price 3*s.* 6*d.* net.

The Ruthenian Question in Galicia. By E. Lutoslawski and E. Romer. Paris: Rue de Rennes, 71.

Aircraft Department, 1914-1919. William Beardmore and Co., Ltd., Naval Construction Works, Dalmuir, Dumbartonshire.

Sirocco Record in the War of 1914-1918. Davidson and Co., Ltd., Sirocco Engineering Works, Belfast.

Glossary of Aeronautical Terms, Prepared by the Technical Terms Committee of the Royal Aeronautical Society. Edited by W. Barnard Faraday, LL.B. London: The Royal Aeronautical Society, 7, Albemarle Street, W. 1. Price 2*s.* 6*d.*

An Apology for War Work. Edgar Allen and Co., Ltd., Imperial Steel Works, Sheffield.

Un Nouveau Système tres Simple de Représentation Proportionnelle a Proportions Exactes. By Charles Janet. Limoges: Librairie Ducourtieux et Gout, 7 rue des Arenes.

The Professional Photographer. Kodak, Ltd., Kingsway, W.C. 2.

Royal Automobile Club Year Book, 1919. London: The Royal Automobile Club, Pall Mall, S.W.1. Price 5*s.* net.

Catalogues

"Dunelt" Steels. Dunford and Elliott (Sheffield), Ltd., Attercliffe Wharf Works, Sheffield.

"Exide" Accumulators for Motor Car Starting and Lighting. The Chloride Electrical Storage Co., Ltd., Clifton Junction, Manchester.

"Surplus," No. 2, June 16, 1919. Surplus Government Property for Sale. Ministry of Munitions, Whitehall Place, S.W. 1. Price 3*d.*

Motor Tools. Tuck and Blakemore, Ltd., Coventry.

The 450 h.p. Napier Aero Engine. D. Napier and Son, Ltd., 14, New Burlington Street, W.1.

Sage Aircraft: Aeroplanes, Seaplanes, Airships. Frederick Sage and Co., Ltd., 58-62, Gray's Inn Road W.C. 1.

◆ ◆ ◆ ◆

Aeronautical Specifications Published

Abbreviations:—cyl.=cylinder; I.C.=internal combustion; m.=motors.

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 31, 1919

13,303. Blackburn Aeroplane and Motor Co. and J. W. Copley. Connections for tension wires of aircraft. (129,000.)

13,377. Daimler Co. and A. E. Berriman. Cylinders for aircraft engines. (129,007.)

13,613. G. Brewer. Releasing mechanism for parachutes, etc. (129,017.)

13,768. R. F. Macfie. Indicator for land speed and angle of drift; also acting as bomb sight. (129,021.)

13,856. E. E. Brown and D. J. Mooney. Metal frames for aircraft. (129,023.)

14,014. Siddeley-Deasy Motor Car Co. and F. M. Green. Landing-chassis. (129,029.)

14,080. British Aeroplane Varnish Co. and J. G. Ward. Solutions of cellulose esters. (129,033.)

14,115. A. V. Roe. Clamping-devices for ties of cross-braced structures. (129,034.)

14,126. A. Mond. Doping of aeroplane fabrics. (129,035.)

Published August 7, 1919.

14,443. A. A. MacGregor. Gyroscopic indicator for use in steering aircraft. (129,307.)

14,668. A. E. Parnacott. Means for lowering captive balloons or airships. (129,315.)

14,724. H. Fowler, G. S. Wilkinson and A. G. Pitt. Lubrication of aero engines. (129,316.)

14,793. Blackburn Aeroplane and Motor Co., H. Booth and J. W. Copley. Deck flying wheels, etc., for aircraft. (129,317.)

14,819. Soc. du Carburateur Zenith. Carburettors for aero motors. (129,318.)

14,864. Blackburn Aeroplane and Motor Co., H. Booth and A. E. Mills. Aircraft and guns thereon. (129,319.)

14,935. H. Saunders and H. Alexander. Petrol and oil tanks. (129,320.)

15,045. Sopwith Aviation Co. and T. Sopwith. Radiators. (129,322.)

15,221. E. R. Calthrop. Means for destroying aerial craft. (129,329.)

15,387. Nieuport and General Aircraft Co., H. L. Hall and C. A. Sharp. Application of dope to aircraft. (129,332.)

15,461. Blackburn Aeroplane and Motor Co., H. Booth and J. W Copley. Control mechanism of aircraft. (129,335.)

15,464. R. A. Watt. Aerial circuits for wireless telegraphy. (129,336.)

15,496. F. H. Page. Driving of pumps, etc., on aircraft. (129,338.)

15,746. Stabilimenti Biak—Ing. A. Pouchain. Aircraft propellers (129,353.)

15879. Blackburn Aeroplane and Motor Co. and H. Booth. Carrying of weights on aircraft. (129,359.)

15,941. G. Constantinesco. Actuating gun triggers on aircraft, etc. (129,362.)

16,146. R. Esnault-Pelterie. Tanks of aircraft. (129,369.)

16,158. L. Bechereau. Means for driving propeller by several engines. (129,370.)

16,192. H. W. Hill. Sighting apparatus for use against aircraft. (129,372.)

16,503. E. Boyle and A. Payze. Mounting guns on aeroplanes. (129,378.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 31, 1919

6,443. P. E. J. Minvalla. Parachutes. (129,052.)

9,193. E. B. Killen. Landing carriages. (129,071.)

11,098. F. J. Mateyka. Parachute. (129,119.)

11,437. Blackburn Aeroplane and Motor Co. and H. Booth. Regulating cooling of I.C. aircraft engines. (129,128.)

11,822. A. Cairns. Propulsion of aerial machines. (129,142.)

12,606. J. G. Navarro. Steering and braking mechanism for aircraft. (129,149.)

13,913. Boulton and Paul and J. D. North. Loading and discharging devices for aircraft. (129,161.)

14,326. J. R. Norrington. Buckle for safety belts. (129,164.)

Published August 7, 1919.

11,050. F. C. Mears. Parachutes for use with aeroplanes. (129,416.)

11,299. Blackburn Aeroplane and Motor Co., and A. C. Thornton. Control of I.C. engines for use on aircraft. (129,436.)

11,364. Blackburn Aeroplane and Motor Co., H. Booth and G. E. Petty. Control devices for aircraft. (129,441.)

11,607 and 11,608. A. Flatters. Processes for doping fabrics and rendering them gas, water and fire-proof. (129,455 and 129,456.)

11,687. J. R. Little. Locking, etc., of doors or partitions of aircraft sheds. (129,457.)

16,060. A. E. Fesselet and others. Multiplane heavier-than-air flying-machines. (129,528.)

16,110. G. Clowes. Apparatus for adjusting or testing inclineation or incidence of aeroplane wings. (129,530.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published August 7, 1919.

3,783. M. J. B. Barbarou. Carburettors. (129,586.)

5,132. D. J. Mooney and D. H. Emby. Construction of metal cross members, etc., for aircraft. (129,596.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlix, l, li and lii)

NOTICE TO ADVERTISERS.

In order that "Flight" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates*:—

United Kingdom.	s.	d.	Abroad.	s.	d.
3 Months, Post Free	7	1	3 Months, Post Free	8	3
6 ,, ,,	14	1	6 ,, ,,	16	6
12 ,, ,,	28	2	12 ,, ,,	33	0

These rates are subject to any alteration found necessary under war conditions.

Should any difficulty be experienced in procuring "Flight" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office by forwarding remittance as above.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 555 (No. 33, Vol. XI.) AUGUST 14, 1919 Weekly. Price 6d. Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.*

These rates are subject to any alteration found necessary under war conditions

CONTENTS

Editorial Comment: PAGE
- Terrible Revelations .. 1071
- What is Behind It? .. 1071
- More of It .. 1072
- Where will be the Reduction? .. 1072
- The Profiteering Bill .. 1074
- A Big Private Purchase of Machines .. 1074

Flight—and the Men: Mr. C. R. Fairey .. 1073
"The Jackals" .. 1075
The Austin "Whippet" .. 1076
Experimental Design and Testing of Aeroplane Ribs .. 1081
The Select Committee on National Expenditure .. 1083
Maintaining Constant Pressure before Carburettors .. 1086
Airisms from the Four Winds .. 1091
R.A.F. Sports .. 1095
Civilian Flying .. 1097
The Royal Air Force .. 1098
In Parliament .. 1099
Side-Winds .. 1101
Correspondence .. 1102

EDITORIAL COMMENT

Terrible Revelations

ALLEGATIONS which can only be described as terrible are made in the report issued last Saturday by the Select Committee on National Expenditure. The portion relating to aeronautics is reproduced elsewhere in these pages. A sub-committee was appointed to enquire into certain aspects of Air Ministry finance, and the principal witness called was Sir John Hunter, Administrator of Works and Buildings. According to his evidence, no man employed on the construction of aerodromes—and there were 70,000 of them—earned the money he got. Further, fraud seems to have been rampant, and has so far not been visited with punishment. Sir John avers that in the case of the Renfrew aerodrome he "found a conspiracy of Government men and contractor's men, and suspected that the contractor himself was also in it." Four men were arrested, and have been out on bail for four months, but the Crown authorities refused to prosecute, and the men have now been freed from the charge. As to the reason why the Crown declined to prosecute, a letter from the Secretary to the Lord Advocate to the Secretary of the Air Ministry was put in in explanation. This letter states that: "The evidence available is insufficient to afford any strong probability of obtaining a conviction. There is no evidence at all that any of the accused applied to their own uses any of the money said to have been improperly obtained from the Ministry. The circumstance, though it does not in itself provide an answer to a charge of fraud, makes the insufficiency of the evidence more formidable than would otherwise be the case. Further, a prosecution would reveal what appears to be inefficiency and absence of control on the part of the representatives of the Ministry on the spot."

Sir John Hunter, in reply to this simply extraordinary letter, pointed out that it was admitted that the books or time sheets were falsified by entering thereon the names of men said to be employed on the job, but who did not in fact exist. Wages were drawn regularly and charged to Government as having been paid to these men. "Would not," asked Sir John, "any jury draw the obvious inference that the persons responsible for putting these 'dead men' on the books and drawing wages regularly for them from Government funds had, in fact, put the money in their own pocket? And is there not evidence that this was done with the connivance of the clerk of works?" Later, Sir John saw the Lord Advocate personally, but the latter refused to alter his decision not to prosecute.

* * *

What is Behind It?

It is very clear that such matters as these cannot be allowed to rest where they are now. As a matter of fact, Sir John has caused a civil action to be entered against the contractor for about £50,000, but although it is possible that this action may succeed, that would only mean the recovery of a certain amount of public money. Whatever the result of this civil action may be, it is a thing entirely apart from the charges of fraudulent practices alleged against a number of people concerned in the construction of this aerodrome. No one who reads the evidence with an unbiassed eye can fail to come to the conclusion that prosecutions ought to have been initiated at once. The most extraordinary aspect of the whole thing is the refusal of the Lord Advocate to go on with the criminal proceedings. We are not learned in the niceties of the law, but if ever we have seen what seems to be a good *prima facie* case for a criminal prosecution it is supplied by one where, admittedly, names of men who had no existence in fact were entered on a pay roll and their wages regularly drawn. If the money was drawn, it must have been drawn by someone. Clearly, it was not passed on to men who did not exist, so it stopped somewhere, and where that somewhere is should be easy to find out. We find it more than difficult to believe that the refusal to prosecute is not contained in the final paragraph of the letter from the Lord Advocate's Department: "A prosecution would reveal what appears to be inefficiency and absence of control on the part of the representatives of the Ministry on the spot."

We imagine that every unbiassed person who reads the letter will agree with the conclusion that we ourselves have arrived at. The clear inference is that there is someone whom it is desired to shield from the consequences of inefficiency or slackness, or worse. But that will not do. No matter who the persons, or how highly connected they may be, or whatever the influence they have been able to bring to bear to stifle enquiry, the names must be given to the public and the proper action taken to make them pay for their *laches*, whether the remedy against them be civil, military or criminal. As to the actual participators in the "frauds," it is not too late for the authorities to move, and move they must. There has been too much hushing up of war scandals, and the people are just about tired of apologies for the guilty. They want heads.

◆ ◆ ◆

More of It It is not only in the matter of aerodromes that extravagance, inefficiency and graft seem to have been the order of the day. In investigating the clothing contracts, Miss O'Sullivan, Clothing Controller of the W.R.A.F., was called upon to give evidence, and said that the work of inspection was done by forty men, but that it could have been quite efficiently carried out by twelve women! That sort of thing seems to have been quite usual in the W.R.A.F. We ourselves have more than once directed attention to similar abuses of hopeless over-staffing of W.R.A.F. units. Cases have come to our notice of stations where a dozen men were kept, doing absolutely nothing, because the women either could not, or were not allowed to, carry out in their entirety the duties for which they were enlisted. Therefore, the story of forty men doing the work of a dozen women leaves us comparatively cold, except that it furnishes yet another example of the appalling waste of public money and of effort which seems to have been part of the War system. The more we hear about the manner the War was conducted, the more we marvel at our successful issue from it.

We are on more serious ground when we come to regard the allegations in connection with the placing of clothing contracts and with the removal of Miss O'Sullivan from the post of Controller of Clothing. Miss Douglas-Pennant, who gave evidence, said that this lady was removed behind her back and without her foreknowledge. As it was stated that Gen. Seely has ordered an enquiry into Miss O'Sullivan's allegations of irregularities in the placing of contracts, it will be better to treat this part of the affair as being *sub judice* and therefore not a proper one for comment at this stage. This may, however, be said at this juncture, that the broad allegations having become public property any enquiry into details should likewise be public. There must be no hole-and-corner procedure about it. Not only is it due, to the public that they should know who is guilty, if anyone be guilty, of misfeasance or incompetence, but it is equally due to officers and officials whose names have been publicly mentioned that they should be as publicly cleared of odium if enquiry established that they have not been to blame.

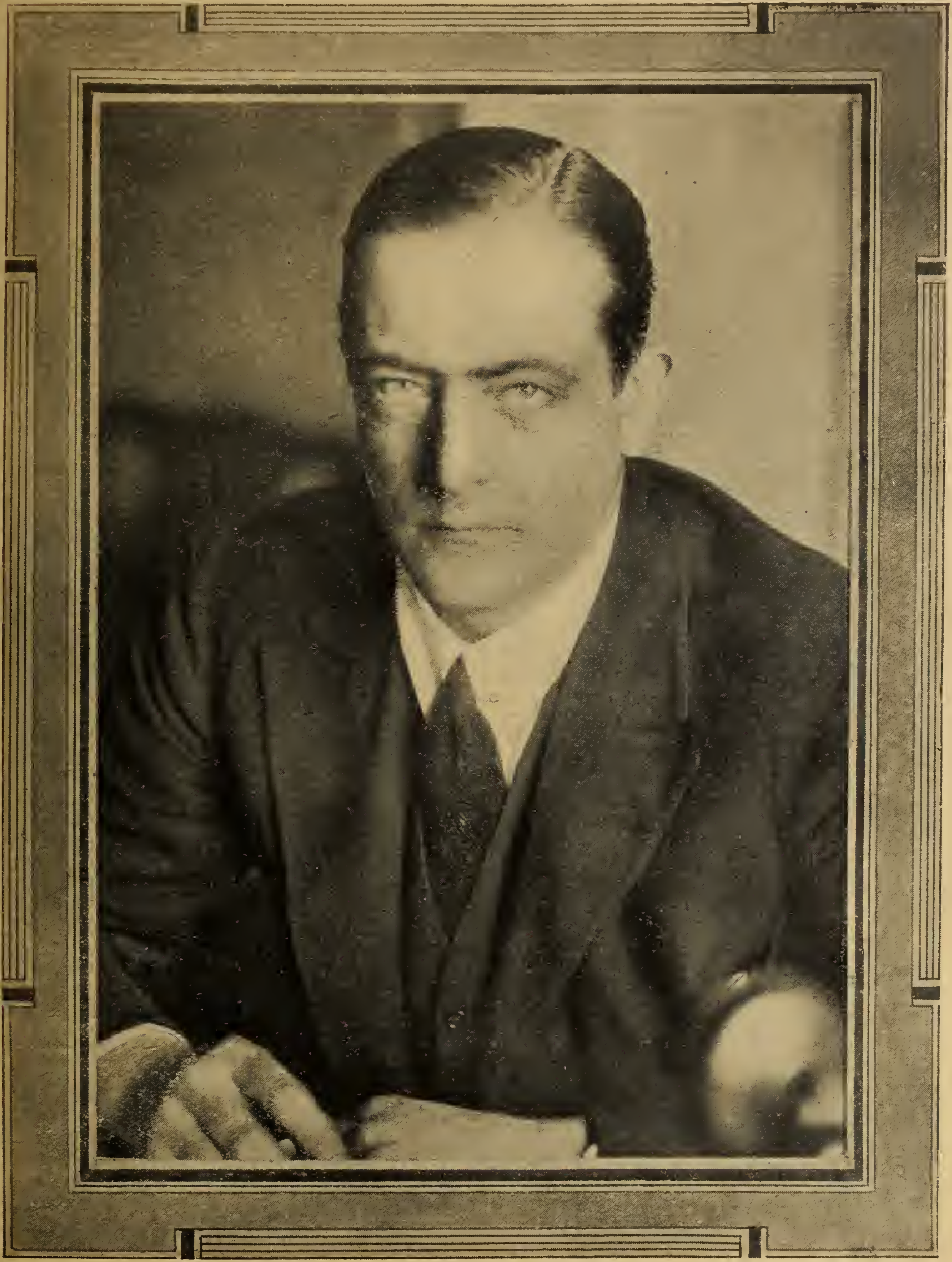
It is almost unimaginable that the existence of these scandals, and others which have not been touched upon by the Committee's Report, were entirely unknown to those in authority. The latter do not appear to have made the slightest attempt to check the wicked waste of public money. Nor, if the Renfrew case is a fair sample of the attitude of mind of those responsible, does any effort seem to have been made to bring to justice people who are alleged to have been guilty of offences which are next door to plain theft. Therefore, it is hardly too much to say that they have placed themselves in the position of being "accessories after the fact," inasmuch as they have more or less condoned malpractices in order that light should not be shed upon departmental incompetence and slackness. Just what action can be taken regarding them it is difficult to say at the moment. Fortunately, the disclosures have raised such a storm of indignation throughout the country that something must, and, we doubt not, will be done, but whether the punishment will be made to fit the crime remains to be seen. To judge by the precedents, we fear it will not.

The one bright spot in the Committee's report is the tribute paid to Gen. Sir Hugh Trenchard and his work. We are unfeignedly glad that the Committee has thus put its opinions on record. No one who knows Gen. Trenchard—or Air Vice-Marshal Trenchard, to be up-to-date and correct—could for a moment imagine that he could have known what was going on without an effort to stop it, and in the endeavour to find out who was the high authority mostly to blame, it is fair and fitting that it should be stated as explicitly as possible who was *not* in fault.

◆ ◆ ◆

Where Will be the Reduction? One of the aims with which we entered the late War was the total destruction of the spirit of militarism and all it stands for, and as a resultant the reduction of the burden of armaments which had for years pressed heavily upon all the European peoples, including not least ourselves. While we are all for an efficient and sufficient scheme of national defence, we cannot help asking when and how the promised reduction in the cost of preparation for war is going to be effected? We are fully aware that no sensible reduction in armaments is possible while the world is in its present disturbed state, but what causes us grave concern is that no one seems willing to take the initiative in proposing a future policy. The Navy is still adding ships to the list, and the pay of increased numbers of officers and men

Flight—And the Men



"Flight" Copyright.

MR. C. R. FAIREY, Chairman and Managing Director of the Fairey Aviation Company.

on the permanent establishment is likely to be, after all allowances have been made, far in excess of pre-War figures. The standing army, instead of being reduced, is, apparently, to have a peace establishment well above that existing at the outbreak of war, and, as in the case of the Navy, increased pay threatens to double its cost as compared with the period ending in August, 1914. Additional to these services, we now have the Royal Air Force, the great deciding factor of the future. If we are to permanently carry all these extra estimates, it looks as though we had fought to rivet the chains of militarism more tightly about our necks. Instead of the burden of armaments being lightened, it appears as though it were to be more than doubled.

We have always been the first to argue that we must have an adequate air force. Indeed, we have gone much farther and laid it down that it is essential to our existence as an Empire that we must be supreme in the air as at sea. But supremacy is a relative matter, and we must see that we do not overstep the bounds of what is actually requisite to safety.

Also, if we are to be compelled to maintain such an air force as will be able to maintain an unchallenged superiority over possible enemies, reductions must be made in the other services to compensate. It seems to us that the whole question of the relative size of each of the fighting Services is a matter that can only be settled by a central authority, able to view the necessities as a whole. Naturally, the sailor, the soldier and the airman each takes his own view of the needs of his particular Service, and so estimates are swollen at the dictation of the experts. Here, we think, is a strong argument for grouping the Services under a single Ministry of Defence which is able to visualise the general problem of defence as one and not three. We agree that there are counter-arguments, but in the present state of the country's finances it is urgently necessary to seek out every road to economy and to pursue it, provided always that it does not jeopardise our safety as a nation and an Empire.

◆ ◆ ◆

The Profiteering Bill

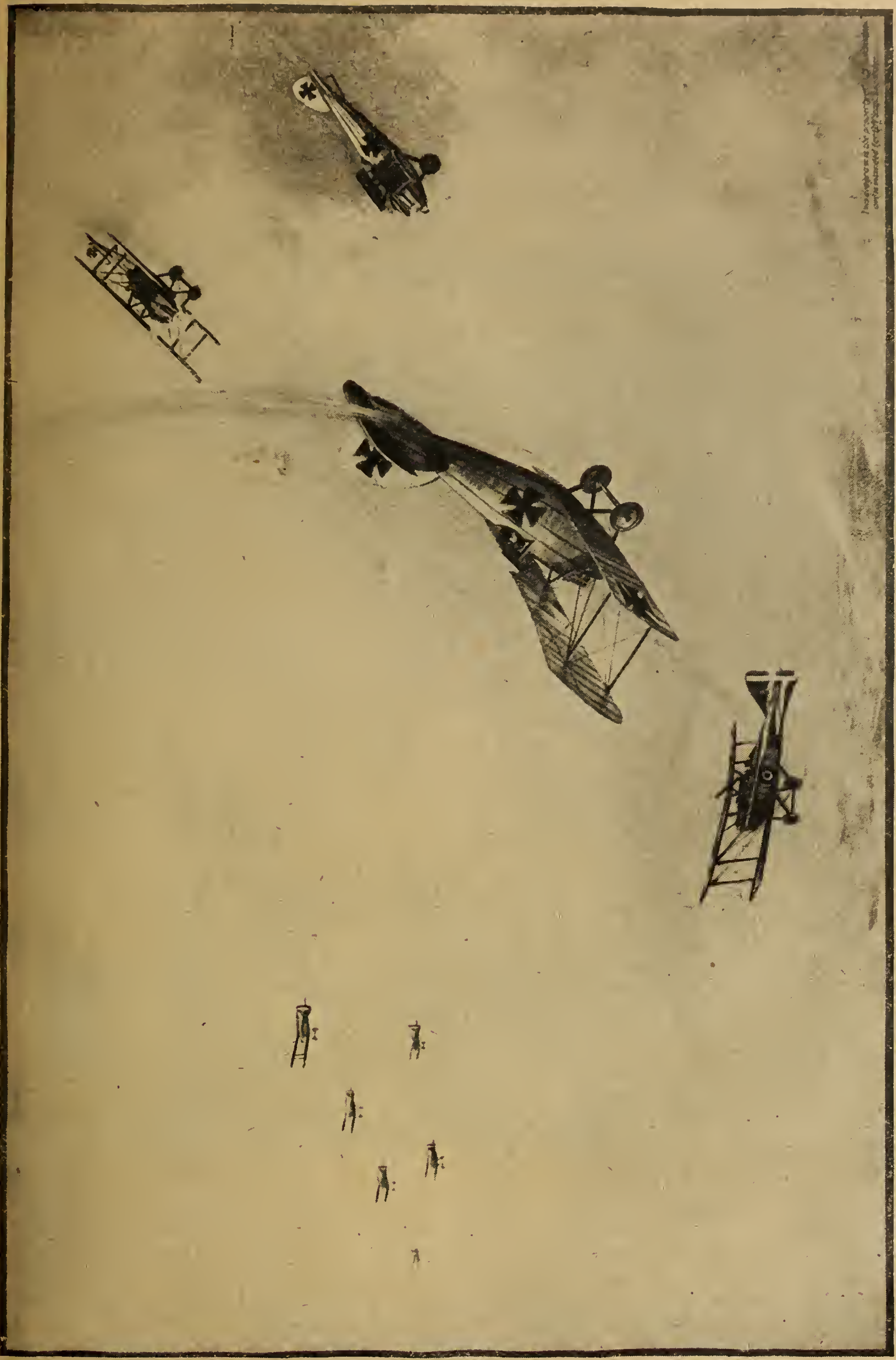
Profiteering is a theme which interests everyone, since in some shape or form it touches us all. Indeed, this is far too mild a statement of the case, since it is safe to say that there is not a single article of commerce or a single commodity which has not been profiteered to the utmost possible limit of what the public will stand. The action of the Government, therefore, in bringing in a Bill designed to stop the wicked exploitation of the public is timely enough, though it may be doubted if it will be effective. Profiteering by the retailer is easy enough to stop. To do that it is only necessary to lay down a scale of prices for commodities and to prosecute where these prices are exceeded. But although the retailer has shown himself to be as bad a profiteer as any, profiteering does not begin or end with him, and to punish him while the bigger fry are allowed to slip through the noose is neither justice nor utility. If profiteering is to be killed, it must be sought out and killed at its source. There has been to the full as much profiteering in raw materials as there has been in the finished article, and it is perfectly obvious that unless profiteering can be checked at every stage of production it is quite useless to lay down maximum prices of sale to the public after the worst of the profiteering has been done. It is not the *actual* costs, after a dozen or so profiteers have taken toll at as many stage of production, which matter. It is the costs as they should be, after showing a reasonable margin of profit at the various stages, which require to be dealt with. That would be a colossal work, and one which we fear would be outside the bounds of practice. Even if it were not, we doubt if this Government dare go the whole way and go for the trusts and combines which are mainly responsible for keeping production down and prices up. If they did, the probability is that they would find some unexpected and decidedly embarrassing fish in the net. That they know, and therefore the net they are casting is one designed to catch the small fish only.

If the Government is sincere in its desire to stamp out profiteering, let it bring in a Bill declaring trusts and combinations illegal, as they are in America, and thus inaugurate a new era of unrestricted competition between individual manufacturers and distributors. Then production would increase and prices would fall again. Unfortunately, there are too many of the trust magnates in high places, and this is one of the things the Government dare not do. If they dared, they would surely have acted on the presentation of the Report of the McCurdy Committee on Trusts, which is as illuminating a document as we have seen for a considerable time. This much is certain, that if Parliament does not act before very long and check the tendency to the formation of trusts and combines, the people will take matters into their own hands and force the issue.

◆ ◆ ◆

A Big Private Purchase of Machines

What is probably the biggest single-handed purchase of aircraft has just been made by an Australian, Mr. S. W. Copley. Beyond the fact that Mr. Copley is well known in insurance and financial circles, no one seems to know what interest he has in aviation or the purpose for which he has just become the biggest private owner of aeroplanes. However that may be, he has bought from the Government 300 aeroplanes, and intends to embark on a commercial flying enterprise, about which all he will say is that it primarily concerns this country. Interviewed by an evening newspaper, he said that some of the machines would be resold, while others would be devoted to the encouragement of commercial aviation. As Mr. Copley apparently desires to keep his intentions to himself for the time being, we shall not presume to attempt to speculate on them. We should probably not succeed in penetrating his plans in any case, so it is just as well. It seems to be quite obvious, however, that he has a plan, for without some concrete idea of what use such a number of machines are to be put to, no one but a lunatic millionaire would or could purchase them—and Mr. Copley is certainly not a lunatic, though he may, for all we know, be a millionaire. As a matter of fact, he seems to have some very definite and sound ideas on commercial flying. It is bound to come, he says, and bound to pay in the long-run, and he means to be in it. Well, we most sincerely wish him all success in his enterprise. The movement badly needs men with money, initiative and faith to get it going and help it through the two or three lean years it must encounter before aviation takes its place as an established factor in transport service.



"THE JACKALS."—The importance of keeping formation cannot be too strongly impressed upon the pilot. Loss of position is likely to lead to an adventure with the Jackals. *(Drawing prepared by the Air Technical Services for use at the R.A.F. Schools.)*

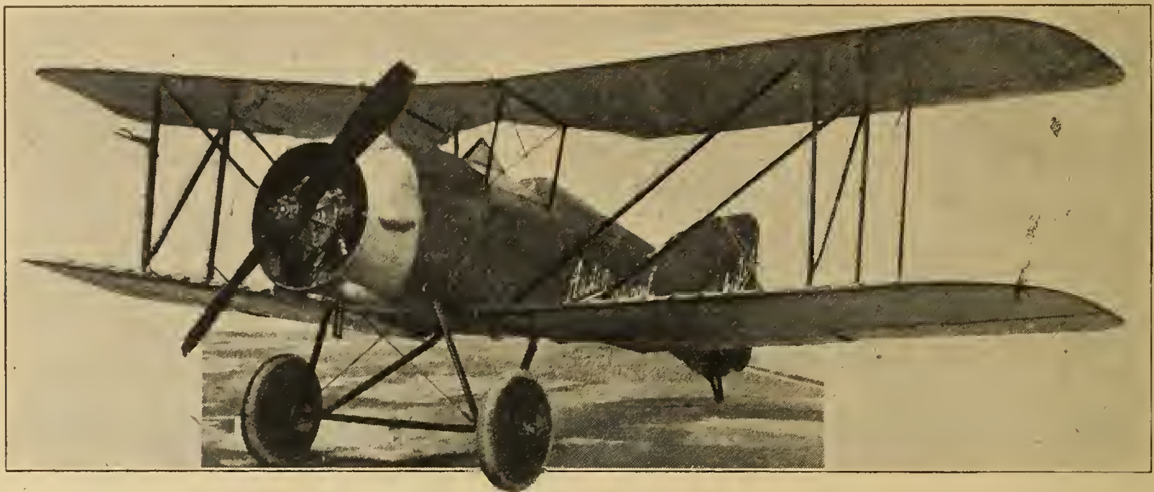
THE AUSTIN "WHIPPET"

UP to now it has been necessary for the "Amateur" pilot to have a certain amount of mechanical knowledge, in addition to knowing how to fly, in order to keep his machine in flying trim and safe—unless, of course, he has the services of a skilled mechanic or mechanics. In other words, the non-mechanical owner-pilot has only now been catered for in the Austin "Whippet," which has just been produced by the Austin Motor Co., Ltd., of Birmingham, to the designs of Mr. J. Kenworthy—the firm's chief aeronautical engineer, associated in the early days with Mr. G. de Havilland at the Royal Aircraft Factory.

The salient points of the Austin "Whippet" are :—It is a small single-seater tractor biplane with an all-steel *fuselage*, folding wings, no bracing wires, and it is a safe and easy machine to fly. Furthermore, it is proposed to place this machine on the market at the comparatively low price of £400 to £500.

In view of the fact that bracing wires have been practically eliminated, and that the wings are made to fold back, the "Whippet" is a machine that should appeal particularly to the "owner-pilot," for frequent adjustments and rigging—especially when folding the wings in position for flight—are thus avoided, whilst the machine can be housed in quite a small building or tent, one 8 ft. wide, 18 ft. long, and 8 ft. high being sufficient for the purpose.

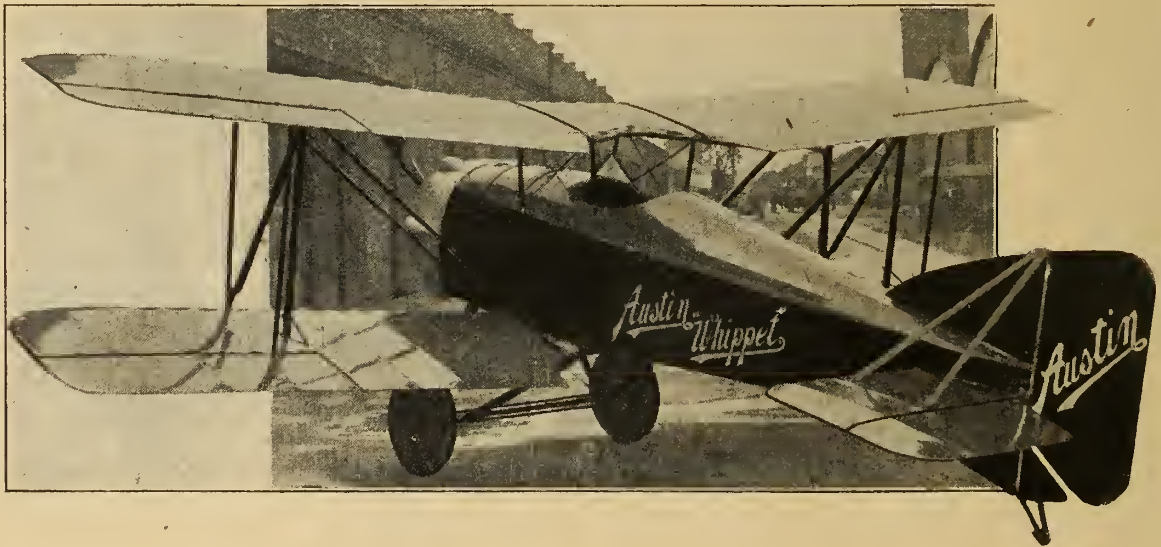
As shown in the accompanying scale drawings, it is fitted with a two-cylindered horizontally-opposed engine, but we understand that a six-cylindered 45 h.p. Anzani engine will be fitted in all future models.



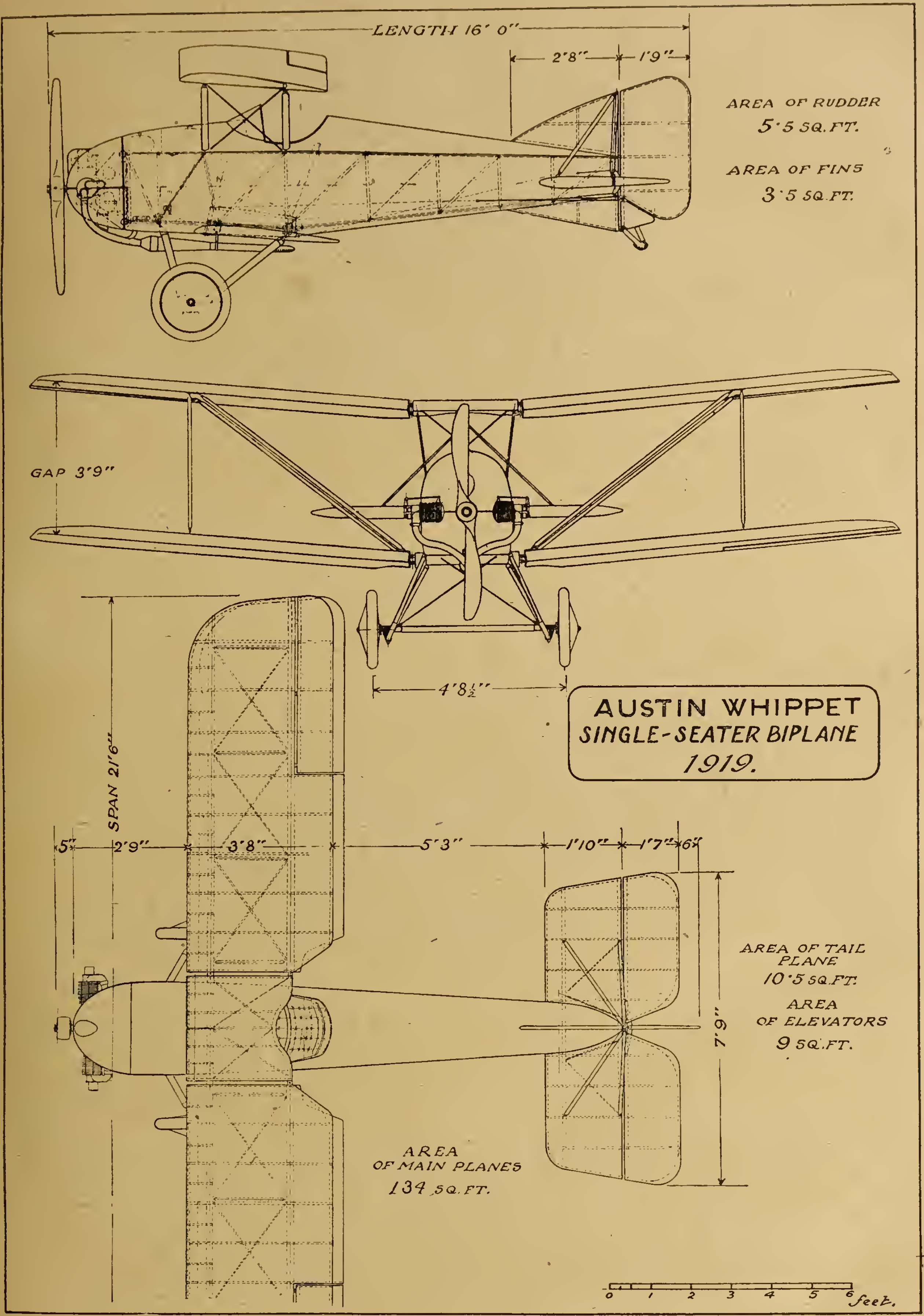
Three-quarter front view of the Austin "Whippet."

The principal dimensions of the "Whippet" are : Span, 21 ft. 6 ins. ; length, 16 ft. ; chord, 3 ft. 8 ins. ; area of main plane, 134 sq. ft. The weight of the machine empty is 500 lbs., and fully loaded 730 lbs. It has a speed range of 30 to 95 m.p.h., and climbs to 5,000 ft. in 6 mins., and 10,000 ft. in 14 mins. Fuel is carried for a flight of two hours' duration.

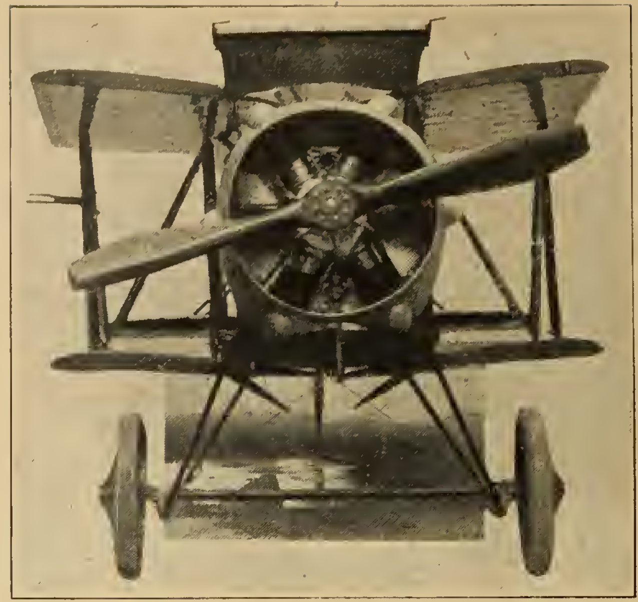
As previously stated, the *fuselage* is of steel construction throughout, and is built up in two sections, being divided at a point immediately behind the cockpit. The longitudinals, diagonals and cross-members are of circular-section steel tubing, and are readily replaceable. Bracing wires are entirely eliminated, and it is claimed that the whole frame-work is not affected by climatic conditions. The engine is overhung from the front of the frame, and a special shock-absorbing device, consisting of rubber buffers, is fitted between the *fuselage* and the engine-bearer. The engine is enclosed in an aluminium cowling.



Three-quarter rear view of the Austin "Whippet."

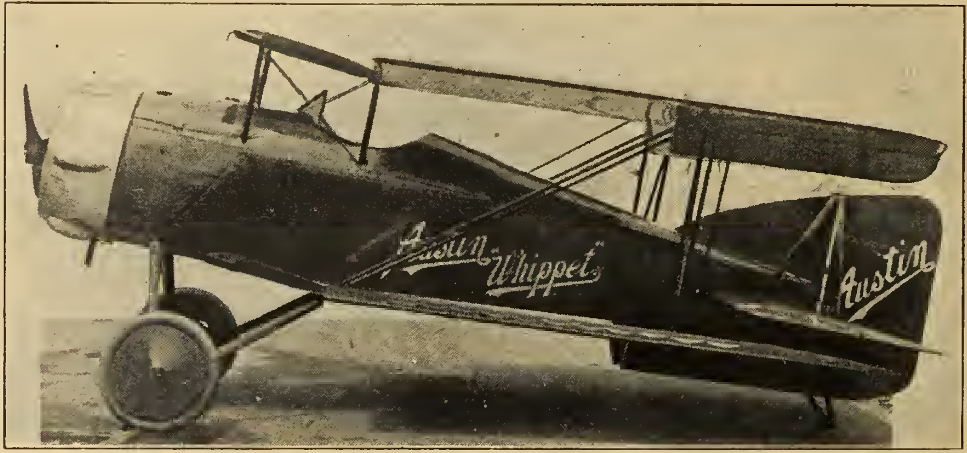


THE AUSTIN "WHIPPET" SINGLE-SEATER BIPLANE: Plan, side and front elevations to scale.



Front view of the Austin "Whippet" with the wings folded.

The main planes have been designed with a high factor of safety, and are of standard wood construction with hollow box-section spars. Steel tubes are employed for the compression members, and internal bracing is by steel piano-wire. One set of "N" struts, of streamlined steel tubes, separate the top and bottom planes on each side of the *fuselage*, and the top centre section is supported above the *fuselage* by two pairs of vertical streamlined steel struts. This portion of the cellule alone is wire-braced. The upper and lower wings are hinged at the roots of the rear spars to the top centre section and *fuselage* respectively. Bracing for lift and incidence is by streamlined steel tubes, which are anchored at their lower ends to the roots of the lower wings, and are thus not disconnected when folding the wings. In order to correct incidence, the rear lift struts are made adjustable. Both upper and lower wings are given a dihedral of about 5°, but are otherwise "straight." The top plane is staggered forward some 3 ins. When folded back the wings are supported and locked by tubes attached to the *fuselage*, and when in flying position are locked by a quick-release but positive locking device. *Ailerons* are fitted to the top planes only.



Side view of the Austin "Whippet," with the wings folded.

The tail plane is of similar construction to the main planes, and consists of two outer portions and a centre portion, which simplifies the question of spares, as either outer portion can easily be changed. The tail plane is of comparatively thick streamline section, and is braced by telescopic streamlined steel tubes. Its angle of incidence can also be adjusted to correct the c.g. for different weights of pilots. The elevators and rudder are of standard design, the framework being of steel tubing and the ribs of wood. A triangular vertical fin is mounted both above and below the *fuselage*.

The landing chassis is of the ordinary V-type, the V-struts terminating at their lower ends in pressed steel sockets, tubular tie-rods connecting each V. The axle rests in between the V where it is attached by the usual elastic cord. Bracing is by streamline steel wire. The tail skid is of the swivelling type, the skid itself being made of two steel pressings welded together. In order to provide a good wearing surface, a special shoe is fitted, consisting of ten vertical laminated plates. The springing of the skid is obtained by making the supporting strut of telescoping tubes operating on a compression spring.

The elevators and *ailerons* are operated in the usual way by a "joy-stick," and the rudder and tail skid by rudder-bar. Operating rods are used for the engine control. For starting the engine a small induction pump is fitted, which forces a firing mixture into the cylinders, and a starting magneto inside the *fuselage* ignites this charge.

* * *

Parliament and Wireless Telephony

MANY Members of Parliament availed themselves of the opportunity of hearing something of the development of wireless telephony at the demonstration on Monday arranged by Major-General Seely. The R.A.F., he said, took up the subject early in 1915, and by March, 1918, the first two squadrons of aeroplanes had been fitted with the apparatus, which gave them such an advantage that it was found that German machines took care to avoid them. The postal aeroplanes, such as those plying between Kenley and France, are now so fitted. Ranges of 100 miles from an aeroplane and of 165 miles from an airship have been obtained and could be increased by the use of larger aerials at the receiving stations, if any good purpose would be served thereby.

The members heard a gramophone in action at Aperfield Court, 20 miles away, and communication was next established with aeroplanes sent up from Biggin Hill aerodrome. After some jamming the observer on a Nieuport machine was heard to state that he could hear everything sent to him, that he was then approaching the river, and that he could not yet see the Houses of Parliament. General Seely invited the observer and pilot to dine with him at the House of Commons, and asked that the same invitation might be communicated to other aeroplanes in the air within 20 miles. Some other machines were then picked up and requested to give their positions.

Another part of the demonstration concerned direction-finding by wireless for the navigation of aircraft and an intercommunication telephone was also shown by General Seely.

EXPERIMENTAL DESIGN AND TESTING OF AEROPLANE RIBS*

BY GEORGE B. FULLER AND LESSITER MILBURN.

The function of the rib in an aeroplane is to carry the load with the least possible distortion and with the proper factor of safety.

Inasmuch as no mathematical solution is readily applied to the average aeroplane rib, a method of experimental design was adopted to produce a rib which should meet the requirements with the least possible weight, and at the same time utilise the least possible time, labour and material expense in production.

The aeroplane rib is, at best, a very light and non-rigid member. The rib shown in Fig. 1 has a 94-in. chord, is ½ in. wide, weighs 11½ oz. and carries an ultimate load of not less than 555 lbs. This rib was the final selection from the results of a series of tests made upon ribs of various types which were designed by approximate mathematical methods.

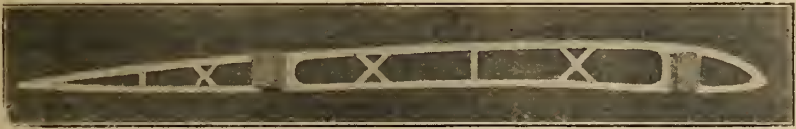


Fig. 1.—The final rib selected from the results of the tests has a chord of 94 ins., weighs 11½ ozs., and carries an ultimate load of not less than 555 lbs.

The conditions demanded of a rib-testing machine follow :—

1. A rib-testing machine should hold the rib and apply the load in the same manner as the air load when the rib is in the wing.

2. The distribution of the load along the chord must not vary from the predetermined load grading when the rib deflects as the load is applied.

3. The machine should be so arranged that the load may be varied from zero to the breaking load, and an accurate means of measuring the load at any point must be provided.

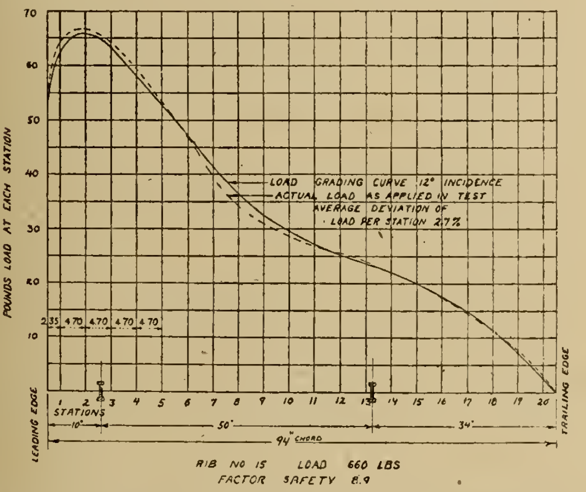


Fig. 2.—Curve showing the distribution of load along the rib

4. An accurate means of measuring the distortion of the rib under load should be provided.

As the load on the rib varies continually with the varying angle of incidence of the wing, the most severe case was chosen. The supports of the rib, also, are not all the same. At or near the drift struts the ribs may be said to have a fixed or rigid support, while near the centre of the bay, the rib supports may be considered as not being fixed, due to the spring of the beam. In these tests a non-rigid support was used after the first five tests, to give the most severe condition.

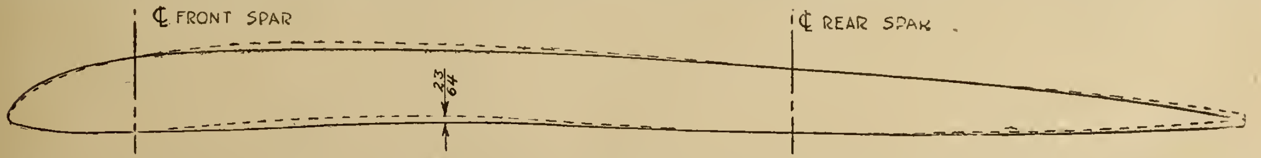


Fig. 3.—Rib section to scale obtained by tracing photograph showing total deflection under distributed load

Bearing in mind the above conditions of loading and methods of fastening, there were some five methods of applying the load to be considered, as follows :—

1. A system of equalising levers, linked together, which would distribute the load over the rib, the lengths of the levers being proportioned to give proper loads at the points required.

2. A system of loading the rib, through rubber bands of varying strength, to agree with the load-grading curve.

3. A system of springs used in the same manner as the rubber bands.

4. A system of hydraulic cylinders, the area of each being proportional to the load, as taken from the load-grading curve at the particular point, all having the same pressure.

5. A system of levers resting on knife edges, each lever being independent of any other and having its own load applied in a pail, or the like.

After a number of sketches had been made and the points of advantage and disadvantage of each of the above methods fully considered, the fifth or last method was adopted and used in all the following tests.

Description of the Machine Used

The machine was constructed of wood, with a platform at about the height of a man's arm, on which the rib was to be placed. Guides of ¾-in. pipe were secured to the platform to maintain the rib in a vertical position. At the rear of the platform knife edges were mounted on a horizontal beam. Over these knife edges 20 ash levers were set, each having a metal plate to take the knife edge. Both ends of these levers were cut in the form of an arc, having the centre at the knife edge, so that the lever ratio was always the same. At the rear end of each lever a pail was attached and the front ends were connected to the stirrups by wires. The lower end of the wire was slipped through the stirrup, bent up and secured with a small washer so that the stirrups could be readily fastened to the wires. The distance from one stirrup to the next was 4.7 ins. Each lever was counterbalanced with a weight, so that when the pails were empty the lever rested evenly on the knife edge.

To reproduce the condition of non-rigid support of the ribs mentioned above, the test ribs were made up on dummy spars as shown in Fig. 1. Two U-bolts were passed over each spar and connected to the floor by steel cables, leaving the spars free to move without respect to each other.

Method of Loading

The load may be applied by putting either water or sand in the pails. When the machine was designed it was intended that a water load be used. A tank was to be placed over the loading pails with 20 lines of hose, one leading to each pail. In the end of each hose a nozzle was placed having an exact diameter and calibrated for various heads. The diameters were such that the water would flow into the pails according to the ratio established from the load grading curve. The flow of water was to be controlled by a gate valve operating on all the lines of hose at the same time.

On account of delay in securing apparatus for water loading, sand loading was substituted. A small measure was made for each of the load pails, and the capacity of each cup was so proportioned that when one round of cups of sand had been poured into the pails the pull on the stirrup was in agreement with the load-grading curve chosen.

---

* Courtesy *Automotive Industries*, N.Y.

In order that the size of pail used would not be too large it was necessary to adopt three ratios of leverage for the levers. Beginning with the leading edge of the rib, the first six levers were made with a ratio such that the pull on the stirrup was three times the load in the pail. The next seven levers had a ratio of two to one, and the last seven, one to one.

Operation of the Machine.

The rib being assembled and secured to the dummy spars ready for test, 20 small grooved blocks were tacked along the lower edge as seats for the stirrups, to prevent crushing of the cap-strip and to simulate the sewing of the fabric to the rib, as done in the wing. The rib was placed on the platform of the machine, between the guides and the stirrups were attached to it. The stirrups were then attached to the levers, and the balance of the levers checked as a precaution. The four U-bolts were put on and connected to the steel cables leading to the floor, the lengths of the cables being adjusted so that all four would become taut at about the same time. The guides were fastened so that the rib would just slide easily between them. The purpose of these guides was to approximate the condition in the wing, where the ribs are cross-tied with tape and sewed through the wing every 2 or 3 ins. with a stout linen cord to prevent them from twisting out of the vertical.

One round of cups or measures of sand of a fine, dry grade was placed in the loading pails to take up all slack in the wires, cables and stirrups. The total load on the rib at the end of one round was 41 lbs., distributed in this case according to the load-grading curve shown in Fig. 2. A steel scale was placed at the centre of the rib and a reading point selected and marked on the rib-web.

A second round of cups was then poured into the pails, and a reading taken on the scale, for the purpose of comparing the relative rigidity of various ribs. The loading was continued by rounds until failure occurred, the contour and the weak points of the rib being carefully observed meanwhile, together with the readings for rigidity. At stated points during the loading—as, for instance, at normal load, at two, four, six, or eight times normal load—photographs were taken of the rib. By comparing tracings, made from these photographs with the natural, free outline of the rib, an accurate measure of the rib contour under stated loads was obtained.

When the rib failed, the point and probable cause of failure were noted. After failure, the amount of sand in each load pail was carefully determined, and the weight recorded with the pail number. From these weights, the total load on the rib was checked, and also the distribution of the load by means of a curve, plotted with the loading points as *abscissæ*, and the pail weights as ordinates. This curve will have the same form as the load-grading curve, if the test has been properly carried out.

The time required for test was three to five minutes, which was the disadvantage of using sand, instead of water. The water load can be applied in any time, down to about 15 seconds, by enlarging the orifices in the nozzles, or increasing the water-head.

After test, the rib was removed from the machine, detached from the dummy beams, and weighed in fractions of an ounce.

Progress in Design

The method of experimental design is at best a "cut and dry" method. The first five ribs were designed by approximate mathematical methods. All the others were an evolution from them by making a study of the action of the rib during the test to destruction, and either making the weak section stronger, and the strong sections lighter, or by redesigning the various details of the rib which failed, or showed extra strength, to secure the desired results.

Ten types of ribs were experimented with, nine of which are shown in Fig. 4, the tenth being the well-known Handley-Page type of rib. Thirty-four ribs were made and tested before a satisfactory rib was produced. Since production has been in progress, a number of tests have been made which are not shown in the table.

All the ribs tested were loaded according to the air loading shown in Fig. 2. This chart also shows an average typical loading, the result of a test, and gives a good idea of the small error in the loading by this method of testing. While this error may seem to be large at some stations along the chord of the rib, it is known by actual weight, and no interpolation is necessary to find the load at any station.

The following table gives a complete analysis of this difference between the sand loading and the air load curve selected. The average difference over the stations is 0.78 lb. The average difference in per cent. is 2.7, and appears largely to be due to the loading at station 20. If we neglect station 20, the average per cent. of error is 1.8 per cent. instead of 2.7 per cent.

Types of Ribs Tested

The large table illustrates the various types of ribs designed and tested, and gives a complete detail of each rib as to material used and the dimensions.

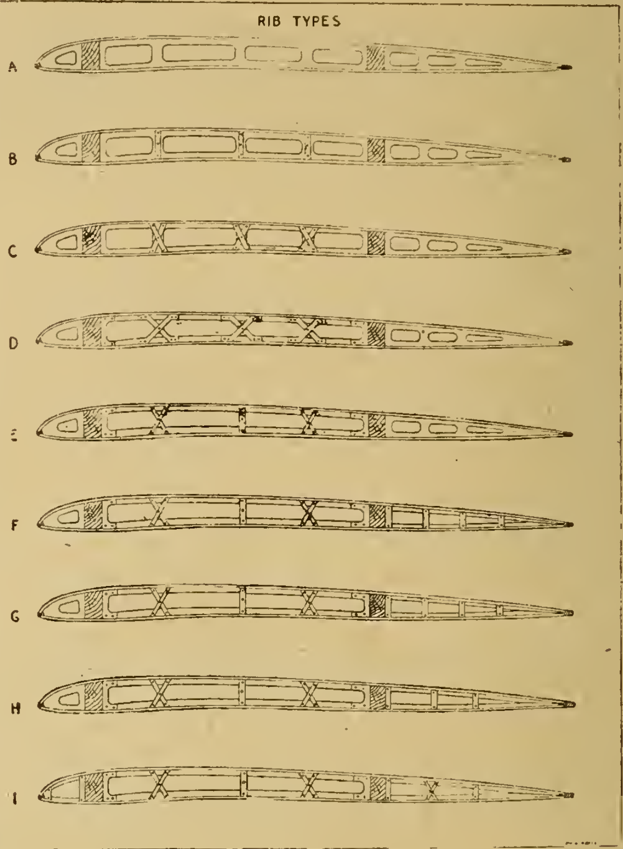


Fig. 4.—Various types of ribs tested. The reference letters are those used in the accompanying table

Type "A" was designed along the standard type of rib generally used. It had a $\frac{5}{32}$-in. birch veneer web with the grain of the outer ply running horizontal. The cap-strips were $\frac{3}{16}$ by $\frac{5}{8}$ in. selected spruce.

Type "B" is the same as type "A," except that reinforcements were put on the web to prevent buckling. Ribs 2 to 8, inclusive, were of this same type and material, 7 and 8 being a little heavier than the others. These ribs also showed a strong tendency to bend in the horizontal portion of the rib at each portal near the vertical portion of the web.

Type "C" is the same general design as type "B." The web in the centre, nose and tail sections being of $\frac{3}{16}$-in. thick spruce instead of $\frac{5}{32}$-in. veneer. The "X" bracing was put on the web between each portal. In the tests this prevented the shearing of the webs and leads to the next type.

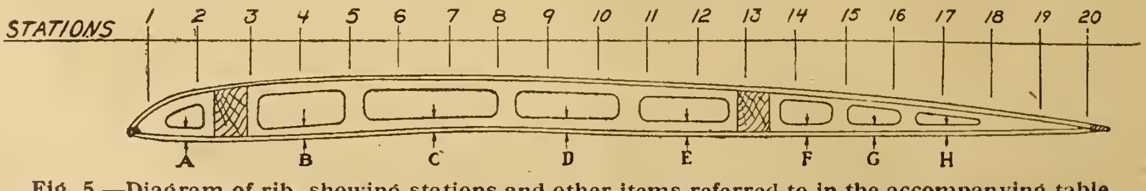


Fig. 5.—Diagram of rib, showing stations and other items referred to in the accompanying table

Results of Tests on Aeroplane Ribs conducted in the Glenn L. Martin Laboratory.

Rib No.	Type.	Web (Between Beams).										Portals.	Tail.	Nose.	Capstrip-Spruce, $\frac{1}{16}$ by	Beams Fastened.	Weight, oz.	Load total, lbs.	Factor of safety.	Inches Total Deflection Divided by $\frac{F.S.}{2}$	Failure.		Remarks
		Material.	Grain.	A.	B.	C.	D.	E.	F.	G.	H.										Station.	Cause.	
1	A	$\frac{5}{32}$ birch veneer	Horizontal	½	⅝	½	½	½	⅝	½	½	Cut out horizontal grain	$\frac{5}{32}$ veneer ..	$\frac{5}{32}$ veneer	⅝ plain	Rigidly		358	4·8	—	9-bottom	Shear ..	Method of fastening true only for ribs close to box ribs and drift struts.
2	B	$\frac{5}{32}$ birch veneer	Horizontal	½	⅝	½	½	½	⅝	½	½	Cut out, horizontal grain, with vertical side-strips	$\frac{5}{32}$ veneer ..	$\frac{5}{32}$ veneer	⅝ set-in	Rigidly	15	624	8·4	·077	12-bottom	Bending ..	Method of fastening true only for ribs close to box ribs and drift struts.
7	B	$\frac{5}{32}$ birch veneer	Horizontal	$\frac{11}{16}$	$\frac{13}{16}$	½	½	$\frac{11}{16}$	⅝	½	½	Cut out, horizontal grain, with vertical side-strips	$\frac{5}{32}$ veneer ..	$\frac{5}{32}$ veneer	⅝ set-in	From floor	16	383	5·2	·104	11-bottom	Shear ..	Humps over portals for last third of load.
8	B	$\frac{5}{32}$ birch veneer	Horizontal	$\frac{11}{16}$	$\frac{13}{16}$	½	½	$\frac{11}{16}$	⅝	½	½	Cut out, horizontal grain, with vertical side-strips	$\frac{5}{32}$ veneer ..	$\frac{5}{32}$ veneer	⅝ set-in	From floor	16	322	4·4	·094	13-bottom	Shear ..	Veneer had diagonal grain at point of failure.
9	C	$\frac{3}{16}$ spruce	Horizontal	¾	1$\frac{1}{16}$	¾	¾	1	¾	⅝	½	Cut out, horizontal grain, with X side-strips	$\frac{3}{16}$ spruce double-side strips	$\frac{3}{16}$ spruce cut-out	⅝ set-in	From floor	19½	350	4·7	·061	Portals ..	Shearing ..	Turning moment between upper and lower sides sheared portals.
10	B	$\frac{5}{32}$ veneer	Vertical ..	⅝	$\frac{13}{16}$	⅝	⅝	$\frac{11}{16}$	⅝	½	½	Cut out, vertical grain, with double vertical side-strips	$\frac{5}{32}$ veneer vertical grain	$\frac{5}{32}$ veneer vertical	⅝ set-in	From floor	16½	274	3·7	·135	11-bottom	Bending ..	Sharp failure.
12	B	$\frac{5}{32}$ veneer	Vertical ..	⅝	$\frac{13}{16}$	⅝	⅝	$\frac{11}{16}$	⅝	½	½	Cut out, vertical grain, with double vertical side-strips	$\frac{5}{32}$ veneer vertical grain	$\frac{5}{32}$ veneer vertical	⅝ set-in	From floor	16½	275	3·7	·136	11-hottom	Bending ..	Sharp failure.
13	C	$\frac{3}{16}$ spruce	Horizontal	¾	1	¾	¾	1	¾	⅝	½	Cut out, horizontal grain, with X side-strips	$\frac{3}{16}$ spruce double-side strips	$\frac{3}{16}$ spruce cut-out	⅝ set-in	From floor	18½	600	8·1	·053	8-top gusset	Bending ..	Shape good to 450 lbs., then humped in centre (secondary failure at Sta. 13).
15	B	$\frac{5}{32}$ veneer	Horizontal	¾	1	¾	¾	1	¾	⅝	½	Cut out horizontal grain, with double vertical side-strips	$\frac{5}{32}$ veneer horiz	ontal grain	⅝ set-in	From floor	20¼	660	8·9	·050	8-bottom gusset	Bending ..	Humps over central portals.
16	B	$\frac{5}{32}$ veneer	Horizontal	¾	1	¾	¾	1	¾	⅝	½	Cut out horizontal grain, with double vertical side-strips	$\frac{5}{32}$ veneer horiz	ontal grain	⅝ set-in	From floor	20¼	868	11·7	·047	13-hottom gusset.	Shear ..	Shape good throughout, failure sharp.
17	B	$\frac{3}{16}$ spruce	Horizontal	¾	1	¾	¾	1	¾	⅝	½	Cut out horizontal grain, with double vertical side-strips	$\frac{3}{16}$ spruce, no side strips	$\frac{3}{16}$ spruce	⅝ set-in	From floor	18½	459	6·2	·048	14-tail ..	Bending ..	Tail portals weak without side-strips. Tail portals sheared at about half load.
18	C	$\frac{5}{32}$ veneer	Horizontal	½	1	½	½	1	⅝	½	½	Cut out horizontal grain, with single X side-strips	$\frac{5}{32}$ veneer, no strips	$\frac{5}{32}$ veneer	⅝ set-in	From floor	15½	378	5·1	·077	9-10 bottom	Local ..	Central X portals weak, and crumpled under eccentric load.
19	D	$\frac{3}{16}$ spruce	Horizontal	¾	⅞	⅞	⅞	⅞	¾	⅝	½	Built up spruce ¾ × $\frac{3}{16}$ single X, wrapped and doped	$\frac{5}{32}$ veneer, no strips	$\frac{5}{32}$ veneer	$\frac{9}{16}$ set-in	From floor	19¾	662	9·0	·072	5-top ..	Bowing of portal	Central X portals weak, and crumpled under eccentric load. Portals bowed out at about 425 lbs. load.
20	D	⅛ spruce ..	Horizontal	¾	⅞	⅞	⅞	⅞	¾	⅝	½	Built up ¾ × $\frac{3}{32}$ veneer, double X, wrapped and doped	$\frac{5}{32}$ veneer, no strips	$\frac{5}{32}$ veneer	½ set-in	From floor	17	637	8·6	·046	5-top ..	Bowing of portal	Front portal crumpled inward at about 575 lbs. load.
21	D	⅛ spruce ..	Horizontal	¾	⅞	⅞	⅞	⅞	¾	⅝	½	Built up ¾ × ⅛ spruce double X, wrapped and doped	$\frac{5}{32}$ veneer, no strips	$\frac{5}{32}$ veneer	½ set-in	From floor	16	705	9·5	·041	5-top, web and cap	Local ..	Humps over portals. X portals had a ¼-in. block at their cross points to bow them out in centre.
22	E	⅛ spruce ..	Horizontal	¾	¾	¾	¾	¾	¾	⅝	½	Built up $\frac{7}{64}$ × ⅝ spruce double X, & vertical	$\frac{5}{32}$ veneer, no strips	$\frac{5}{32}$ veneer	½ set-in	From floor	14	533	7·2	·046	12-web bottom	Split ..	$\frac{3}{32}$ mahogany veneer beam gussets. Beam brace blocks partially cut away.
24	F	⅛ spruce ..	Horizontal	⅞	⅞	⅞	⅞	⅞	¾	¾	¾	Built up spruce $\frac{3}{32}$ × ⅝ double X, & vertical	3 vertical spr. portals	$\frac{3}{16}$ spruce	½ set-in	From floor	13¼	624	8·4	·044	4-5 bottom	Shear ..	
25	F	⅛ spruce ..	Horizontal	⅞	⅞	⅞	⅞	⅞	¾	¾	¾	Built up spruce $\frac{3}{32}$ × ⅝ double X, & vertical	3 vertical spr. portals	$\frac{3}{16}$ spruce	½ set-in	From floor	12¼	610	8·2	·046	5-bottom web	Splitting	Horizontal spruce beam gussets.
26	G	⅛ spruce ..	Horizontal	⅞	⅞	⅞	⅞	⅞	¾	¾	¾	Built up spruce $\frac{3}{32}$ × ⅝ double X, & vertical	3 vertical spr. portals	$\frac{3}{16}$ spruce	½ set-in	From floor	13	509	6·9	·047	3-bottom web	Splitting	Vertical spruce beam gussets.
28	H	⅛ spruce ..	Horizontal	¾	⅞	⅞	⅞	⅞	¾	¾	¾	Built up spruce $\frac{3}{32}$ × ⅝ double X, & vertical	2 vertical spr. portals	$\frac{3}{16}$ spruce	½ set-in	From floor	11½	626	8·5	·046	3-4 bottom web	Splitting	Tail took strong crescent shape. $\frac{3}{32}$ mahogany veneer beam gussets.
29	H	⅛ spruce ..	Horizontal	¾	⅞	⅞	⅞	⅞	¾	¾	¾	Built up spruce $\frac{3}{32}$ × ⅝ double X, & vertical	2 vertical spr. portals	$\frac{3}{16}$ spruce	½ set-in	From floor	11	665	9·0	·041	14-tail ..	Bending ..	Tail took strong cresceut shape. $\frac{3}{32}$ mahogany veneer beam gussets.
30	I	⅛ spruce ..	Horizontal	¾	⅞	⅞	⅞	⅞	¾	¾	¾	Built up spruce $\frac{3}{32}$ × ⅝ single X, & vertical Type I	Spruce, single X & vertical	$\frac{3}{16}$ spruce	½ set-in	From floor	11½	546	7·4	·046	3-4 hottom	Shear ..	$\frac{3}{32}$ mahogany veneer beam gussets.
32	Hand. Page	⅛ spruce ..	Horizontal	⅝	⅝	⅝	⅝	⅝	⅝	⅝	⅝	$\frac{3}{32}$ × ½ vertical spruce, with diag. tension strips	..	..	½ set-in	From floor	10	436	5·9	·037	3-tension strip	Torn loose	
33	Hand. Page	⅛ spruce ..	Horizontal	⅝	⅝	⅝	⅝	⅝	⅝	⅝	⅝	$\frac{3}{32}$ × ½ vertical spruce, with diag. tension strips	..	..	½ set-in	From floor	10	370	5·0	—	3-tension strip	Torn loose	
34	Hand. Page	⅛ spruce ..	Horizontal	Ri	b N	o.	33	wa	s re	bui	lt	with screws, but did not show fair test	..	..	..	..	10	250	..	—	3-web split		
35	I	Made in pr	oduction, sa	me	as	Rib	No.	30,	Ty	pe	I.					From floor	12	615	8·3	·035	4-bottom	Bending	
36	I	Made in pr	oduction, sa	me	as	Rib	No.	30,	Ty	pe	I.					From floor	12¼	451	6·1	·050	5-top ..	Splitting	Web at 4, 5, 6 had diagonal and spiral grain.

Type " D " is similar to type " C," except that the portalled web is replaced by the " X " brace of veneer and a thin strip of spruce next to the cap-strip shaped to conform to the curve of the wing section, this strip with the cap-strip forming a " T " section. The cap-strips were reduced from $\frac{5}{8}$ by $\frac{3}{16}$ in. to $\frac{9}{16}$ by $\frac{3}{16}$ in. and again to $\frac{1}{2}$ by $\frac{3}{16}$ in.; also the web thickness has been reduced from $\frac{3}{16}$ to $\frac{1}{8}$ in. thick. The shape of the " X " brace will be seen. It was taped and doped to prevent any shearing tendency. Veneer gussets $\frac{3}{32}$-in. thick on both sides of the web next to the beams are used to take up part of the bending. From the table it will be noted that the size of the cap-strips is $\frac{1}{2}$ by $\frac{1}{8}$ in., and that the central " X " brace was replaced with a vertical brace. This now makes two sets of " X " bracings in the centre section. It might be noted here that the " X " bracing and the single-vertical bracing are double, one on each side, separated by a block $\frac{1}{2}$ by $\frac{1}{2}$ by $\frac{1}{8}$ in.

Type " F " is a marked departure from all previous types in that the portalled section at the rear of the rear beam is replaced with a built-up section similar to the centre section. Vertical grain spruce gussets were substituted for the veneer gussets next to the beams on the central section.

Type " G " is the same as type " F," except that horizontal grain spruce gussets were used instead of the vertical grain. On trial the spruce gussets proved to be unsatisfactory. Type " H " has veneer gussets on the central section, but had only two verticals in the tail section, and, as in type " G," the tail section took a marked crescent shape showing the necessity of an " X " brace to take the shear.

Type " I " is similar to type " H," except that it has one " X " brace in the tail. The section in front of the front beam is built up of strips similar to the centre and tail sections. This type of rib is the one used in all aeroplanes so far produced by the Glenn L. Martin Co. It is made entirely of spruce, except for the four small gussets, next to the wing spars, which are $\frac{3}{32}$-in. veneer.

Only two ribs of the Handley Page type rib were made and tested. At this time it was decided not to carry the experiments any further, but to use type " I " rib, as it made a very good production job, and was found to be equally strong for normal flight as well as for upside down flying.

Since the table was made, a large number of tests have been made on the type " I " rib, as made in production. These tests were made with the load-grading, as shown in Fig. 2, and the load grading as specified by the Army in sand loading of wings. These tests are not only for the standard rib, but for the rib in the section of the wing with the *aileron* cut out.

It will be noted that the weight of the various ribs started in at 15 oz. and ran as high as 20¼ oz. The average weights of ribs in production is 11½ oz.

The cost of manufacture of this rib as produced is much less than the standard type using veneer for the webs and cutting out various shaped portals.

All tests were made with certified glue, but later some ribs were built up with cold glue, and apparently there was no difference in the results. But in production only certified hot glue is used.

The deflection in the table is given for each load of factor of safety of one, and is a convenient indication of rigidity. It is seen that the final type of rib held its original shape the best and that the aerodynamic characteristics will not be appreciably changed in normal flight. In the table on page 1081 the deflection is shown for the centre section. Space hardly permits of any more detail information on this.

Fig. 3 shows the contour of the rib, and the dotted outline shows rib No. 31 with a load eight times normal load. The total deflection is $\frac{23}{64}$ in., or 0.043 in. deflection for normal load.

Station—	Readings from Load Grading Curve.	Actual Weight.	Differencte in Weigh.
1..	61.80	64.2	2.4
2..	65.80	66.8	1.0
3..	63.40	64.2	0.8
4..	57.79	58.5	0.51
5..	52.95	53.5	0.55
6..	47.35	47.0	0.35
7..	41.35	39.5	1.85
8..	36.52	34.0	2.52
9..	32.50	31.0	1.50
10..	29.28	28.5	0.78
11..	27.28	26.8	0.48
12..	25.27	26.0	0.73
13..	23.67	24.0	0.33
14..	22.06	22.0	0.06
15..	20.06	20.0	0.06
16..	17.25	17.2	0.05
17..	14.84	14.2	0.64
18..	10.83	11.0	0.17
19..	7.62	7.3	0.32
20..	2.51	3.0	0.49
	660.13	658.5	15.59

Average difference in weight, 0.780 lb.
Tabulated loadings as shown in Fig. 2.

◆ ◆ ◆ ◆

General Sykes Flies to Amsterdam

MAJ.-GEN. SIR F. H. SYKES, Controller-General of Civil Aviation, on the invitation of the Executive of the Amsterdam Aircraft Exhibition, started from Felixstowe on August 12 by flying boat for Amsterdam, where he arrived at 1.14 p.m. (B.S.T.).

Three additional flying boats accompanied that carrying Gen. Sykes, and the convoy set out for Scheveningen.

The intention was that the four flying boats, each of which flew the Union Jack, should circle the Exhibition three times before landing at the Naval Station at Schellingwoude.

The Air Ministry

IT is announced by the Air Ministry that the Marquess of Londonderry, Finance Member of the Air Council, has appointed Mr. E. F. Cliff to be his private secretary, *vice* Capt. Lord E. A. Grosvenor, R.A.F., with effect from July 22, 1919.

Marks on Aircraft

ATTENTION is drawn to the Secretary of State's order published in the *London Gazette*, of August 1, which, in the usual official wording, makes a small alteration in the method of marking aircraft.

Under the Regulations published on April 30, the marks of civil aircraft were to be underlined with a black line: the International Air Convention reserves this black line for one particular type of aircraft, *i.e.*, the private or tourist aircraft, as opposed to the commercial or State machines. The order published in Friday's *Gazette* thus brings our Regulations into line with the International Convention in this respect.

R.A.F. and the British War Medal

THE Air Ministry makes the following announcement:—

A preliminary issue of 2 inches of the riband will be made to all Air Force personnel who are entitled to the British War Medal, on the understanding that such issue does not confirm the title of the recipient to the subsequent award of the medal.

In view of the numbers entitled to participate in the issue, some considerable time must necessarily elapse before the issue is completed. Every effort is, however, being made to accomplish this as soon as possible.

Officers demobilised or invalided should make application to the Secretary, Air Ministry, stating full particulars of their services.

Discharged and demobilised airmen should apply to the Officer i/c Records, R.A.F., Blandford, as follows:—

(*a*) Those resident in Great Britain, Ireland, Channel Islands and Isle of Man, on the *special R.A.F. post-card* (F.S. Form 758), obtainable at any post office. The Army post card (Army Form W 5100A) will not be accepted, neither will any other form of application.

(*b*) Those resident abroad, by an ordinary letter giving full particulars regarding official number, rank, unit in which last served and the address to which the riband should be sent.

Discharged and demobilised members of the W.R.A.F. should apply by letter giving full particulars of their service, to the Officer i/c W.R.A.F. Records, 15, St. George's Square, S.W. 1.

Members of women's formations who have been employed under a direct contract of service with the R.A.F. Medical Service should apply to the Secretary (D.M.S.), Air Ministry.

Officers and men of the R.N.A.S. who were discharged prior to April 1, 1918, and those who did not transfer to the R.A.F., will be dealt with in an Admiralty announcement, which will be published in due course.

Francis Mond Professorship of Aeronautical Engineering

THE Vice-Chancellor of Cambridge University announces that the election of a Francis Mond Professor of Aeronautical Engineering will take place at 3 p.m. on Friday, September 26, at the University Offices, St. Andrew's Street, Cambridge.

Candidates for the vacant Professorship are requested to communicate with the Vice-Chancellor, and to send such evidence as they may desire to submit to the Electors, on or before Friday, September 19.

AIR MINISTRY METHODS

THE SELECT COMMITTEE ON NATIONAL EXPENDITURE have made further progress in the matters to them referred, and have agreed to the following THIRD REPORT :

THE AIR MINISTRY.

1. The Sub-Committee on the Air Ministry have continued their investigations and have met 11 times and examined 29 witnesses.

CONTRACTS.

2. The Sub-Committee examined Sir John Hunter, K.B.E., Administrator to Works and Buildings. Asked as to the work at Halton Park, he informed them that the work was commenced in 1917, but, pending consideration of the future programme of the Air Ministry, the works generally had been stopped. Asked if he could give any explanation of the reason why such enormous wages were paid by the Contractor, the witness stated that it was all settled by the Government, that there was no person who had written more strongly than he had done on the subject and that he was of opinion that no man who had been employed on the erection of aerodromes had earned the money he had received.

Asked how many men would be covered by that statement, he replied ; The whole lot—70,000 of them. Asked whether that was not rather a sweeping assertion to make, he replied that he was speaking in a general fashion.

3. Asked whether he had come across any cases of fraud in relation to the carrying out of contracts, he replied that he had, and that there was a conspiracy in which one Government man and three contractor's men were concerned.

4. The witness was asked to give particulars of the cases to which he referred, and the following is an extract from a letter, dated June 18, 1919, which he sent to the Sub-Committee :—

"In reply to your letter of the 17th instant, asking for particulars of fraud in connection with my work at the Air Ministry, I give you some notes of prosecutions. The Renfrew one is the most serious, where I found a conspiracy of Government men and contractor's men, and I suspected the contractor was also in it. I had four men arrested, and they have been on bail each for £100 for the past four months, but the Crown Authorities declined to prosecute, and the men were freed from the charge on June 7. I am, however, arranging a Civil action against the contractor for roughly £50,000, less the money we have in hand belonging to him for commission on work done."

5. He further stated on examination that there was another official of the Air Ministry concerned. The Sub-Committee questioned the witness as to the reasons why the Crown Agent authorities refused to prosecute, and the following letter addressed to the Secretary, Air Ministry, from Mr. Millar Craig, Secretary to the Lord Advocate, was put in :—

"March, 6, 1919.

"Sir,—With reference to your telegram of December 9 last to the Crown Agent, and confirmation thereof (No. A. 8924/CL), regarding fraudulent practices in connection with contracts for Renfrew Aerodrome, I am directed by the Lord Advocate to inform you that after full enquiry and consideration he does not see his way to order a prosecution.

The evidence available is insufficient to afford any strong probability of obtaining a conviction. There is no evidence at all that any of the accused applied to their own uses any of the money said to have been improperly obtained from the Ministry. This circumstance, though it does not in itself provide an answer to a charge of fraud, makes the insufficiency of the evidence more formidable than would otherwise be the case. Further, a prosecution would reveal what appears to be inefficiency and absence of control on the part of the representatives of the Ministry on the spot.

"In view of these considerations, his Lordshp regrets that he cannot come to any other decision than that intimated above."

6. On receipt of that letter, the witness addressed the following remarks to the Secretary of the Air Ministry :—

"I have read the attached letter from the Lord Advocate with the greatest surprise, and I think that it is absolutely necessary that he should be asked at once to give further consideration to the question of prosecuting the persons now charged with offences at Renfrew. I wish to point out at the outset that I as Administrator of Works and Buildings, am the person responsible for the work done at Renfrew Aerodrome, and that this whole question of prosecuting the men now charged arose through discoveries which I made, and it is I who have been pressing for this prosecution, after consultation with Lord Weir, the late Secretary of State for the Air Force, and with his approval. Any question, therefore, of the possible effects of the prosecution in revealing inefficiency and lack of control on the part of representatives of this Department on the site should be ignored altogether. As the person most affected, I cannot concur in the view that such a question should be allowed to affect the legal question in the case.

"I find it very difficult to understand how a criminal charge cannot be formulated and a conviction obtained, having regard to the admissions made, and in some cases signed by persons charged.

"It is admitted that the books or time sheets were falsified by entering thereon the names of men said to be employed on the job, but who did not, in fact, exist. Wages were drawn regularly and *charged to the Government* as having been paid to these men. Where did that money go? The Lord Advocate says there is *no evidence* that any of the accused applied 'to their own uses any of the money said to have been improperly obtained from the Air Ministry.' But would not any jury on the facts above stated draw the obvious inference that the persons responsible for putting these 'dead men' on the books and drawing wages regularly for them from Government funds had, in fact, put the money in their own pocket? And is there not evidence that this was done with the connivance of the Clerk of Works?

"But I wish to carry the matter further and to point out that the position if no prosecution is attempted, is in my opinion more serious for the Air Ministry than if a prosecution should be started and fail, and I wish to explain the position so that it may be put before the Lord Advocate.

"After a personal enquiry, on making the discovery of these irregularities, I informed the contractors that I would not authorise payment to them of commission in accordance with the terms of their contract, but would have the whole job measured up and pay them on such measurement on proper rates.

"Mr. Cowieson (the head of the firm of contractors), at an interview which I had with him and his Law Agent, agreed to this, and later agreed by letter. I attach copies of letters which passed between us after that interview.

"A firm of measurers was engaged by me, and their work is now practically complete, and it appears that already there is a sum of about £60,000 charged by the contractors to the job which cannot be accounted for.

"If the suggested proceedings against the officials are now dropped, what is the position of the Government and myself with regard to the contractor? I can see that the Air Ministry will be placed in a very objectionable position. Even if the prosecution should fail on whatever charge was formulated, the evidence must be such as to strengthen the position of the Government against the contractors and save money to the country.

"When the warrants were issued by the Procurator Fiscal of Paisley against the men now charged, another warrant against— — —was also issued, but by arrangement with me no use has been made of this warrant up to the present time.

"It is suspected that materials delivered on the site were in fact diverted to private jobs of his, but up to the present there is no evidence which could prove this. You will see therefore that the matter is a very serious one, and in the interests of the Government should not be dropped unless it is absolutely certain that no charge can be framed for a prosecution against the individuals now under arrest.

"Will you please submit the matter again to the Lord Advocate and ask him to reconsider his opinion in the light of the facts above stated as I am very much perturbed by the contents of his letter. The matter is *extremely urgent*, as more than three months have elapsed since the men now charged were arrested, and I understand that the time for taking proceedings is fast running out."

Later the witness saw the Lord Advocate personally and he refused to alter his decision.

7. The Chairman of your Committee saw the Lord Advocate, and informed him that the Sub-Committee had received a copy of his letter to the Air Ministry, and later he wrote to the Lord Advocate and asked him if he would like to appear before the Sub-Committee and to give evidence as to his reasons for refusing to prosecute in the Renfrew case.

The Lord Advocate replied as follows :—

"July 11, 1919.

"Dear Banbury,—Yours of the 8th instant has reached me here in Edinburgh this morning.

"I cannot be in town until Wednesday morning of next week in any case, and my Department's letter speaks for itself.

I am, &c."

8. Sir John Hunter also informed us that he had applied to the War Office asking them to court-martial an officer employed by the Air Ministry on the same contract, whom he suspected of fraud, but that they refused to take any action, and informed him that he ought to take criminal proceedings.

9. Further evidence as to the placing of contracts was given by Miss O'Sullivan, the Clothing Controller of the W.R.A.F.

10. This witness stated that a contract had been given to a Manchester firm (Messrs. Cohen & Wilks) for 30,000 coat frocks and 30,000 overcoats without having been put up to competition. She informed the Sub-Committee that a pattern coat frock was sent in by this firm and by another firm (Messrs. Kenneth Durward) and that Messrs. Kenneth Durward's pattern was selected, the other firm's pattern being unanimously rejected by the Committee appointed to deal with the matter. Notwithstanding this the order was given to the latter.

11. She also stated that the deliveries of the article in question were dilatory and not up to sample, the garments being amongst other things badly cut.

12. By direction of Miss Douglas Pennant, who was then commandant of the W.R.A.F., the clothing controller went to Manchester and she stated that the coat frocks were being cut on the bias instead of on the straight ; this course, if pursued would have resulted in the saving to the advantage of the contractor of about $\frac{1}{4}$ yard on each garment. According to the contract, payment was to be made for 3 yards 24 inches of cloth on each garment.

13. The Sub-Committee sent for the Assistant Director of Army Contracts at the War Office, and asked him if it was correct that the contract had been given to the firm in question without having been put up to public competition. He replied that it was so. Asked for the reason for doing this, he replied that Major Cockburn of the Air Ministry had informed him that only a particular kind of cloth would be accepted by the Air Ministry, and the witness stated that no other firm was able to supply this particular cloth. The Assistant Director further stated that there was in addition considerable difficulty at that time in getting contractors to tender, as a very large amount of this class of work was being carried out for the Government.

14. Asked if he had taken any steps to obtain this kind of cloth from other people, he replied that he had asked the Director of Wool Textile Production at Bradford, to provide the cloth, but that this gentleman had replied that it was not possible to procure deliveries for commencement earlier than three to four months, and that the material would be piece dyed, price 9*s.* 6*d.* a yard.

15. Asked why it was that the firm in question could obtain material which the Director of Wool Textile Production, who was in control of the whole wool production of the country, could not obtain, he replied that he could not really answer, but that in his opinion it was a remarkable thing. He further stated that the firm in question were able to supply it at 7*s.* 7¾*d.* a yard.

16. The Sub-Committee then examined Major Cockburn, especially on the question as to the reason why he informed the Assistant Director of Army Contracts that no other cloth than this particular sort would be accepted. His replies were so unsatisfactory that your Committee think it right to refer to them at some length.

17. The following questions were asked Major Cockburn :—

"Q. Did you refuse to accept any cloth for these coats and skirts except the particular cloth which this firm had?—A. No. I had no power to arrange anything of that sort. That is right outside my duty. I was the Q. Staff Officer.

"Q. I would rather you had answered my question?—A. My answer is—firstly, I did not ; and secondly, if I had wanted to, it was not in my power to do so.

"Q. That is an important answer because the Assistant Director of Army Contract has just told us you did do that?—A. I am afraid he is wrong.

"Q. The Assistant Director of Army contracts has stated that tenders were not invited for the contract with this firm for two reasons, 'one was that it was difficult to get any other firm, and the second was that Major Cockburn refused to accept anything but the pattern he had sent in,' and no one had any cloth of that pattern except this firm. Now you say that it is not true? A. No, Sir, it is not true."

18. Later in his evidence the witness stated : "Now let me tell you why I recommended the gabardine from these contractors." Asked how that coincided with his previous answer, he stated that when he had said that this was the only cloth that could be accepted, he had nothing to do with it personally.

19. Major Cockburn was asked why the order was not given to Messrs. Kenneth Durward as their pattern had been selected. He replied that he could not say ; that that was a contract matter which had not come under his purview. Asked why he did not inform the Assistant Director of Army Contracts that Kenneth Durward's pattern had been selected, he replied that the Assistant Director knew it, as he had the pattern down at the Royal Army Clothing Depôt and had seen it, unless the witness was mistaken. The witness was then informed that his evidence on the above points was an absolute contradiction of that which the Assistant Director of Army Contracts had given.

20. The evidence of this witness on these points was sent to the Assistant Director of Army Contracts to ask him if he had any opinion to express on it. He replied that he would like to inform the Committee that his statement as to Major Cockburn's refusal to take other than yarn dyed cloth, like the sample provided by the Manchester firm, was based on the following note which appeared in official papers, dated May 23, 1918 :—

"Spoke Major Cockburn, Air Board, who absolutely refuses to accept gabardine for this service, except as specified in Minute I."

He further said that he could only repeat that the Contracts Department, so far as he was aware, had no knowledge that any sample was made by the firm of Kenneth Durward, Ltd.

21. Miss Douglas Pennant stated that the removal of Miss O'Sullivan from the work of inspection was done behind her back. That she had an interview with Colonel Bersey and Colonel Latimer upon the subject, and came to an agreement that Miss O'Sullivan should continue the inspection with a representative of Colonel Latimer's.

A few days later, Colonel Bersey came into her room and asked her to sign a file at once; she asked to look at it before signing and found that it was an absolute reversal of the arrangement that had been made. That she then returned the file to Colonel Bersey and he wrote a minute in which he admitted that it was not on the lines as previously agreed.

The Sub-Committee have examined the file and find that it confirms Miss Douglas Pennant's statement.

Colonel Latimer, having previously stated that he had transferred the inspection part of Miss O'Sullivan's duties to someone else with the concurrence of Miss Douglas Pennant, was recalled. The statement that he had made was read to him, and he was asked if he still adhered to it. He replied, "Oh, absolutely." The file, which was signed by Colonel Bersey, was then shown him. The witness endeavoured to explain his answer, but the statements he made were utterly at variance with the file, and the Committee regret that they can attach no credence to them.

Miss Douglas Pennant having stated that Colonel Bersey was not anxious to assist her in discovering any irregularities, and that he did not want troublesome questions brought up, he was requested to attend before the Sub-Committee. He, however, did not put in an appearance, nor did he take any notice of the Sub-Committee's request. Time did not permit of steps being taken to compel his attendance.

22. Complaints were also made by Miss O'Sullivan, Captain Cherry and Lieut. G. Earl, officers in the W.R.A.F. Clothing Department, that they could not get copies of the contracts from Q.6 in which department Major Cockburn was employed, and of which Colonel Latimer was the head.

23. Miss O'Sullivan also said, in a statement put in, that the work of inspection which was being done by 40 men could be done by 12 women.

24. Your Committee examined Colonel Latimer, and being questioned on this point he replied as follows :—

"Q. Did you ever use 40 men from the Labour Battalion to inspect clothing ?—A. No, I do not think we ever did, because we selected men very carefully from Blandford, men of low category. We might have had men from the Labour Battalion for humping purposes, handling bales of clothing, and that sort of thing, but not for inspection.

"Q. Why did you use men instead of women to inspect women's clothing ?—A. You ask me a question I cannot answer. We used any labour that was available, men or women, or children even.

"Q. Do men know much about women's clothing ?—A. I suppose the majority of the stuff is made by men, and, considering that is so, they should do.

"Q. Did Miss O'Sullivan inform you that she thought 12 women could do this inspection, whereas you required 40 men ?—A. Miss O'Sullivan made very many wild statements, and I believe that is one among them. I cannot recollect for certain. Q. You think it is one ?—A. Very probably.

"Q. Why was it a wild statement ?—A. Because she could not possibly have done it. Q. Did you ever give her a chance ?—A. No."

25. He also stated that copies of the contracts were alway available for all persons authorised to have them. When shown files in which requests for copies of the contracts had been made and ignored in answers signed by himself, he said :—

"A. Well, no complaint was ever made to me as the head of that branch that they could never obtain contracts or anything they required.

"I was in constant touch with the Commandant of the W.R.A.F., and I specially arranged that she should be in direct touch. If there was anything wrong, there was no reason why they should lie down under it. They do not seem to have taken much trouble to get that.

"Q. But surely, if they ask for them, it is your duty to supply them ? What were you there for except to deal with those things that came to your notice ?—A. I was there to take action against any subordinate who failed in his duty.

"Q. Were you not there to see that your subordinates did their duty ?—A. Yes, but not to dry-nurse them and to go round and follow them, and guide their hands and blot everything they wrote."

26. The Sub-Committee are of opinion that this witness's evidence was also unsatisfactory. Asked what useful functions his Department served, beyond being a "post office," he replied "very little."

27. Mr. John De Lange, confidential secretary to Messrs. Cohen & Wilks, attended and gave evidence. He stated that 6 ins. less cloth was used in the coats and skirts and 6 ins. more in the overcoats, and that this arrangement was approved by Mr. Hutchinson. Asked as to Miss O'Sullivan's statement as to the saving in cloth effected by cutting on the bias, he said he was not a practical man and could not answer. He also stated that to the best of his recollection Messrs. Cohen & Wilks had no cloth of this description on hand at the time the tender was given them.

28. The Sub-Committee examined Major-General Sir H. Trenchard (Chief of the Air Staff), and are of opinion that he is doing all that is possible to cut down expenditure while having due regard to the efficiency of his Department.

29. Your Committee are of opinion that a very unsatisfactory state of affairs has been revealed. In their opinion, when cases of negligence or of fraud have been discovered, action should be taken against the offenders, regardless of whether they are officials of the Department or not. They regret very much that the Lord Advocate should have taken up the position that he did.

30. In the case of Miss O'Sullivan, it would appear that she demanded an enquiry into the alleged irregularities as long ago as March last. An enquiry was not commenced until June, and then was not completed, Miss O'Sullivan refusing to sign the notes of her evidence. She was removed from the position of Clothing Controller, was given leave and informed that she would be demobilised, though this latter intention does not appear to have been carried out.

31. The Sub-Committee were informed by General Seely in a letter dated July 25, 1919, that the Secretary of State on his advice had decided to hold an inquiry into the irregularities alleged by Miss O'Sullivan.

FINANCE DEPARTMENT.

32. The Sub-Committee examined the Assistant Financial Secretary, and are of opinion that the Finance Department is very satisfactorily conducted, but that the position of the Assistant Financial Secretary should be greatly strengthened in order that Finance may exercise its proper influence. It is remarkable for instance that Finance is not represented on the Committee appointed by the Secretary of State to investigate and report on the changes and reduction of the staff, and the redistribution of duties among the Departments necessitated by the reorganisation of the Air Ministry. Wherever financial consent is necessary before a proposal can be carried into effect the Assistant Financial Secretary is entitled to require full justification of the course proposed as being the most practicable and economical method of obtaining the required result. The Sub-Committee found that this has not always been the case in the Air Ministry. In particular they have observed a tendency in the Secretariat to usurp functions which belong properly to the Finance Department. As the responsibility rests ultimately with the accounting officer and his staff, such tendencies cannot but be prejudicial to the smooth working of the service.

MOTOR VEHICLES.

33. The Department have informed the Sub-Committee that the statement put in by them which appeared in our first Report, regarding the expenditure at Kennington Garage on motor cars, should have included the expenditure at the Belvedere Road Garage, where the heavy motor lorries are kept. They have put in a fresh statement showing the cost for the year ending March 31, 1919, as nearly as can at present be ascertained. Letter and statement below.

"Air Ministry, August 4, 1919.

"Sir,—Referring to your letter of the 30th ultimo, addressed to the Secretary, Air Ministry, on the subject of the cost of touring cars, I have the honour to request you to explain to the Select Committee on National Expenditure, that it has been found impossible, in the short time available, to prepare a complete statement, as required by your Committee, of the sum spent at Kennington and Belvedere Road from April 1, 1918, to April 1, 1919.

"The difficulty relates to the repairs and renewals, which have involved numerous issues of spare parts and materials of some 2,000 different kinds. The quantities of these items could be arrived at by scrutiny of all the issue vouchers, but as the articles are supplied by the Ministry of Munitions, it is necessary to rely on that Department for the prices, and I understand that the pricing can only be done by reference to the contracts, at a considerable cost of time and labour.

"I regret, therefore, that the cost of spare parts and material cannot be stated, with the exception of the cost of tyres, which has been ascertained. Every effort has been made to complete the return in all other respects, and I submit, for the information of your Committee, the enclosed Statement (A) of the cost of the Motor Transport Section at Kennington and Belvedere Road. The rates and taxes in Statement (A) include £1,001 for electricity, of which it is stated that at least 50 per cent. was used in connection with experimental work. The wages in Statement (A) include those of drivers, carpenters, labourers and other personnel at the Convoy and Despatch Section, Covent Garden, a unit controlled from Kennington, which deals with urgent issues to France. The total for the wages of this unit is stated to be £3,737.

"To arrive at the correct total for Motor Transport at Kennington and Belvedere Road a deduction should be made of £3,737 + £500 = £4,237.

"It has not been possible, in the time, to collect the figure for the maintenance and repair of buildings and plant.

"The difficulty of obtaining accurate figures has been much enhanced by the fact that the Kennington unit is in course of removal to Wormwood Scrubs.

"I beg also to forward Statement (B) showing the numbers and description of vehicles in April, 1918, and in March, 1919, and the numbers not in regular use. Side-cars are regarded as part of the motor cycles.

"Subject to the above remarks, I certify that to the best of my knowledge and belief the Statement (A) and (B) are correct.

"W. A. BLAND, Assistant Financial Secretary.

A.—*Statement of Expenditure in Respect of the M.T. Section at Kennington and Belvedere Road for the Year April 1, 1918, to 31 March, 1919.*

		£
Rent		1,300
Rates and taxes		2,011
Pay and allowances of officers		2,070
Pay of other ranks R.A.F. Pay of W.R.A.F. Wages of civilians		36,190
Clothing and allowances of other ranks R.A.F. and of W.R.A.F.		14,048
Oil, wick and carbide		828
Tyres		5,409
Petrol		13,301
		£75,157
Deduct.—		
Electricity used for experimental work	£500	
Wages of employees at Covent Garden	£3,737	
		4,237
		£70,920

Nothing is included in this Statement on account of spare parts (other than tyres) or materials used for repairs and renewals of vehicles; maintenance and repair of buildings and plant; or depreciation of vehicles.

B.—*Schedule of Vehicles on Charge of the Motor Transport Section at Kennington and Belvedere Road.*

	April, 1918.	March, 1919.
Crossley heavy tenders	5	8
Crossley light tenders	5	14
Ford vans or tenders	4	17
Leyland float lorries	5	8
Leyland platform lorries	—	1
Crossley touring cars	27	19
Ford touring cars	13	19
Rolls-Royce touring cars	1	2
Daimler touring cars	1	1
Rolls-Royce limousine	1	1
Rolls-Royce landaulettes	1	4
Crossley landaulettes	23	27
Ford landaulettes	1	6
Motor cycles	25	43
Ambulances (motor)	2	3
Stellite two-seater cars	1	—
Crossley limousine	—	6
P. and A. heavy tenders	—	9
P. and A. floats	—	2
Tractors and trailers	—	2
Lancia touring car	—	1
Totals	115	193
Motor cars out of use	5	25
Motor cycles out of use	1	5
Totals	6	30

For the purpose of this statement side-cars are regarded as part of the motor cycles.

Personals

Casualties

Lieut.-Col. A. C. Boddam-Whetham, D.S.O., 4th Battalion Argyll and Sutherland Highlanders and R.A.F., of Earlscliffe, Folkestone, who met his death in an accident in Palestine, had been appointed to go to Dasmascus to take up the work of finding landing stations for the air route to India, and was about to start from Ramleh, Palestine. After rising to a height of 1,000 ft. the engine missed fire. The pilot endeavoured to land at the aerodrome, but at about 100 ft. the machine appeared to side slip to the ground. The pilot was killed instantly, and Col. Boddam-Whetham died before reaching hospital. He was buried with full military honours in the military cemetery at Ramleh. Col. Boddam-Whetham served in the South African War, as well as in the war just ended.

Lieut. Phil Hall-Smith was killed on August 1, at the age of 30, at Leuchars Aerodrome, Fife, as the result of an aeroplane accident.

Married

Maj. Allan Duncan Bell-Irving, M.C., Croix de Guerre, Gordon Highlanders, R.A.F., was married on August 5, at Vancouver, B.C., to Mary E. Keith Falconer, daughter of Com. H. Pybus, R.N.R., and Mrs Pybus, Vancouver, B.C.

Capt. Pierre Clifford Campbell-Martin, M.C., Croix de Guerre, Sherwood Foresters, R.A.F., son of Mrs. A. E. Campbell-Martin, of Calcutta, India, was married on August 6 at the Church of the Holy Ghost, Nightingale Square, S.W., to Monica, daughter of Mr. and Mrs. John O'Hea, of 11, Endlesham Road, S.W.

Maj. Bruno P. H. de Roeper, A.F.C., R.A.F., second son of Mr. and Mrs. de Roeper, of "Bella Vista," Upminster, was married on August 2 at Romford, to Jean Julia Key, only daughter of Mr. and Mrs. W. Garbutt Key, of "Glen Caladh," Hall Lane, Upminster.

Lieut. Harry Mather, late R.F.C., eldest son of Walter Mather, Esq., Brierfield, was married on August 2 at St. Martin's-in-the-Fields, to Chotee, elder daughter of Lieut.-Col. G. F. A. Whitlock, C.B.E., R.E., 30, Winn Road, Southampton.

Surg.-Lieut. Arthur R. Sharrood, R.N., attached R.A.F., son of the late Mr. F. H. and Mrs. Sharrod, formerly of Cherrington Manor, was married on July 30 at the Parish Church, Wellington, Salop, to Gwendoline Lander, younger daughter of Mr. and Mrs. J. V. T. Lander, "Sunnycroft," Wellington.

Maj. H. G. Travers, R.A.F., D.S.C., was married on August 6 at Ryton, near Shifnal, Salop, to Hermia, younger daughter of Col. and Mrs. E. A. Fraser, of Bodicote Lodge, near Banbury, Oxon.

To be Married

The marriage arranged between Capt. Alban Spenser Ellerton, O.B.E., R.A.F., and Miss Maureen Gilliland Husband, of 69, Belsize Park Gardens, will take place on September 13, at 11.30 a.m., at the Savoy Chapel.

The marriage arranged between Lieut. R. K. Fletcher, late R.A.F., and Ruth, daughter of Mr. R. Hallpike, The White House, Croydon, will take place on August 25, at St. Matthew Church, Croydon.

The marriage arranged between Capt. Stafford Berkely Harris, A.F.C., R.A.F., and Miss Enid Campion will take place at St. Jude's Church, Southsea, on August 21, at 2.15 p.m.

The marriage arranged between James Walter Douglas Melhuish, M.C., late 7th Worcesters and R.A.F., only son of Mr. T. W. W. Melhuish, M.I.C.E., and Mrs. Melhuish of Clifton Hill, Exeter, and Decima Mary Tenison, only daughter of Mr. and Mrs. Tenison Mosse, of Bank of England, Manchester, and grand-daughter of the late Hon. Alfred Ebden, of Belmont, Rondebosch, Cape Town, will take place at 2 p.m. on August 14 at the Cathedral, Manchester.

The engagement is announced of Lieut.-Col. Ruscombe Smyth Pigott, D.S.O., R.A.F., youngest son of the late Cecil Hugh Smyth Pigott and Mrs Smyth Pigott, of Brockley Hall, Somerset, and Lady Clare Feilding, daughter of the Earl and Countess of Denbigh

The engagement is announced between Lieut Harold E. Shepperd, R.A.F., only son of Mr. and Mrs. E. A. E. Shepperd, of Knockholt, Kent, and Olive Ethel, third daughter of Mr. and Mrs. E. H. Godson, of Heckington, Lincs.

The engagement is announced between Capt. William McIver Watt, M.B.E., the Black Watch, attached R.A.F., only son of Mr. Nat Watt, Commercial Bank House, Musselburgh, and Gwendolen Joyce, younger daughter of Mr. and Mrs. J. A. Christie, Mellington, Charlton Kings, Cheltenham.

Items

The will of Sergt. James Edward Sutcliffe, R.A.F., of Southport, has been proved at £1,137.

◆ ◆ ◆ ◆

The Thanks of the Nation

In the House of Commons, on August 6, the Prime Minister moved the votes of thanks to the Forces—the third one reading :—

"That the thanks of this House be accorded to the officers, non-commissioned officers and men of the Air Force for their brilliant daring and conspicuous services over sea and land."

In the course of his brief speech, Mr. Lloyd George said that everywhere on land, on sea, and in the air the strain on the heart, the nerve, the will, the courage of men had been beyond anything ever described in the story of this world. He was not going to particularise branches of the service nor to attempt to summarise their achievement. They were too well known. They were written deep on the hearts of the people of this country.

The resolution was passed *nemine contradicente*.

The House then went into Committee of Supply to consider the grants to officers. In the course of his speech, Mr. Lloyd George said : "As for Air Vice-Marshal Trenchard, he, by his energy and daring and drive and imagination and magnetism, which make for great leadership in war, made the Air Force become the powerful and formidable fighting machine that it was."

In the debate Mr. Johnson-Hicks said there was another name he should like to see mentioned in the list, that of Sir Frederick Sykes. Maj.-Gen. Seely knew the very great services which General Sykes rendered when General Trenchard resigned his post and Gen. Sykes was appointed to take command.

The grants were approved by 272 votes to 54.

Honour for Sir H. M. Trenchard

It was announced in a supplement to the *London Gazette*, of August 8, that Air Vice-Marshal Sir Hugh M. Trenchard, K.C.B., D.S.O., Chief of the Air Staff, had been appointed Col. of the Royal Scots Fusiliers, to date July 12.

Mr. Joynson-Hicks Honoured

In the deferred Prime Minister's list of Birthday Honours, published on August 13, appears the name of Mr. William Joynson-Hicks, M.P., upon whom a Baronetcy is conferred for raising the 17th and 23rd Service Battalions, Middlesex Regiment, and for public services.

Honours

It was announced on August 8 that His Majesty the King has made the following appointment to the Royal Victorian Order :—

Fifth Class.—Flight-Lieut. W. A. Coryton, R.A.F.

It was announced in a supplement to the *London Gazette* on August 11 that the King has been pleased to give directions for the following appointments in recognition of services during the War :—

O.B.E. (*Military Division*).

Lieut. J. R. P. Clarke, R.N.V.R.—For valuable services in the Anti-Aircraft Corps.

Comdr. G. Grenville-Grey, R.N.V.R.—For valuable services in the Anti-Aircraft Corps.

Lieut.-Comdr. I. D. C. Howden, R.N.V.R.—For valuable services in the Anti-Aircraft Corps.

Lieut.-Comdr. G. C. White, R.N.V.R.—For valuable services in the Anti-Aircraft Corps.

M.B.E. (*Military Division*).

Actg. Gnr. E. D. Lamb, R.N.—For valuable services in the Anti-Aircraft Corps.

Actg. Gnr. (T.) P. W. Snell, R.N.—For valuable services in the Anti-Aircraft Corps.

MAINTAINING CONSTANT PRESSURE BEFORE THE CARBURETTORS OF AERO ENGINES REGARDLESS OF THE ALTITUDE

By **LESLIE V. SPENCER, M.E. (formerly Editor of Technical Publications, Experimental Department, Aeroplane Engineering Division, Bureau of Aircraft Production at the McCook Field, Dayton)**

In the development of engines for aviation service, an entirely new problem, with which the designer of motors for ground-level operation has no concern, is encountered. That is, the aero engine has to contend with a constantly decreasing atmospheric pressure as the altitude increases. This means that unless some method of compensating for the pressure drop is provided, the engine will deliver a decreasing amount of power as it ascends. For instance, at 15,000 ft. an engine can deliver only about 60 per cent. of the power which it is capable of developing at the ground (practically sea level).

The altitude-pressure chart shown in Fig. 1, brings this out. It will be seen that at 20,000 ft. an engine must operate with an intake pressure of approximately half that at ground level. This means that the power of the engine will suffer accordingly.

In order to overcome this difficulty in the operation of engines at high altitudes, engineers have turned to the idea of super-compressing the air sent to the carburettor or carburettors so as to maintain as nearly as possible the ground-level pressure regardless of the height. This scheme of constant intake pressure maintenance has been given various names, and perhaps the best of these is the term *supercharging*. Therefore, a supercharging device or supercharger may be regarded as a machine which serves to increase the power of an internal combustion aviation engine above that which this engine would normally have at any specific atmospheric pressure. In other words, its function is not to *increase* the normal ground-level power of the engine, but to maintain as nearly as possible that power up to the limiting altitude for which the supercharger is designed. It must supply the deficiency between the atmospheric conditions encountered at any particular altitude and those necessary for maintenance of the normal ground-level power. The super-compressor must supply only enough additional air, which, when added to that obtainable at a given height, will total the amount available at the ground. Accomplishing this, the engine is able to deliver approximately the same power irrespective of its height above the earth, within limits, since for all practical purposes it may be regarded as being ignorant of the fact that it is operating in an atmosphere rarer than that at the ground.

Undoubtedly, had the War lasted longer, we would eventually have had fighting planes operating with superchargers, but up to the time of the signing of the Armistice none of the development work either in this country or abroad had progressed to such an extent that it was ready for practical application. Reports have been received from time to time that the Germans were operating planes on the Western Front equipped with supercharging devices, but there has been no corroboration of such rumours. It is certain, however, that the enemy recognised the supercharger as a potent factor in the design of fighting planes, realising that such equipment would add greatly to the performance qualities of the ships. Little is known as yet as to the exact lines along which the German development has been carried.

In Europe, serious attention, as early as 1915, was given to the development of means for maintaining constant atmospheric pressure at altitudes, but in this country, along with the rest of our aeroplane development, nothing was done by the Government in this connection until after our entrance into the struggle. The British, French and Italians each carried on independent experimental development work, and it is a striking endorsement of the turbo-supercharging scheme, as first worked out by Prof. Rateau in France, that at the present time this method of super-compression is most in favour with all experimenters after other systems have been given exhaustive trials. This applies to European development work, which was begun two years before our own. Work in America has practically all been with the Rateau system, modified mechanically, it is true, but still preserving the same principles of operation as first advanced and tried by Rateau. Full details of this method of supercharging will be taken up in detail later. Suffice it to say here that the Rateau system, so far, at least, appears to have the most advantages.

From the foregoing it will be apparent that the problem of keeping a constant pressure before the carburettors is an extremely difficult one. Development work, however, has progressed far enough to make it certain that there are distinct advantages to the idea, and in Europe experimentation has been carried beyond the strictly laboratory stage, a number of planes both in France and England having been flown experimentally with superchargers operating on the engines. Experimental work in America, while never brought to the point of applying the devices to planes in actual flight, has been carried forward to the extent that one of the devices developed during the War has been tested with gratifying results at the summit of Pike's Peak, which has an altitude of some 14,000 ft. All altitude tests that have been made have borne out the theories involved, and have shown conclusively that all that hinders the practical application of the machines to planes is mechanical difficulties, which are rapidly being overcome as the experimental work progresses.

Although other methods of maintaining constant inlet pressure are possible, all the systems of supercharging which have been experimented with so far depend upon the general scheme of connecting the air intake of the carburettor with the air outlet from a compressor, which is driven by one of several methods. The degree of compression of the air sent to the carburettor intake is governed by the speed of the compressor which is in turn either automatically controlled to supply the right amount of air for any given altitude, or is governed by some mechanical means.

Three types of compressors could be used for the purpose. These are the reciprocating, the centrifugal and the rotary designs. In order to make use of a reciprocating compressor, its volumetric displacement in a given time must be in excess, since it would require larger diameter cylinders than the engine, which of necessity would mean that the compressor would be as large if not larger than the engine itself.

The rotary compressor or blower has been tried under all conditions in competition with the centrifugal type of compressor by the British at the Royal Aircraft Establishment, and has been discarded in favour of the latter. Although light and of small bulk, the rotary blower does not appear to be capable of extending operations at high speed, due to mechanical limitations. Its capacity is also not so great for a given speed as that of the centrifugal type, in the small sizes such as required for such service.

In general, the centrifugal form of compressor unit has proven the most desirable when all considerations are weighed. Having a minimum of working parts, being very compact for a given capacity, and being capable of operation satisfactorily at top speed over long periods of time due to its simplicity of construction, the centrifugal compressor would seem to warrant exclusive attention on competition with the other two possible types. As a matter of fact, experimenters with compressors for this service have all come to this conclusion, and only the centrifugal type is now thought of when laying out a system for super-compression.

As to the methods of driving the compressor, there are also three possibilities. It can be direct-connected through the engine just as a magneto or other accessory is operated. The gear train with the crankshaft or other driving shaft of the engine must, of course, be so designed as to produce the proper relative rotative speed of engine and compressor, so as to give the rotor the requisite speed for the purpose in hand. As a second consideration, the compressor might be driven by a small steam turbine, the steam being produced by suitable utilisation of the heat of the exhaust gases from the engine. A third alternative is to drive the compressor impeller by means of an exhaust gas turbine, receiving its energy directly from the engine exhaust gas.

Taking these up in the order named, much experimental work has been carried on with the direct-connected means of drive through an intermediate gear train. England and Italy have done a great deal of experimenting with the gear drive, and have experienced great difficulty in coping with the severe stresses developed in the rapidly operating mechanism due to sudden fluctuations in the speed of the engine. In order to relieve the mechanism of any ill effects of sudden changes, some form of clutch or a series of clutches can be in-built into the drive to absorb them. But this means added complication that is not altogether desirable. Consequently, those who at first favoured gear drives are gradually leaning towards the turbine drive.

Turning to a consideration of the steam turbine, this need not be given very serious attention, in that its use would involve the installation of a boiler, condenser and other complicated apparatus necessary to steam generation. Such a system of turbine propulsion has never been tried, but it is entirely possible to utilise the heat of the exhaust gases to produce the steam. Although such an arrangement could undoubtedly be built to operate satisfactorily in the laboratory, it has no practical value for application to an aeroplane, where every added complication is serious, and where every added ounce of weight is important. Aside from these considerations, a steam generating set would be exceedingly hard to incorporate within the narrow confines of the engine part of the *fuselage*.

We, therefore, arrive at the conclusion that the turbine driven by the energy of the exhaust gases offers the best possibilities from every standpoint, and that this conclusion is correct is evidenced by the fact that although England primarily designed its supercharger systems for direct-connection of the compressor to the engine through gearing, this idea has practically been abandoned at the Royal Aircraft Establishment in favour of the exhaust-gas turbine-driven centrifugal compressor. This is the Rateau system, with which the efforts of the French engineers have been almost entirely concerned.

The exhaust-gas turbine can be connected direct with the exhaust ports of the engine through special manifolding replacing the standard manifolds, so that all the exhaust must pass through the turbine nozzles and give up its energy to the turbine rotor before being allowed to escape into the atmosphere through the turbine discharge passage. In the designs which have been experimented with thus far, the turbine rotor and the impeller of the centrifugal compressor are mounted on the same shaft. Thus the building of the turbine and compressor as a unit is made possible, resulting in an exceedingly compact machine, which in most instances can be mounted directly on the front of the engine. By this arrangement, the outfit takes up a minimum of space, and although such a position of the device makes it necessary to remove the radiator from the front of the *fuselage*, this offers no difficulties, since a great many designs of planes place the radiator in the wings or at the sides, or at the bottom of the *fuselage* from choice.

It will be seen that inasmuch as there is no direct mechanical connection between the turbo-compressor and the engine, this type of apparatus is entirely free from troubles due to sudden variations in the rotative speed of the engine, which is one of the principal objections to the gear-driven compressor installation.

In conducting the engine exhaust gases to the nozzle-box of an exhaust gas turbine, and thence through nozzle ports to the turbine wheel, no difficulties are encountered except that the high temperatures of the exhaust gases must be coped with. To date, this has been the main trouble designers of turbo-superchargers have had, viz., designing the device in such a way that the excessive heat can be cared for without damage to the turbine parts. This trouble seems to be close to satisfactory solution, and it is not looked upon as being serious enough to overbalance the other advantages of the exhaust turbine-driven supercharger as compared with other types.

Of course, around the turbine rotor there is atmospheric pressure, whatever its value may be at any given altitude, and as the supercharged engine exhausts at a normal pressure of about 30 ins. of mercury, corresponding to a normal atmospheric pressure of about 15 lbs. per sq. in. at sea-level, the expansion of the gases from this pressure to that of the atmosphere at any given altitude is sufficient to operate the turbine at high speed. Ordinarily, the turbine rotor speeds run up to 25,000 r.p.m. in these devices, due to this expansion. There is plenty to take care of the needs of the device, as will be evident.

The rotating member of the compressor being on the same shaft as the turbine rotor, it is designed to draw in the rarefied atmosphere and compress it to normal ground-level value—also approximately 15 lbs. per sq. in. The compressed air is sent direct to the carburettor or carburettors through the intake piping system.

Thus it will be seen that the engine gets its charge at sea-level pressure and discharges at this pressure, and although this condition is artificially maintained regardless of the height (up to the limits of altitude for which the turbo-compressor is designed), the engine may be considered as being always operating in ignorance of the fact that it is not on the ground at or near sea level.

From this it will be seen that in order to maintain efficient operation, the induction piping system of the apparatus must be proof against air leakage. That is, there must be no chance for pressure escape between the carburettor air-intake connections and the induction piping running from the air compressor. Similarly, the junction between this induction piping and the compressor casing proper must be air-tight. While maintaining air-tight connections of this kind offers some difficulties under service conditions, this is not considered a very difficult matter, since special types of gaskets and connections have been and are being devised to take care of this point efficiently.

Experiments with this system indicate that of the energy of combustion the engine and turbo-compressor utilise about 33 per cent., whereas approximately 45 per cent. is lost in the exhaust which finally escapes from the discharge ports of the turbine. The balance of the combustion energy is given up to the cooling water and is dissipated in other mechanical losses throughout the cycle.

When the United States entered the War, as has already been pointed out, the Allied countries had already done two or three years' experimental work on various types of supercharging systems. Soon after our entry into the struggle, Mr. E. H. Sherbondy and Dr. Sanford A. Moss were requested by the Government to take up the investigation and research and development work on supercharging for our own Air Service. Mr. Sherbondy brought to the work long experience in the design of internal combustion engines and in power-plant and turbine construction. Likewise, Dr. Moss, engineer for the General Electric Co., Lynn, Mass., has had a great deal of experience with exhaust turbines, carrying on such experimental work for his concern over a long period.

Both of these engineers worked primarily with the Rateau system, as already described, and although the same cycle of operations was followed in each case as Rateau originated, their work is mechanically very little like that of Rateau. Dr. Moss and Mr. Sherbondy carried on their experimental work also entirely independently of one another, evolving units which have no mechanical similarity whatever. It was only after careful study of the various types of compressors, drives, etc., that they arrived at the centrifugal compressor exhaust-turbine system as presenting the greatest possibilities.

The designs of the machines and the results of the tests of the Moss and Sherbondy devices offer an interesting series of experimental and engineering records, and although up to the time of the signing of the Armistice, the machines had not been developed to the stage where they were ready for flight testing, the various difficulties incident to any new development work were so far toward practical solution that if the War impetus had been maintained, it is probable that we should have seen American supercharging systems in the air this spring or summer.

As mentioned in the previous general discussion of the problem of supercharging the aero engine so as to maintain a practically constant induction pressure regardless of the altitude, and therefore nearly uniform power output, the United States Government soon after our entry into the War secured the services of Mr. E. H. Sherbondy and Dr. Sanford A. Moss to carry on independent investigations along this line, and to design super-compression machines which would be especially adapted to the Liberty twelve-cylinder engine.

It is doubtful if this line of experimental work would have been inaugurated so early in our aircraft experimental programme if it had not been for the fact that the promising results which Prof. Rateau and other European experimenters had secured during the two or three years previous had not been followed closely by the U.S.A. National Advisory Committee for Aeronautics and by the Government engineers.

Having at hand the results of previous experimentation abroad, neither Sherbondy nor Moss had to strike out blindly, but in the main concentrated upon ways and means of developing thoroughly practical machines or systems based primarily on the scheme of supercharging originated by Prof. Rateau, that is, a system in which the power for driving the compressor is furnished by an exhaust-gas-driven turbine. Moss clung strictly to the one line of action, whereas Sherbondy studied the problem also from the angle of driving the compressor by a shaft from the engine through the intermediary of a set of gears which served to step up the speed to that required for the operation of the compressor impeller. Thus, he not only designed several supercharging apparatus utilising the Rateau principle, but he also laid out

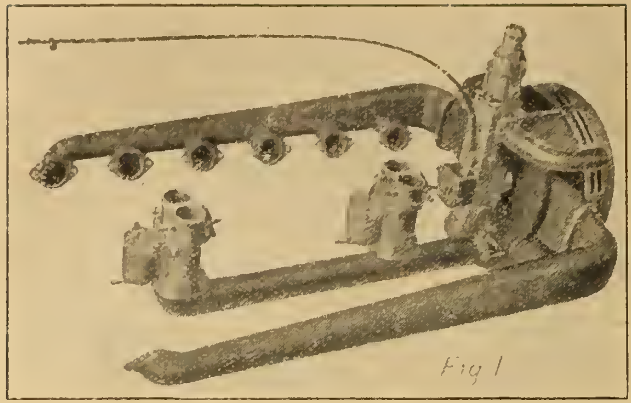


Fig 1

geared designs. Only the former were built, however, as Sherbondy soon became convinced that the utilisation of the exhaust gas energy for driving the impeller was to be preferred, for reasons which have already been pointed out.

Although neither Sherbondy's nor Moss's machine was ready for actual flight tests at the time the Armistice surprised the world, the work had so far progressed that it remained only to alter certain of the mechanical details so as to overcome weaknesses which the extensive ground tests had brought to light, when either machine would undoubtedly have been ready for preliminary trial in the air. This is particularly true of the Moss supercharger, which has been subjected to gratifying altitude tests on a portable dynamometer at the summit of Pike's Peak—a little over 4,000 ft. above sea level.

If the work of European experimenters had not already convinced the aeroplane engineering world that there is great advantage to be gained by maintaining a constant pressure before the carburettor regardless of the altitude—within limits, of course—these altitude tests of the Moss device would have proved it. The advantages being already fully appreciated, due to the earlier tests in England, France and Italy, the results obtained with the Moss apparatus served to further strengthen the validity of the theories back of the idea.

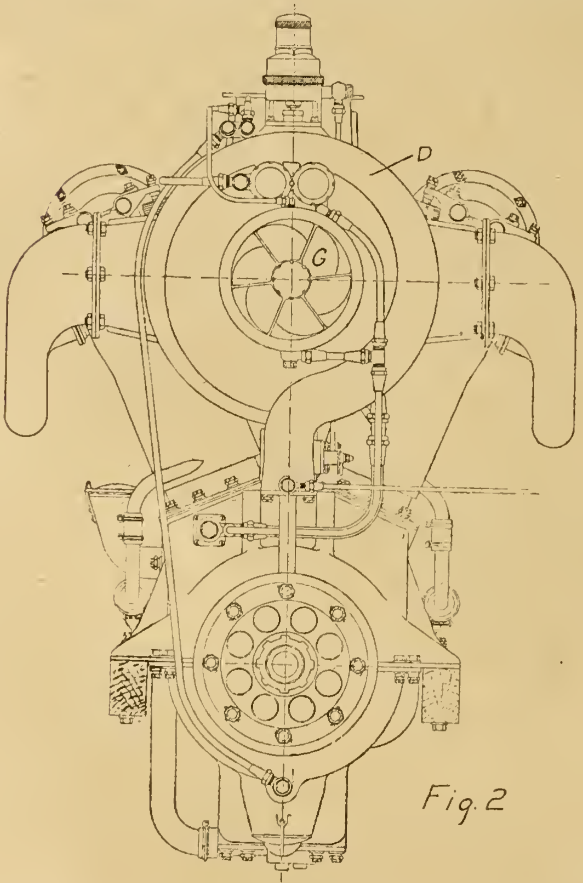


Fig. 2

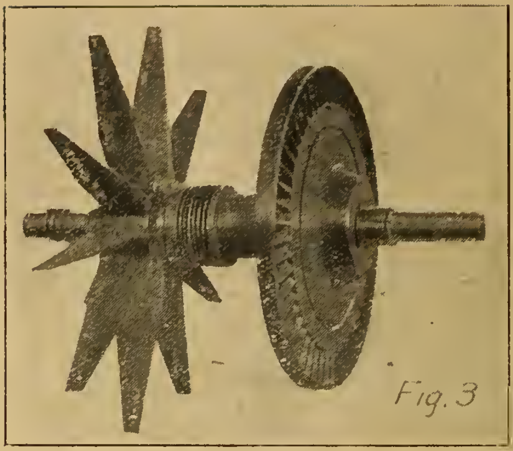


Fig. 3

The Sherbondy Superchargers

Fig. 1 gives a very clear idea of the general arrangement of the apparatus of the Sherbondy turbo-compressors as laid out for the Liberty twelve-cylinder engine. The two carburettors are carried on the one induction pipe, which has air-tight joints to the carburettor air intakes, and also to the compressor discharge. The specially-designed exhaust manifolds which lead the exhaust gases to the turbine are also illustrated clearly. The compactness of the turbine and compressor unit proper is seen, this main part being designed to attach to the front of the engine without interfering with the normal position of the propeller. Installation

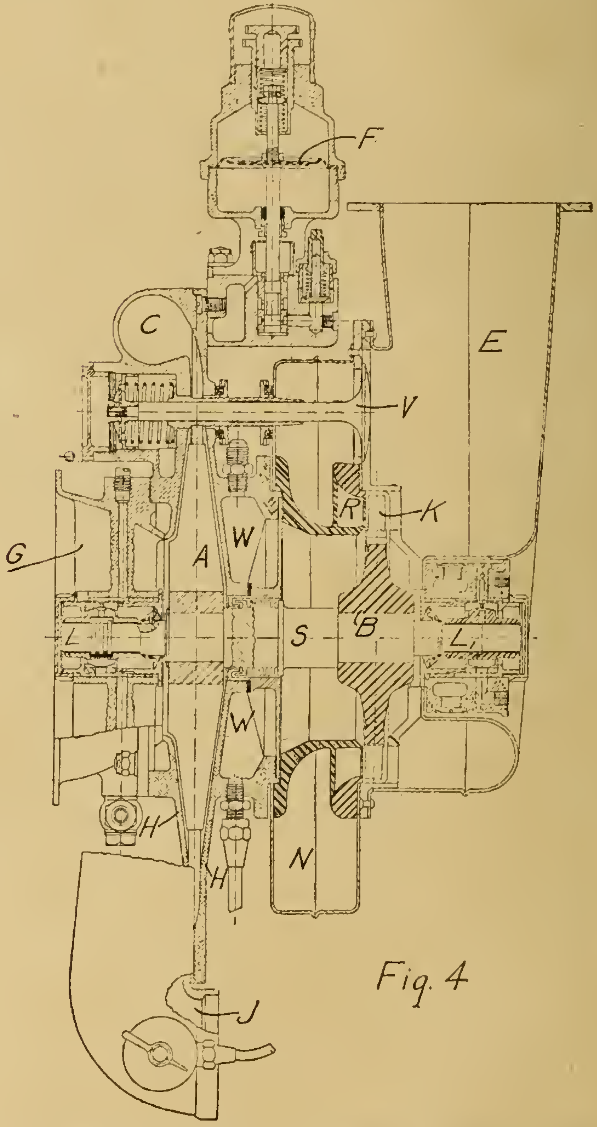


Fig. 4

of the turbo-compressor here means that the radiator must be put elsewhere than at the front, most probably in the wings.

At the rear of the turbine housing is the automatic control mechanism, which serves to maintain the turbine speed at the right value to supply the correct supercharge under any atmospheric conditions up to the limit of about 20,000 ft., which is the maximum height for which the Sherbondy machine is intended to be effective.

As already explained, the turbine rotor and the air impeller are direct-connected on the same shaft, a labyrinth arrangement being constructed on the shaft between the two rotating members to prevent pressure leakage between the compressor chamber and the turbine. The rotating part of the device is shown in Fig. 3.

Fig. 4 is a sectional drawing of Mr. Sherbondy's last supercharger, in which a number of minor changes were made over the two previous designs in order principally to overcome the troubles due to the warping of the thin-gauge parts of the two earlier constructions. The impeller, A, is enclosed in an aluminium housing, H, which, throughout the length of the impeller blades follows the same taper, and is carefully machined inside to maintain a constant clearance between blades and housing of only twenty-five thousandths of an inch. The housing has the same taper as the blades, but to a diameter a little larger than that of the impeller, where its sides become parallel for about another inch. This space acts as a diffusion chamber, after which the housing opens into an outer chamber, C, of circular section. This outer chamber is of constantly increasing diameter, tapering from an area of almost nothing until it finally reaches the area of the induction pipe. This may, perhaps, be better understood by referring to the front elevation drawing in Fig. 2, which shows the outer chamber. D, very clearly. The point of juncture with the induction pipe is shown at J in Fig. 4.

The impeller has ten blades, and is 9 ins. in diameter. The blades are tapered from a point a little over half-way out on the intake side, and converge to a relatively narrow tip width, as seen in the drawing. The entering edge of the blades is rounded off to prevent air shocks.

A most interesting feature is the turbine rotor, which in the latest Sherbondy design is fitted with 72 buckets cut by a special process to the greatest accuracy. As will be readily appreciated, the buckets all had to be of exactly the same weight so as to prevent unbalance of the rotor—a condition which would be very serious at the high speeds which the device is designed to attain. These buckets are assembled into sockets accurately machined in the periphery of the rotor proper, and expansion under the heat of operation serves to hold them in place most securely.

Much research and experimentation was carried out by Mr. Sherbondy before he was able to fix upon an alloy which would be sufficiently strong and of a high enough heat-resistant quality to withstand the very high temperatures and stresses encountered in operation of the device.

The turbine rotor was designed for an angular velocity of 780 ft. per second, which means a rotative speed of 31,050 r.p.m. The turbine nozzle angle is 21° 45′, and that of the buckets, 35° 15′, with a gas velocity at entrance designed to be about 1,950 ft. per second, and that at exit from the buckets, 750 ft. per second. This is a ratio of a little over 2.5 to 1.

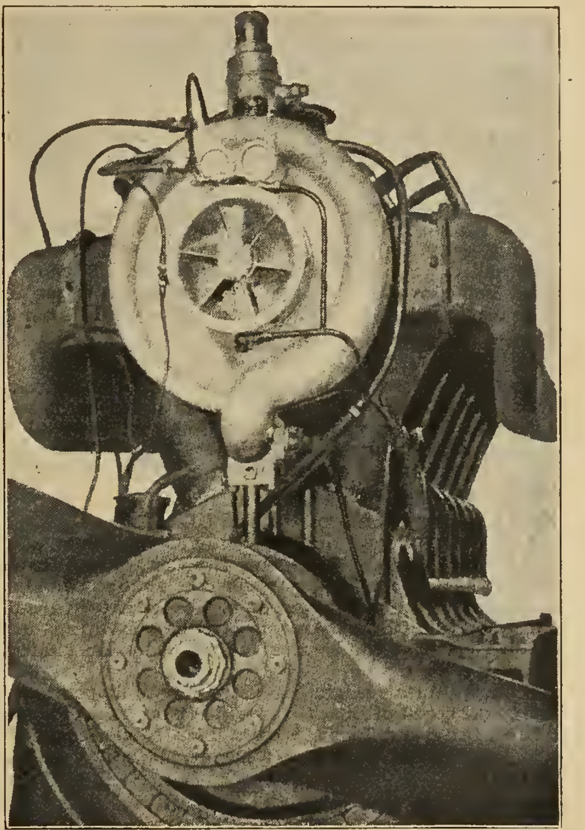
In designing the air inlet, it was desired to prevent all air shock so far as possible, and, therefore, the conical air inlet, G, Figs. 2 and 4, was provided with radial guide vanes which impart a certain velocity to the air and give it direction also before it comes in contact with the rapidly-rotating impeller blades.

The designing of the bearings was also a tough problem, for they must withstand a variety of severe conditions in service, especially when the device is operating at or near its maximum effective speed. Reference to L and L_1 in Fig. 4 will give an idea of the details of their construction. The rear bearing, L_1, is subjected to most serious conditions in this design, in that it is in the path of the exhaust gases, whereas the front bearing, L, is in the centre of the air inlet part, and is under no severe heat conditions. Both bearings are constructed with spherical seats, which allow them to compensate automatically for any misalignment of the assembly, a possibility should the castings warp to any extent under the high temperatures. They are in effect small self-aligning bearings. The bearing proper between shaft and housing is of plain babbitt. At the front there is, in addition to the bearing just mentioned, a marine type thrust bearing which holds the rotating member against end-thrust caused by the pressure of the gauges going through the nozzles against the buckets of the rotor.

Pressure feed is used for efficient lubrication of both bearings, which are provided with an excess over actual requirements for obvious reasons. This oil is intended to be forced to these bearings through connection into the regular pressure feed line of the Liberty engine. Thus the Liberty oil pump supplies them, avoiding an added complication of having a special oil pump in the turbo-compressor unit itself. An oil seal is made against oil leakage around the shaft by providing a washer that is a loose fit on the shaft, and which has a spherical shape on one side. This side fits against a seat in the bearing chamber, against which it is held by a spring. This construction is very effective in preventing oil escapage into the turbine casing or blower housing, as the case may be.

In several of the earlier Sherbondy designs, trouble was experienced with the gas casing, which had a tendency to warp and thus throw the turbine nozzles out of place to such an extent that they touched the turbine wheel in several instances. Other troubles were encountered due to warping of the nozzle ring and the misshaping of the nozzles themselves. In the last design, as seen in Fig. 4, however, these difficulties were overcome in large measure by bolting the nozzle ring to the compressor casing and permitting the gas casing to deflect as much as it pleased with no ill effect upon the running of the device. It is just such problems as these that Sherbondy has had to overcome throughout, for the intense heats encountered, the restricted space available for the unit and the necessity for extreme lightness are three diametrically opposed factors which must be compromised into the best possible assembly.

At F in Fig. 4 is seen the diaphragm, which is the controlling unit for operation automatically of the by-pass valves, V, which allow escape of exhaust in proportion to the supercharger speed required for efficient working of the turbo-compressor at any given altitude. Obviously, at ground level, these by-passes are open, whereas, at the maximum height, they should be entirely closed so that all exhaust energy is given to the turbine to operate it at top speed. In effect, the automatic control works upon the principle of differential pressure on the two sides of the diaphragm, which opens and closes a piston valve in the casting. This, in turn, operates a system of oil ports through which oil flows under pressure to open or close ports that govern the action of the small pistons of the by-pass valves. The



The supercharger developed by E. H. Sherbondy for the Aircraft Production Bureau

action is thus devoid of shocks, and any movement of the by-passes is gradual and lacking in jerkiness that would tend to produce undesirable shocks to the mechanism as a whole. In other words, the control system has been arranged to have a more or less damping action, making any changes in the amount of gases passing to the turbine gradual rather than sudden enough to cause trouble.

In operation of the supercharges the air is drawn in through the passage, G, is carried around by the impeller, A, and in its compressed state is sent to the carburettors through the outlet, J. The exhaust gases are led to the gas-chamber, N, whence they are directed through the nozzles, R, to the buckets, K, of the turbine wheel, B. The exhaust gases, after giving up their energy, are discharged through the exhaust outlet, E, into which the valves, V, also send any gases which are not sent through the turbine, due to the automatic control already mentioned. There is in reality no connection between the turbine and the compressor, except through the common shaft, S, which is fitted with a labyrinth between the two rotors to prevent pressure escape from the turbine to the blower casting. As a means of cooling, water is circulated through the space, W, between the two parts, a provision which was quite essential to assist in keeping down the excessive temperature.

The Sherbondy machine was designed to have an air discharge capacity of 692 cub. ft. per minute when the Liberty engine is operating at 1,700 r.p.m. Under these conditions, it is intended to handle any pressure requirements of the engine from nothing at sea level to approximately 7.5 lbs. per sq. in. at 20,000 ft., at which altitude the atmospheric pressure is about half that at sea level.

It is computed that the theoretical horse-power available in the exhaust gas of the Liberty engine is about 80, whereas, with a compressor efficiency of around 60 per cent. the horse-power required to compress the air is about 32, indicating that the overall efficiency of the system is somewhere in the neighbourhood of 40 per cent.

(*To be concluded.*)

◆ ◆ ◆ ◆

An Irish Aerial Derby

In connection with the Royal Air Force sports at Lansdowne Road, Dublin, an aerial Derby was held on August 8 over a course from Tallaght, Co. Dublin, to the Curragh, then to Gormanstown, Co. Meath; from there to Dublin, and from Dublin to Tallaght, a distance of 102½ miles. The machines were handicapped on the Air Ministry's ratings of speed.

Twenty-one machines took part, including Maj. C. J. Mackey, M.C., D.F.C. (R.E. 8), Lieut. T. H. Langrishe (Clerget Avro), Lieut. F. A. Urmiston (Mono Avro), Capt. F. Workman, M.C. (Clerget Avro), Lieut. W. A. Roberts (Clerget Avro), Lieut. W. E. Davies (Clerget Avro), Capt. F. C. Mailer, A.F.C. (D.H. 9), Lieut. J. S. Chick, M.C. (D.H. 9), Capt. M'Keon (S.E. 5), Capt. R. B. Boume (D.H. 9), Lieut. Rodwill, R.I. (D. H. 9), Capt. Bowen (D.H. 9), Lieut. T. H. Wright (Clerget Avro), Capt. Seagrave (Mono Avro), Lieut. P. D. Baker (Mono Avro), Major Baker (Bristol), Lieut. Woodman (Bristol), Lieut. Holland (Bristol), Captain Sibley (Mono Avro), Capt. Gerard (Camel), Lieut. Mansfield (Bristol).

The result was as follows:—Lieut. Urmiston, 1 h. 9 m. 34 s.; Capt. Sibley, 1 h. 9 m. 35 s.; and Lieut. Baker, 1 h. 11 m. 55 s. Capt. Sibley was disqualified for finishing on the wrong side of the post, and the second place was given to Lieut. Baker, while Lieut. Roberts was given third place, 1 h. 11 m. 55 s.

The Hotel Cecil

With the exception of the wireless operators, who will remain until the masts have been taken down, the Air Ministry vacated the Hotel Cecil on Tuesday. It is estimated that it will take six months to restore the building to the condition in which it was when taken over.

Flying Boat's Return

The British flying boat F. 5, which left Felixstowe on July 19 on a test flight over Scandinavia, returned to England on August 6. She left Esbjerg, Denmark, at noon and reached Felixstowe at 7.15 a.m. The distance is 300 miles but the machine had to contend with a head wind all the way.

A Flying Week for Nottingham

On Friday Maj. McMinnies flew from Southport to Nottingham to see Sir Jesse Boot, landing in a small field next to Boots's recreation ground. He transacted his business and was back in Southport again in the time that it would have taken to reach Nottingham by train. It is probable that a flying week and aerial gymkana and fête will take place at Nottingham during September.

A New Passenger Height Record Claim

At Villacoublay on August 8 Maurice Walbaum, accompanied by his mechanic, Tisse, on a Breguet 300 h.p. Renault, set out to beat the world's passenger height record. In his first attempt at 5.30 p.m. he got up to 6,000 metres in 27 mins., and then landed at Issy. An hour later he went up again, and this time got to 7,800 metres (25,740 ft.). He landed at Villacoublay at 7 p.m.

The official world's height record for pilot and one passenger stands to the credit of Bier, the Austrian pilot, at 6,170 metres, but Capt. Lang and Lieut. Blowes, on a Napier-engined De H.9. in January last went up to a height, officially certified to be 28,000 ft.

Flying Through the Arc de Triomphe

In defiance of an official interdict a Frenchman, Charles Godefroi, has succeeded in flying through the Arc de Triomphe, the feat which even the French have been moved to term *une prouesse folle*, and in practising for which Navarre lost his life. The flight was made soon after 7 a.m., on a Nieuport, of 9 metres span, fitted with a 120 h.p. Le Rhone motor. The height of the opening in the Arc de Triomphe is 29.42 metres and the width between the pillars 14.62 metres. Godefroi flew up the Avenue de la Grand Armee through the Arch to the Concorde where he managed to get above the trees and turned back to Villacoublay.

The authorities have been much perturbed by the flight and have prohibited the exhibition of a film showing it. They also endeavoured to suppress all illustrations but found this impossible. The Army authorities, it is understood, are holding an inquiry to discover how Godefroi, who was a sergeant in the Air Service until his demobilisation last week, secured possession of a military machine.

A Motorless Flyer

During the War the competition for the Peugeot prize of £400 for a flight of 10 metres carried out with no other motive power than that furnished by the pilot, has been in abeyance. Recently, however, interest in it has revived, and there has been a lot of strenuous practising lately. A message from Paris on August 11 announced that the well-known French cyclist, Poulain, at Longchamps, had made a hop of 12 metres at a height of 1 metre, his speed being 9 km. per hour.

Smuggling Saxon Crown Jewels

It is reported from Malmo that an attempt was made on August 9 to bring valuables belonging to the ex-King of Saxony into Sweden, states the *Times* correspondent at Copenhagen.

At 9 a.m. a seaplane approached the coast at Smygehuk, the southernmost point of Sweden, and a German couple, who for some time had been living in the neighbourhood, had come down to the shore. After an exchange of signals the airman dropped two parcels, and then returned.

The coastguard, seeing the incident, and thinking that smuggling was being attempted, tried to catch the Germans, who, however, succeeded in escaping. Meanwhile the Stockholm police had been informed by telephone, and later in the day the Germans were arrested at the neighbouring railway station. They first maintained that the parcels had fallen into the sea, but these were duly found when the Germans were searched.

The parcels contained some exquisite lace, jewellery and Government securities amounting to large sums, belonging to the ex-King of Saxony. The valuables have been retained by the authorities.

According to a later message, the woman is a countess and the man a Dresden court official.

Aeroplane Disaster in Germany

According to messages from Berlin a giant flying machine hired by the Ukrainian Government was shot down by Polish troops in the Forest of Routen, and the 10 people on board, including M. Vitovsky, formerly the West Ukrainian Minister of War, were killed.

The pilot was Bendereich, and the machine carried a crew of five, as well as four passengers. The machine was on its way from Breslau to the Ukraine when the catastrophe occurred.

Besides the dead bodies there were found scattered about round the spot where the machine fell several bags and quantities of Russian gold coin and currency notes.

To Fly to Spitzbergen

A British aviator is at present at Bergen with his machine, and is about to leave by steamship for Tromso, whence he will fly to Spitzbergen, according to a message from *The Times* correspondent at Christiania.

AIRISMS FROM THE FOUR WINDS

Who said the aeroplane could not beat the cable? Read!

* * *

Telegram received 11.25 a.m. on August 12 :—

"*Handed in at Amsterdam at* 2.30 *p.m., on August* 9.

"*Cannot get through until Tuesday, arrive Wednesday,*" etc.

Only three clear days!

And there were apologies last week as to an adverse wind being the cause of a seaplane taking 7¼ hours to fly from Esbjerg to Felixstowe.

"Flight" Copyright.

A corner of a batch of machines, chiefly S.E.5's, for disposal at Hendon. These are a varying quantity, the numbers being added to each day, whilst those disposed of balance more or less the new-comers.

Small wonder the wail has gone forth from the Government: "Bankruptcy stares Great Britain in the face."

* * *

Wake up England!

Wake up Telegraph Authorities!!

* * *

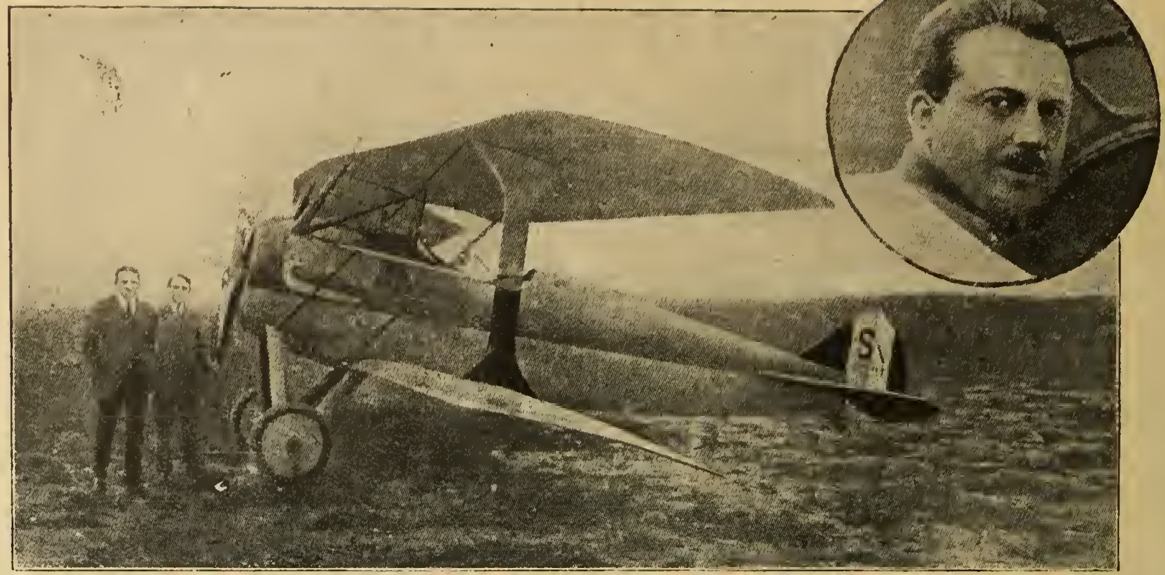
On Monday last Air Vice-Marshal Sir Hugh Trenchard submitted to King George for inspection a new uniform (index number not yet known) for the R.A.F. As Chief of the Force, His Majesty may well desire to inspect this latest "creation," having regard to the possibility of his having occasionally to don it personally.

* * *

A suggestion in regard to the R.A.F. Cadet College is made by "an old officer," who fears that the adoption of the plan as set forth can scarcely fail to impair very seriously the future value of the R.A.F. "It would seem obvious," writes an old officer, "that a reasonable amount of military knowledge is essential to intelligent observation from the air or otherwise, of military operations. Therefore the airman, in order to be a competent observer, must be a naval or military, not a civilian 'specialist,' and entry to the Air Force Cadet College ought consequently to be from the Navy or Army, or at all events from among the trained cadets of Dartmouth, Woolwich and Sandhurst. Information that enemy troops were seen at a certain place at a certain hour is valuable indeed, but its value will be

"Flight" Copyright.

What it is to be a celebrity, and a sample of what you then have to face! A bunch of the 32 photographers who awaited the appearance of Sir A. W. Brown and his bride, Miss Kennedy, after their marriage at the Chapel Royal, Savoy, on July 29.



THE SPAD-HERBEMONT TWO-SEATER MONOCOQUE : A Military biplane, 300 h.p. Hispano-Suiza, on which the French pilot, Sadi Lecointe, made a record altitude (solo) flight of 89,200 ft. He also beat the speed record (with passenger) with a speed of 142.8 m.p.h.

greatly increased if the scout who makes the report is capable of making, on the spot, deductions likely to assist the General Staff in divining the object with which the enemy troops have been sent to the locality wherein they have been observed. In a word, let us first make trained sailors and soldiers, and afterwards make of them airmen and other specialists. The R.A.F. cannot efficiently be the 'eyes' of the naval and military command unless its observers are capable of understanding what they see."

* * *

That proper military training should be beneficial to the efficiency of the force there can be no possible doubt, and it is hardly to be conceived that this will not be part of the system, but side by side, not of necessity primarily, with the bringing into line of the young mind, with matters more directly concerned with the art and science of aviation. It is the flying spirit that in the first instance matters. The rest follows naturally.

* * *

"Several thousand German prisoners," so runs a report, "paraded at Dorchester internment camp yesterday for the presentation by the R.A.F. of money and a watch to Pte. Bruckmann, a prisoner, who rescued two officers from a burning plane. He was himself burned. The War Office has granted him immediate repatriation."

We are just wondering whether this added reward of the W.O. may not just now be a doubtful blessing.

* * *

That "fish by aeroplane" has, after all, materialised. But it would nevertheless have to be at least a millionaire's, or even a war profiteer's luxury to have his fish for dinner brought that way, at present, in order to save an hour. For a year or two, anyway, we fancy most of the Manchester men of wealth will continue to take their chance of getting decently fresh fish by waiting the two hours which, according to Mr. Bracegirdle, the enterprising aerial-route fishmonger, it takes for a cargo of fish to travel from Fleetwood to Manchester. But then the formality of handing every cargo of fish, a quarter of an hour after its arrival in the City of Trams, to the Lady Mayoress at the Town Hall, as in Mr. Bracegirdle's case last week, is not insisted upon by the sanitary authorities.

* * *

This sort of spasmodic enterprise moreover is apt to bring trouble upon and indictments of inefficiency of the aeronautic movement generally, by reason of its setting up ideals in the

Sir Sayed Ali El Mirgham, K.C.M.G., K.C.V.O., and some seven Sudanese Chiefs on a visit to Hendon, on flying experiences bent. Although Sir Sayed was forbidden to fly by the Holy Men who accompanied the Mission, by reason of it being irreligious, the eight chiefs took chances upon this point, and after a flight in a Grahame-White machine, one of the visitors picturesquely described his impressions as follows : "The earth looked like a carpet and the clouds like mountains." Another interesting point was that these ingenuous folk insisted upon being photographed, because unless they took back some proof their tribes would not believe they had been in the air.

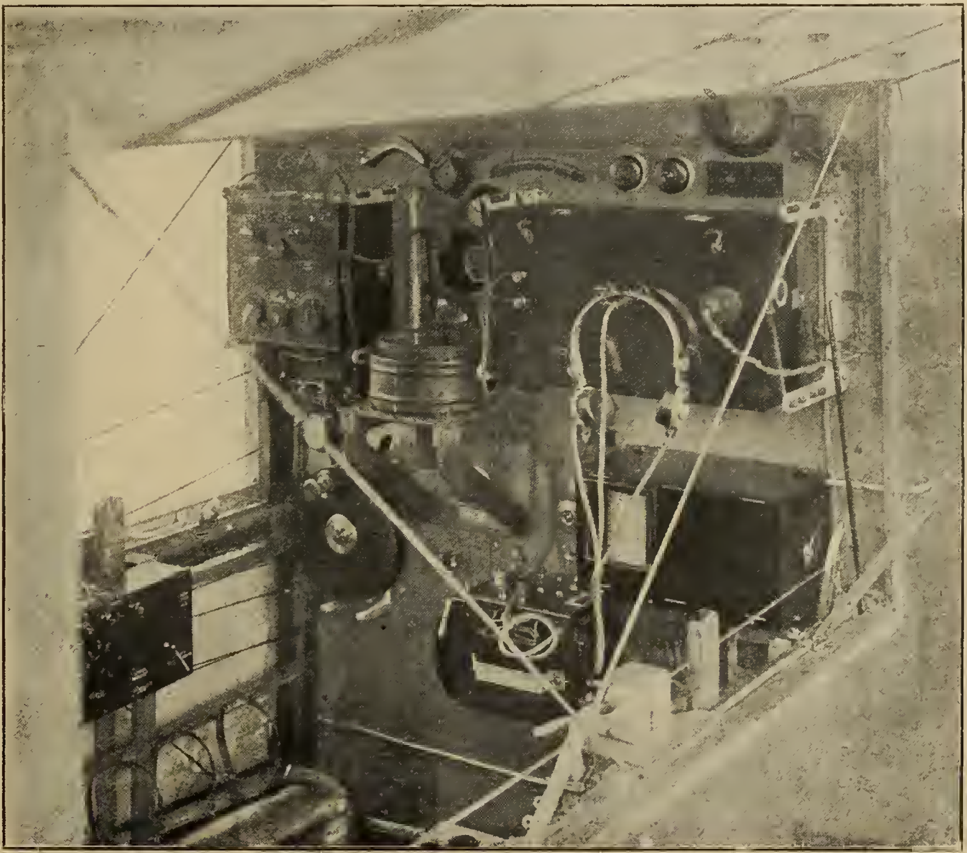
"Flight" Copyright

A French lady designer of one of the greatest London emporiums goes a flipping at Hendon in a D.H. enclosed machine, no doubt with designs on designs aviatic.

minds of the unpractical members of the public, which there is, for some time, not the faintest hope of realising. By way of instance, this little 12-stone Fleetwood-Manchester fish stunt instantly brings forth suggestions for distributing fish generally by way of the air.

"Why should not the aeroplane," writes one shrewd housewife from Wigmore, Herefordshire, "be used more freely for the rapid transport of fish from the sea to inland towns and villages? It would be a boon to many to taste fish in its full-flavoured freshness, and invalids especially would be grateful." Without a doubt this correspondent is right, but nothing short of a new Government Department, at the taxpayers' expense, could do credit to such an enterprise upon these lines.

Mr. T.O.M. Sopwith, as an early prophet and believer in the future success of aviation, was quite a success, most people will admit. Therefore, in these days of croaking, it is really heartening to read in the *Financial Times'* "Saturday Causerie" the following interesting item, to which considerable aviatic interest attaches: "It is now understood that the purchaser of Lord Lovelace's Surrey seat, Horsley Towers, which was disposed of by auction the other day for £150,000, is Mr. "Solly" Joel, and that Mr. T.O.M. Sopwith, of the Sopwith Aviation Co., is also considerably interested in the deal. Mr. Joel has paid much more attention lately to real estate than to mines, his previous big transaction, which occurred about 18 months ago, being the acquisition of the site of Meux's Brewery in the Tottenham Court Road.



The instrument board and wireless outfit in the cabin of the "Seabird," the biplane manufactured by the Alliance Aeroplane Co., which recently flew from London to Madrid in 7¾ hours for £500,000. Mr. Sopwith, who lives close by Horsley—at Cobham and rents the Earl of Lovelace's shooting, was credited locally with a keen desire to secure the Horsley Towers estate for the purpose of erecting an aerodrome in the park, which covers 260 acres, and he is currently believed to have offered £200,000 for the property before the public sale. If that be so the terms on which Mr. Joel has secured it would appear to be very favourable to the purchaser. The total area of the estate is 2,750 acres, with a rent roll of £2,500, excluding the Lovelace seat. The estimated value of the timber alone is put between £64,000 and £80,000. Mr. Joel has clearly not left his astuteness behind in the Kaffir Market. Horsley Towers is one of Sir Charles Barry's Tudor-Gothic mansions. It has looked on many changes, but none so strange as that which may eventually cause it to witness within its shadow the rearing of Sopwith 'pups.'"

* * *

THE competition in novel air "stunts" continues, and with the vast possibilities in this direction there should be, before the novelty wears off, some really amusing, if not startling developments from the smart set of hustlers. The other day it was an actual wedding in the air; then the fish episode from Manchester; again the Arc de Triomphe foolishness and the flying, for the first hour of their honeymoon, of Mr. Weeks, a pilot, with his bride, Miss Achfield, after being married at Swansea.

* * *

Now comes, from Messrs. Brown Bros., the record of the completion of a little business deal in the air. This firm write us as follows in regard to what they claim to be the first instance in history of securing an order for motor accessories while in the air: "Mr. Arnold, who is our Australasian representative, took a trade visitor from New Zealand for an aeroplane flight, and while at an altitude of between 3,000 and 4,000 ft. over London and travelling at a speed of over 100 miles per hour, celebrated the occasion by securing his fellow passenger's signature to a substantial order for motor accessories. This is an actual fact, as the writer has inspected the order, and whilst the caligraphy is somewhat shaky, it certainly was quite legible."

* * *

WHAT will happen presently if the fraudulent swell turns pilot and brings the plane into his scheme of operations? One can well imagine a nervous passenger being suddenly called upon, away up in the blue, to sign blank cheques or other valuable obligations upon blood-curdling threats from the man at the wheel, calmly complying, whilst ——, but there we will not anticipate the consequences of the thrilling incident as worked out in the next few hundred novels and plays of the moment. Let the respective authors apologise themselves.

IF a Canadian deponent is to be believed the plane is apparently not going to take all the "stunting" at its expense lying down. According to a correspondent from the other side a remarkable occurrence took place recently at London (Ontario) when a biplane and a motor car came to loggerheads within the City limits. The biplane it appears had recently been purchased in Toronto by two American aviators, Donald Whistler and E. T. Webster, both of Elkhart (Indiana). They were flying from Toronto to Elkhart by easy stages, and landed at London in a small field which gave them little opportunity to rise. A neighbouring farmer in a large touring car with seven passengers stopped to watch the aircraft rise. The passengers alighted to get a better view. The biplane caught the top of a tree when rising, toppled, and fell squarely on the top of the car less than 15 seconds after the passengers had left it. The air machine straddled across the car and released the brakes. The car ran away with the biplane and collided with another car, when it stopped. Both the cars and the aeroplane were badly wrecked, but no persons were injured.

In our opinion it thoroughly served the plane right.

* * *

A CORRESPONDENT asks if the Order of the Kamal (First Class), which has just been conferred upon Lady Allenby, has anything to do with Mr. T. O. M. Sopwith. Perhaps some of our readers might be able to help. In the meantime we have referred the enquirer to Sultan Hussein, as we have reason to believe he has made quite a study of humps in the past.

* * *

AUSTRALIA and New Zealand are, without doubt, countries of great glory and possibilities. But they have had rabbits to contend with until they have become almost a menace to Society. Now it is parrots—to wit, the Kea—in New Zealand which is causing a veritable panic amongst sheep-owners, according to Mr. Horace Hutchinson writing in the *Westminster Gazette*. And in giving voice to the existence of this plague, Mr. Hutchinson also puts forward a suggestion for a remedy. It is once more the aeroplane. In their onslaught upon the wretched sheep, the writer says "the demons come in flocks, shrieking. They do their deeds of death, eat their meals of quivering hot flesh; then back they go shrieking to their mountains. It is said that their resting-places have not been located in these fastnesses. The few that can be killed by shooting make no impression worth counting on their total. They increase not only in number, but also in boldness and in the badness of their ferocity and appetite for flesh, and, further, in the distance, from their native mountains, to which they will travel down to prey on the sheep. One hardly likes to think what the end of

"Flight" Copyright.

Prince Albert presents the prizes to the Captains of the Tug-of-War teams at the R.A.F. (South-Eastern Area) Sports at Queen's Club.

it is to be. We find, or we suggest, a solution for many troubles, and possibilities of comfort without limit, in that blessed word "aeroplane.' Is it just conceivable that by means of aeroplanes the nurseries of these demons may be discovered, no matter behind what inaccessible mountain walls they be guarded, and that chemistry, in the form of poison gas, and mechanics, joining hands, may find means to destroy the accursed brood? It is an urgent matter, and it is a matter on which it would be very bad economy not to spend money with all reasonable liberality, if there be any reasonable hope of abating a pest so deadly."

So here's another suggested opening for the 'plane to get its work in, without having to court comment as an unsportsmanlike proceeding.

■ ■ ■ ■

R.A.F. SPORTS AT QUEEN'S CLUB

With the view of selecting representatives for the R.A.F. athletic championships to be held at Stamford Bridge on the 21st inst., a series of trials was held by the South-Eastern Area at Queen's Club, Kensington, on August 6. Capt. H.R.H. Prince Albert was present, and at the conclusion presented the prizes to the successful competitors. Brig.-Gen. T. J. Webb-Bowen, C.B., C.M.G., Col. A. M. Longmore, D.S.O., and Maj. Owen were also present.

Among the competitors were some well-known athletes, who made quite a good showing. Sergt. P. H. Poigndestre, the ex-champion sprinter of the Channel Islands, carried off both the 100 yards and quarter-mile races, the former by a good yard from Lieut. A. J. Moore, in 11 1-5 sec., and the latter, in which he beat Sergt. R. E. Skinner by five yards, in 54 3-5 sec. Air-Mech. J. Pratt, of the Horsham and the Surrey A.C., won the mile and three miles very easily. In both events Pratt made his own pace throughout, and his times of 4 min. 51 3-5 sec. for the mile, and 16 min. 26 1-5 sec. were, therefore, good.

Capt. Marlowe won the half-mile after a fine race with Lance-Corporal Cook in 1 min. 57 4-5 sec.; Air-Mech. F. R. Aggersberg gained the 220 yards by half a yard from Corporal P. Wilmot in 24 1-5 sec.; Sergt. Bellingham took the long jump with 17 ft. 7 in.; L. Air-Mech. Owen the high jump at 5 ft.; Boy Downs the 100 yards and 220 yards races confined to enlisted boys, and L. Air-Mech. Kitson the 120 yards hurdles. The S.D. Earls Court beat the 143rd Squadron E. two pulls to nothing in the tug-of-war, and the Sixth S.D. Ascot gained the mile relay. A relay race for the W.R.A.F. was won by N. 1 M.T. Wormwood Scrubbs, and in a tug-of-war Kidbrook beat Regent's Park with two straight pulls.

"Flight" Copyright

R.A.F. (SOUTH-EASTERN AREA) SPORTS AT QUEEN'S CLUB, AUGUST 6: 1. Long Jump; Flight-Sergt. Bellingham was an easy winner. 2. Sack Race, in which the men scored an easy victory over the girls. 3. W.R.A.F. Relay Race; "Changing over." 4. Start of the One-Mile Flat Race. 5. High Jump; H. Kelcey, who last year broke two ribs in his efforts to excel. 6. Obstacle Race; over the top of a greasy inclined board into a water trough, a tough problem for several competitors.

"Flight" Copyright

R.A.F. (SOUTH-EASTERN AREA) SPORTS AT QUEEN'S CLUB, AUGUST 6 : 1. A group of spectators and competitors in the stands. 2. 120 Yards Hurdles ; winner (on right) soon established a good lead. 3. " Mounted " Wrestling. 4. Tug-of-War ; the W.R.A.F. team from Earl's Court pulled well.

* * *

Where the Money Goes !

IN the debate on the Consolidated Fund Bill in the House of Commons on August 7, Mr. Atkey, as one instance of wasteful Government methods, said he had received a letter from Sir James McCraith, a man, whose name stood high in the civic life of Nottingham, in which he said : " There is really such a wicked sample of the present Government waste of public money that I feel you ought to know of it. The facts are that the local anti-aircraft service is still kept in full swing with a colonel and other officers, and only about two months ago another gun was actually put up at Wilford."

Mr. Atkey said he could assure the Government that during the War that gun would have been very heartily welcomed at Nottingham. It was interesting to note that at the time when they were suffering shock from nerves owing to air-raids on Nottingham, there were no guns. Now, apparently, it was in accordance with up-to-date War Office methods that they proceeded to fortify Nottingham. The letter continued :

" Naturally both officers and men are here with practically nothing whatever to do. The general feeling of condemnation of those responsible is intense, and if I were you I would not only ask a question in the House but, if necessary, move the adjournment. Surely somebody should be punished, as it would be just as sensible to send submarines up the Trent."

Mr. Chamberlain said he had sent the particulars on to the War Office for enquiry.

The " Felixstowe Fury " Crash

UP to the time of writing there is no clear explanation of the disaster which overtook the " Felixstowe Fury," the five-engined triplane flying-boat designed by Colonel J. C. Porte, on Monday. It appears that the machine, which has been extensively tested during the past few months, was starting off on a trial flight preparatory to going to Plymouth, the first stage of a journey which would probably have been continued to the Cape. She started from Felixstowe at 9.15 a.m., made towards Landguard Point and then turned to get a favourable wind, but apparently there was some difficulty in clearing the buoys and also a river boat. After rising to about 10 feet the huge machine side-slipped and crashed to the water. Lieutenant S. E. S. MacLeod, who was strapped in, was drowned before he could be released. The other members of the crew—Colonel T. S. M. Fellowes, officer in charge, Major R. Moon, D.S.O. ; Captain C. L. Scott, D.S.C., pilots ; Lieutenant J. S. Armitt, and Mechanics Locker and Coburn were rescued little the worse for their experience.

Fatal Accident at Camberley

WHILE a large aeroplane which had flown over from Hounslow was landing on the football ground at the Royal Military College, Sandhurst, on August 6, it overturned. The pilot Capt. Hastings was killed, and Maj. Phillips and another passenger were so seriously injured as to necessitate their removal to Aldershot hospital, but the mechanic was able to go back to Hounslow by train.

Fatality at Westerham

AN inquest held at Biggin Hill Aerodrome on August 5 failed to show the cause of the accident on August 2, by which Lieut. A. E. Sweeting was killed and Sergt. H. Pressley was seriously injured. It appeared that the machine was being tested after the engine had been overhauled, and when coming down, apparently to land, it suddenly nose-dived from a height of 30 ft. The Coroner returned a verdict of " Death from Misadventure " through the machine nose-diving when on a practice flight.

CIVILIAN FLYING

BLACKPOOL AND SOUTHPORT

The five-seater Avros signified their arrival at Blackpool by setting up new records last week, nearly 500 passengers being flown in one day by three pilots—some flying! The holiday crowds have now arrived, and evince the keenest interest in the performance of the aeroplanes. Thousands throng the beach all day long looking for the day when flights will be 5*s.* each.

Last Saturday flying at Southport continued until 10 p.m., and even then there were a few more couples anxious to book a trip in the moonlight.

RHYL

Three Avro pilots have been kept busy all the week. Members of the Rhyl Council have led the way in flying, and have rendered every possible assistance to the scheme.

It is hoped that when the Air Ministry's licence for the Moorfa Ground, Conway, is granted, a special service will be inaugurated between Rhyl and Conway. The Moorfa is an excellent centre for all North Wales, Llandudno, Conway, Colwyn Bay being within a few miles of the landing ground.

DOUGLAS-WINDERMERE FLIGHTS

Capt. Pixton did very well last week in delivering his 30,000 *Daily News* daily to Douglas, and great crowds have awaited the arrival of the papers each day. The weather was not always kind, as on occasions he had to battle with 40 m.p.h. winds, but he got through to time despite them and a certain amount of mist. The flight has been so successful, that it is proposed to continue it. A standard Avro seaplane is used, but with a special compartment arranged for papers instead of the usual passenger accommodation.

MORECAMBE AND FLEETWOOD

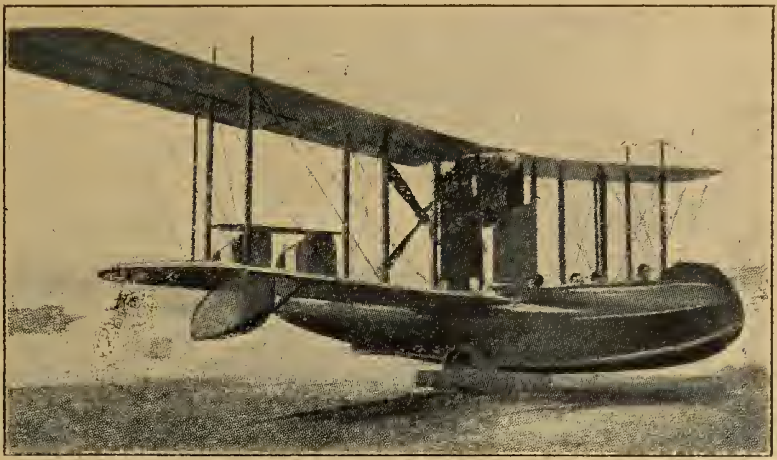
Lieut. Macrae, M.C., has had as much as he can do at these resorts.

On Thursday last the visibility was so remarkable that pilots could see the Isle of Man, all North Wales and Anglesey, Chester, Runcorn, into Yorkshire, far beyond Ingleborough, and away past Barrow into Scotland for a few thousand feet. It was one day in a thousand from the flying point of view.

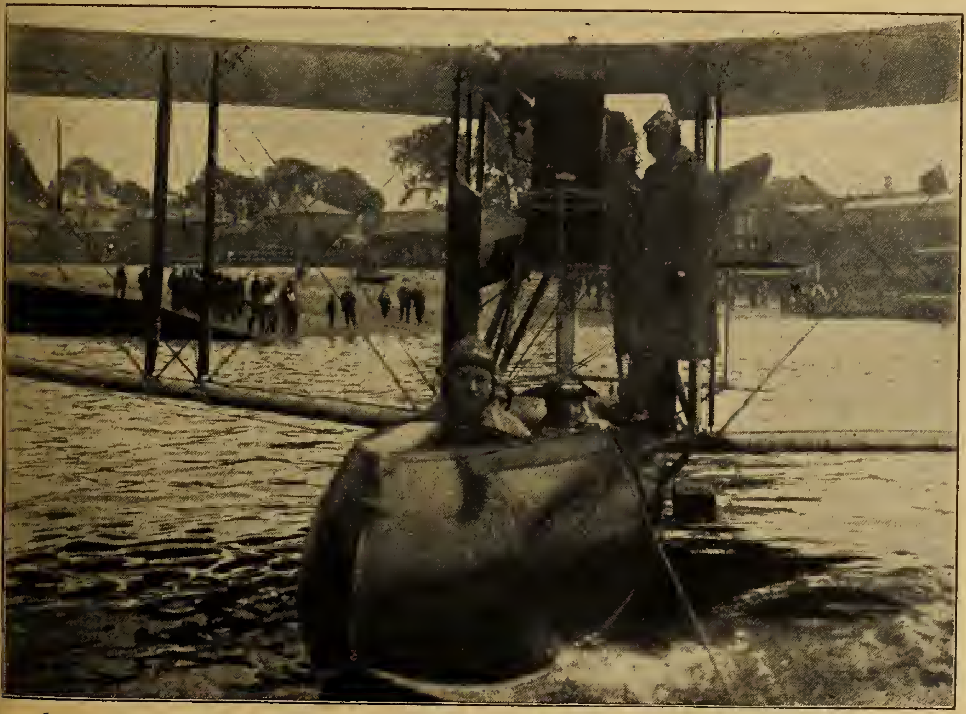
An interesting Benzol test on a 110 h.p. Le Rhone Avro Scout has just been completed in Lancashire. The results closely follow what has already been found out in connection with motor cars using this fuel.

BOURNEMOUTH AND THE ISLE OF WIGHT

An extensive programme of pleasure flying trips has been inaugurated recently by the Supermarine Aviation Co. of Southampton. Bournemouth was the first centre of these activities, and visitors at this place enthusiastically availed themselves of the opportunity of enjoying the thrills of over-water flying. Besides the ordinary daily joy flips around the immediate vicinity of Bournemouth itself—embarkation, etc., taking place from the pier—trips are also made to various towns in the Isle of Wight, and a daily service is run between Southampton and Bournemouth. As soon as the necessary regulations are framed the service will be extended to the North Coast of France, calling at Le Havre, Cherebourg, and St. Malo. The four-seater Channel-type supermarine flying boat (160 h.p. Beardmore) is being employed for these trips.



Three-quarter front view of the Supermarine "Channel"-type flying boat which is being used for joy flips at Bournemouth, Southampton and the Isle of Wight



The Supermarine "Channel"-type flying boat, with Mr. and Mrs. Harry Tate and Mr. R. Tate on board ready for a flight. Comdr. B. D. Hobbs, D.S.O., D.S.C., the pilot, is standing beside the engine

THE ROYAL AIR FORCE

London Gazette, August 5.

Permanent Officers.

Promotions.

To be Air Commodores:—A. V. Vyvyan, C.B., D.S.O., P. W. Game, C.B., D.S.O., O. Swann, C.B., C.B.E., F. R. Scarlett, C.B., D.S.O.; Aug. 1. C. L. Lambe, C.B., C.M.G., D.S.O., J. M. Steel, C.M.G., C.B.E., C. A. H. Longcroft, C.M.G., D.S.O., A.F.C., T. I. Webb-Bowen, C.B., C.M.G., L. E. O. Charlton, C.B., C.M.G., D.S.O., D. le G. Pitcher, C.M.G., D.S.O.; Aug. 5.

To be Group Capts.:—C. R. Samson, R. H. Clark-Hall, T. C. R. Higgins, A. M. Longmore, I. M. Bonham-Carter, O.B.E.; Aug. 5.

The following appointments are made:—

Directors.—P. W. Game, C.B., D.S.O., C. L. Lambe, C.B., C.M.G., D.S.O., R. M. Groves, C.B., D.S.O., A.F.C.; Aug. 1.

Dep. Dir., 1st Cl.—F. C. Halahan, C.M.G., D.S.O., M.V.O.; Aug. 1.

Dep. Dirs., 2nd Cl.—I. M. Bonham-Carter, O.B.E., and to be Dep. Dir., 1st Cl.; Aug. 5. E. R. Ludlow-Hewitt, C.M.G., D.S.O., M.C., C. L. N. Newall, C.M.G., A.M., C. L. Courtney, C.B.E., D.S.O.; Aug. 1.

The following temporary appointments are made at the Air Ministry:—

Staff Officer, 2nd Cl. (T.).—Capt. T. G. Skeats; Aug. 1.

Staff Officer, 3rd Cl. (T.).—Sec. Lieut. C. Y. Mitchell; Aug. 1, vice Capt. T. G. Skeats.

The following temporary appointments are made:—

Staff Officer, 1st Cl. (Air).—Lieut.-Col. G. M. Griffith; March 31.

Staff Officer, 2nd Cl. (P.).—Maj. R. C. Lane; July 31.

Staff Officers, 3rd Cl. (P.).—Capt. H. R. Kavanagh; July 8, vice Capt. L. A. K. Butt; Capt. A. J. W. Barmby, O.B.E.; July 31, from S.O. 2.

Flying Branch.

Lieut.-Col. (actg. Brig.-Gen.) P. L. W. Herbert, C.M.G., to be Lieut.-Col. (A.) from (S.O.), and relinquishes actg. rank of Brig.-Gen.; June 18.

Lieut.-Col. L. W. B. Rees, V.C., M.C., A.F.C., to be Lieut.-Col. (A.), from (S.O.); July 25.

Maj. R. B. B. Colmore, O.B.E., to be Maj. (A.), from (S.O.); May 12.

Capt. E. C. Emmett, M.C., D.F.C., to be actg. Maj. whilst empld. as Maj. (A.); May 1.

Capt. K. B. S. Greig to be graded for purposes of pay and allces. as Maj. whilst empld. as Maj. (K.B.); May 1.

Capt. F. Workman, M.C., to be Capt. (A.), from (T.); April 23.

Capt. A. J. H. MacColl to be graded for purposes of pay and allces. as Capt. whilst empld. as Capt. (A'ship); March 5.

Lieut. J. P. Morkbam to be actg. Capt. whilst empld. as Capt. (A.); Nov. 25, 1918.

Sec. Lieut. H. E. Crane is antedated in his appt. as Sec. Lieut. (A. and S.); May 11, 1918.

The following relinquish their commns. on ceasing to be emplyd.:—Sec. Lieut. W. R. Gray (Sec. Lieut., Shrops. L.I.); Aug. 9, 1918. Lieut. (Hon. Capt.) A. B. Fairclough, M.C. (Capt., Can. M.G.C.), Capt. J. H. Scandrett (Capt., Can. Fd. Art.); April 14. Sec. Lieut. (Hon. Capt.) H. E. Paquin (Capt., Quebec R.); April 19. Sec. Lieut. (Hon. Lieut.) H. McA. Peacock (Capt., R.F.); April 23. Lieut. (Hon. Capt.) G. W. Taylor (Lieut., R. Can. Dragoons); April 27. Sec. Lieut. C. R. Fraser (Lieut., Can. Engrs.); May 15. Lieut. W. A. Scott (Lieut., Can. Forestry Corps); May 31. Sec. Lieut. L. C. L. Cook (Sec. Lieut., R.A.S.C.); June 7. Lieut. A. Grundy (Lieut., Brit. Columbia R.); June 27. Sec. Lieut. E. H. D. Fowler (Lieut., Midd'x. R.), Lieut. R. C. D. Oliver (Sec. Lieut., R. Berks R.); July 1. Sec. Lieut. (Hon. Lieut.) A. C. Lobley (Lieut., E. Ont. R.); July 7. Sec. Lieut. (Hon. Lieut.) P. R. Cook (Lieut., R.F.A.); July 8. Capt. W. A. C. Heyman (Lieut., Hussars); July 24. Capt. F. R. Alford, M.C. (Capt., Can. M.G.C.); July 27.

(Then follow the names of 124 officers who are transfd. to the Unemployed List under various dates. We regret that owing to great pressure on our space, it is impossible to reprint this portion of the List.—ED.)

The following Capts. relinquish their commns. on account of ill-health and are permitted to retain their rank:—C. Lawrence, R. E. Spear (contracted on active service); July 25.

The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank:—S. F. Napper; June 15, substituted for the notification in the *Gazette* of June 27. W. G. Kewley (contracted on active service); July 5.

Lieut. L. F. Sbort (K.O.Y.L., T.F.) resigns his commn. on account of ill-health caused by wounds; July 23.

Sec. Lieut. R. C. Williams (Sec. Lieut., Hussars) resigns his commn., and is permitted to retain his rank; Aug. 6.

The initials of Sec. Lieut. D. E. Waight (Northumberland Fs.) are as now described, and not "W. G.," as stated in the *Gazette* of May 20.

The initials of Sec. Lieut. C. A. Muir are as now described, and not "J. A.," as stated in the *Gazette* of June 3.

The initials of Lieut. W. Partridge are as now described, and not "N.," as stated in the *Gazette* of June 27.

The notification in the *Gazette* of Dec. 31, 1918, concerning Sec. Lieut. H. Brooks is cancelled.

The notifications in the *Gazette* of April 4 concerning the following officers are cancelled:—Sec. Lieut. J. Collins (Rifle Bde.), Sec. Lieut. J. F. J. Peters.

The notification in the *Gazette* of April 29 concerning Lieut. R. Milner is cancelled.

The notifications in the *Gazette* of June 27 concerning the following officers are cancelled:—Capt. F. W. J. V. Fraser, O.B.E., M.C., Lieut. W. H. S. Towell, Sec. Lieut. (Hon. Lieut.) L. S. Dell.

The notification in the *Gazette* of July 4 concerning Lieut. N. B. Lovemore is cancelled.

The notification in the *Gazette* of July 15 concerning 475312 G. C. Boyer is cancelled.

The notifications in the *Gazette* of July 29 concerning the under-mentioned officers are cancelled:—Lieut.-Col. F. C. Sbelmerdine, Lieut. J. E. G. Mosby.

The Christian names of Sec. Lieut. Edward Harry Sansom are as now described, and not "Edward Parry Sansom," as stated in the *Gazette* of Sept. 10, 1918.

The notification in the *Gazette* of Oct. 25, 1918, concerning 475312 G. Boyer is cancelled.

Administrative Branch.

Capt. N. A. Daniell to be graded for purposes of pay and allces. of Maj. whilst empld. as Maj.; May 1.

Capts. to be Capts.:—A. Ridley from (S.O.); June 2. J. W. Carter from (T.); July 28.

Lieuts. to be actg. Capts. whilst emplyd. as Capts.:—H. B. Dakin; May 1. R. J. L. Gerard; July 22.

Lieuts. to be graded for purposes of pay and allces. as Capts. whilst empld. as Capts.:—I. Morgan, Jan. 12. (Hon. Capt.) R. A. Shepheard-Walwyn; May 1.

Lieut. (actg. Capt.) I. Morgan to be Lieut. from (K.B.) and to retain the actg. rank of Capt. (without pay and allces. of that rank) whilst empld. as Capt.; Nov. 17, 1918.

Lieuts. to be Lieuts.:—H. V. Lewis, from (A.); July 9. L. E. M. Gillman, from (S.O.); Aug. 1.

G. D'A. W. Oliver (Lieut., Wilts R.) is granted a temp. commn. as Lieut.; July 20, 1918.

Sec. Lieuts. to be Lieuts.:—(Hon. Capt.) C. S. Burdon; April 2, 1918. J. H. Thompson; Dec. 21, 1918.

Sec. Lieut. F. C. Matten to be actg. Lieut. whilst empld. as Lieut. from Jan. 1 to April 30.

Sec. Lieut. J. Pughe-Jones to be Sec. Lieut., from (A.); Feb. 3, substituted for the notification in the *Gazette* of Feb. 4.

The follg. relinquish their commns. on ceasing to be empld.:—Sec. Lieut. (Hon. Lieut.) L. S. Dell (Lieut., R.F.A.); May 14. Lieut. W. H. S. Towell (T./Pmr. Sub-Lt., R.N.); June 6.

(Then follow the names of 40 officers who are transfd. to the Unemployed List under various dates.)

Lieut. J. J. Coleman relinquishes his commn. on acct. of ill-health contracted on active service, and is permitted to retain his rank; July 25.

Sec. Lieut. H. V. A. Salter relinquishes his commn. on acct. of ill-health, and is permitted to retain his rank; July 25.

The notification in *Gazette* of July 1 concerning Lieut. H. W. Sidley is cancelled.

The notification in *Gazette* July 29 concerning Maj. R. B. B. Colmore, O.B.E., is cancelled.

The notification in *Gazette* Nov. 5, 1918, concerning Sec. Lieut. H. G. G. Rawlings is cancelled.

Technical Branch.

Capt. F. R. Williams to be actg. Maj. while empld. as Maj., Grade (A); May 1.

Capts. to be graded for purposes of pay and allces. as Majs. whilst empld. as Majs., Grade (A.):—T. Temple; April 1. F. Workman, M.C., from (A.); May 1.

Capt. E. R. Whitehouse to be Capt., Grade (A.), from (Ad.); April 11.

Capts. to be Capts., Grade (B):—F. Workman, M.C., from (A.); May 9, 1918. A. J. Woodhouse, from (S.O.); May 30.

Lieuts. to be actg. Capts. whilst empld. as Capts., Grade (A.):—L. E. Yeomans; Sept. 18 1918. T. G. S. Babb, from March 8 to April 30. P. Burke; May 1.

Lieut. J. W. Gardner to be Lieut., Grade (A.), from (Ad.); May 19.

Lieut. H. W. Sidley to be Lieut., Grade (B.) from (S.O.); May 23.

Lieuts. to be graded for purposes of pay and allces. as Lieuts. whilst empld. as Lieuts., Grade (A.):—(Hon. Capt.) J. R. Cassidy; from Aug. 22, 1918, to Jan. 10. T. G. S. Babb; from Feb. 24 to March 7; J. V. Yates; March 8.

Sec. Lieut. H. G. G. Rawlings (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut., Grade (B.); Nov. 1, 1918.

The following relinquish their commns. on ceasing to be empld.:—Sec. Lieut. H. A. Cole (Sub.-Lieut., R.N.V.R.); June 17. Sec. Lieut. (Hon. Capt.) W. W. W. Reilly (Capt., Connaught Rangers); July 29.

(Then follow the names of 28 officers who are transfd. to the Unemployed List under various dates.)

Maj. C. L. Hope relinquishes his commn. on account of ill-health, and is permitted to retain his rank; July 25.

The rank of Sec. Lieut. (acting Lieut.) A. Morison is as now described, and not Sec. Lieut. as in *Gazette* Jan. 24.

The notification in *Gazette* July 8 concerning Sec. Lieut. H. G. G. Rawlings is cancelled.

The notification in *Gazette* April 25 concerning Lieut. D. Gordon is cancelled.

Medical Branch.

Maj. A. Fairley (Surg.-Lieut.-Comm., R.N.) relinquishes his commn. on ceasing to be empld.; July 19.

Transferred to Unempld. List:—Lieut. A. J. Swanton; Feb. 28. Capt. J. Freeman; April 15. Capt. C. C. O'Malley; May 13. Capt. (Hon. Maj.) D. Wilson; July 14. Lieut.-Col. T. Pbilip; July 15. Capt. A. Sutcliffe; July 16.

Memoranda.

Lieut.-Col. B. C. Fellows, C.M.G. (Bt. Maj., Remount Service) (ret. Ind. Army), is granted the hon. rank of Brig.-Gen.; March 19.

Sec. Lieuts. to be Hon. Capts.:—(Hon. Lieut.) R. Blackith; Oct. 7, 1918. F. J. Smith; Jan. 14. W. Blake; May 29.

(Then follow the names of 10 Overseas Cadets granted temp. commns. as Sec. Lieuts., and 185 Cadets granted Hon. Commns. as Sec. Lieuts.)

The follg. gentlemen are granted hon. commns. as Sec. Lieuts.:—A. G. Bethel, W. A. Dunbill, H. M. Lane, G. Mitchell, G. F. Mullin, H. L. Overton, B. S. Ryrie, J. W. Shand, E. Roberts; Aug. 5.

Capt. F. W. I. V. Fraser, O.B.E., M.C. (Capt. Seaforth Higbrs.), relinquishes his commn. on ceasing to be empld; June 12.

(Then follow the names of 4 officers who are transfd. to the Unemployed List under various dates.)

The follg. Capts. (actg. Majs.) relinquish their commns. on account of ill-health, and are permitted to retain the rank of Maj.:—A. E. Hawker Feb. 5, substituted for notification in *Gazette* of Feb. 4. P. le G. Gribble from (S.O.); April 19, substituted for notification in *Gazette* of July 15.

Lieut. W. E. Rubens (Essex R., T.F.) relinquishes his commn. on account of ill-health contracted on active service; July 1.

London Gazette, August 8.

Permanent Officers.

Promotions.

To be Air Commodores—R. M. Groves, C.B., D.S.O., A.F.C., E. A. D. Masterman, C.M.G., C.B.E., A.F.C.; Aug. 8.

To be Group Capt.—P. L. W. Herbert, C.M.G., J. G. Hearson, C.B., D.S.O., E. R. Ludlow-Hewitt, C.M.G., D.S.O., M.C.; U. J. D. Bourke, C.M.G., C. L. N. Newall, C.M.G., A.M., A. E. Borton, C.M.G., D.S.O., A.F.C.; Aug. 8.

The following appointments are made:—

Deputy-Directors, 1st Cl.—Group Capt. E. R. Ludlow-Hewitt, C.M.G., D.S.O., M.C., Group Capt. C. L. N. Newall, C.M.G., A.M.; Aug. 8.

The following temporary appointments are made:—

Staff Officer, 2nd Cl.—Maj. J. Gaskell-Blackburn; July 1, from S.O. 1.

Staff Officer, 3rd Cl.—Sec. Lt. (Hon. Lieut.) L. Miller; Jan. 13.

Air Attache.—Lieut.-Col. R. A. Cooper, D.S.O.; May 1, vice Lieut.-Col. C. H. Meares.

Flying Branch.

Capt. J. H. Green to be graded for purposes of pay and allowances as Capt. while emplyd. as Capt. (A.); May 1.

Capt. J. H. Green to be graded for purposes of pay and allowances as Lieut. while empld. as Lieut. (A.); Sept. 27, 1918.

Sec. Lieut. F. C. Rayson to be Lieut.; May 28.

Sec. Lieut. S. C. Paice (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (A.); May 1, since killed, substituted for notification in *Gazette*, June 3.

H. C. Harris is granted a temp. commn. as Sec. Lieut. "O."; Nov. 4, 1918.

Lieut. E. H. P. Jolley (Sec. Lieut. (temp. Lieut.), I.A.R.O.) relinquishes his commn. on reversion to I.A.R.O.; Aug. 7.

The following relinquish their commns. on ceasing to be empld.:—Lieut. V. S. Bennett (Lieut. (actg. Capt.), R. Newfoundland R.); July 3. Lieut. S. B. Nelson (Lieut., E. Ont. R.); July 23. Lieut. W. G. Jewitt (Lieut., E. Ont. R.); July 24. Lieut.-Col. E. B. Gordon, C.M.G., D.S.O. (Maj. and Bt. Lt.-Col., North'd Fus.); July 26. Lieut. A. Rose, M.M. (Lieut., Alberta R.); July 29. Sec. Lieut. (Hon. Lieut.) A. H. Bill (Lieut., Sask. R.); July 30. Capt. S. H. Long, D.S.O., M.C. (Lieut., D.L.I.); July 31. Maj. A. V. Holt, D.S.O. (Capt., R. Highrs.); Aug. 4.

(Then follow the names of 87 officers who are transfd. to the Unemployed List under various dates. We regret that owing to great pressure on our space, it is impossible to reprint this portion of the List.—ED.)

Lieut.-Col. C. E. C. Rabagliati, M.C. (Capt., Bt. Maj., K.O.Y.L.I.), resigns his commn. and is permitted to retain his rank; Aug. 6.

The follg. Capts. relinquish their commns. on account of ill-health and are permitted to retain their rank:—W. D. M. Bell, M.C. (contracted on active service); April 11, 1918. J. A. Hutchison; May 20, substituted for the notification in the *Gazette* of Jan. 24.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—F. N. Grimwade; April 18, 1918 (substituted for the notification in the *Gazette* of Sept. 6, 1918). R. Coop (caused by wounds); June 6.

Lieut. S. Carlin, M.C., D.F.C., D.C.M. (R.E., T.F.), relinquishes his commn. on account of ill-health contracted on active service; Aug. 7.

Lieut. W. L. C. White to take rank and precedence as if his appointment as Lieut. bore date Oct. 1, 1918.

The initials of Lieut. F. P. O. Mann are as now described, and not "F. O." as stated in the *Gazette* of June 17.

The notification in the *Gazette* of March 21 concerning Sec. Lieut. W. S. Vipond (Lieut., Canadians) is cancelled.

The notification in the *Gazette* of April 8 concerning Lieut. S. D. Morrison (Nova Scotia R.) is cancelled.

The notification in the *Gazette* of July 15 concerning Capt. G. H. Morton (Brit. Col. R.) is cancelled.

Administrative Branch.

Sec. Lieut. (Hon. Lieut.) E. Meynell, D.C.M., to be actg. Capt. while empld. as Capt.; May 1.

Lieut. H. Harker to be Lieut. from (A.); July 25.

F. R. C. Davidson (Lieut., Montgomery Yeo., T.F.) is granted a temp. commn. as Lieut.; Aug. 1, 1918, with seniority from April 1, 1918.

The following relinquish their commns. on ceasing to be empld.:—Capt. (Hon. Maj.) H. R. P. Reynolds (Capt. (Bt. Maj.), R.E.); June 17. Lieut. J. E. H. Bihhy. June 30.

(Then follow the names of 20 officers transfd. to the Unemployed List under various dates.)

Sec. Lieut. L. MacK. Lockhead relinquishes his commn. on account of ill-health, and is permitted to retain his rank; July 29.

The rank of Lieut. H. A. Maynard is as now described, and not Capt., as stated in the *Gazette* of June 17.

The notification in the *Gazette* of June 17 concerning Lieut. L. H. Hillier is cancelled.

The notification in the *Gazette* of July 22 concerning Lieut. (Hon. Capt.) T. E. Gentles is cancelled.

Technical Branch.

Maj. S. S. Nevill, O.B.E., to be actg. Lieut.-Col. whilst empld. as Lieut.-Col., Grade (A.); May 1.

Lieut. C. H. Boyle to be actg. Capt. whilst empld. as Capt., Grade (B.); May 29.

Lieut. L. H. Hillier to be Lieut. (Grade A.), from (A.); Sept. 23, 1918.

Sec. Lieut. J. Penrose to be Lieut., without pay and allces. of that rank; Jan. 15.

Sec. Lieut. (Hon. Lieut.) (actg. Capt.) F. McGuffie to be Sec. Lieut. (Hon. Lieut.), Grade (B.), and to relinquish the actg. rank of Capt., from (S.O.) (March 5), substituted for the notification in the *Gazette* of July 29.

(Then follow the names of 15 officers transfd. to the Unemployed List under various dates.)

Maj. E. J. Parker, M.C., to take rank and prec. as if his appt. as Maj. bore date Oct. 1, 1918.

Sec. Lieut. J. P. Clark resigns his commn.; Aug. 9.

The surname of Lieut. H. W. K. Jennings is as now described, and not "Jellings," as stated in the *Gazette* of June 3.

The rank of Lieut. E. P. Proud is as now described, and not as stated in the *Gazette* of April 4.

The notification in the *Gazette* of April 4 concerning Lieut. W. F. Mytton is cancelled.

The notification in the *Gazette* of July 1 concerning Lieut. J. Hooper is cancelled. The notification in the *Gazette* of July 11 to stand.

Medical Branch.

Lieut.-Col. H. E. South (Fleet Surgeon, R.N.) relinquishes his commn. on ceasing to be empld.; May 19.

Transferred to Unempld. List:—Capt. T. H. James; June 22. Capt. (actg. Maj.) C. J. G. Taylor; Aug. 1.

Dental Branch.

G. Packman is granted a temp. commn. as Capt.; Aug. 1.

The following are granted temp. commns. as Lieuts.:—P. E. Bernard, R. H. More; Aug. 1.

Chaplains Branch.

The Rev. H. E. Ruddy, M.A., is transferred to Unempld. List; July 28.

(Then follow the names of 261 Overseas Cadets granted hon. commns. as Sec. Lieuts.)

Lieut.-Col. A. Christie, C.M.G., D.S.O. (Capt. (temp. Lieut.-Col.), Royal R. of Artillery), relinquishes his commn. on ceasing to be empld.; Aug. 2.

(Then follow the names of 8 officers transfd. to the Unemployed List under various dates.)

Capt. C. H. S. Taylor relinquishes his commn. on account of ill-health contracted on active service, and is granted rank of Lieut.-Col.; June 30.

The notification in *Gazette* April 29 concerning Maj. J. W. K. Allsop is cancelled.

The notification in *Gazette* July 18 concerning H. P. MacDonald is cancelled.

AVIATION IN PARLIAMENT

Civil Aviation Department Salaries

MR. JOYNSON-HICKS, in the House of Commons on August 8, asked the Under-Secretary of State to the Air Ministry if he can make a statement as to the names, salaries, and working of Gen. Sykes' staff in the Civil Aviation Department?

Maj.-Gen. Seely: The following members of the staff of the Civil Aviation Department are being paid the civil rates shown:—

Maj.-Gen. Sir F. H. Sykes.—£2,000 plus £500 retired pay.
Maj.-Gen. E. D. Swinton.—£1,800. less 10 per cent. deduction on account of pension.
Lieut.-Col. W. O. Raikes.—£1,000.
Mr. G. B. Cockhurn.—£800.
Mr. J. M. Pearson—£280 plus bonus.

Other gentlemen are serving in the Civil Aviation Department as officers, and these are in receipt of Staff rates of pay or pay and allowances of their rank. Letters offering civil appointments in those cases agreed by the Treasury have been sent.

C.A.D. Organisation

CAPT. W. BENN asked the Under-Secretary of State to the Air Ministry whether he can make a statement regarding the organisation of the Civil Aviation Department, especially the training and licensing of commercial pilots?

Maj.-Genl. Seely: As regards the first part of the question, the organisation of the Department of Civil Aviation is proceeding on the general lines indicated in the Memorandum circulated amongst members by me on April 30 last. Treasury sanction has been obtained for a certain proportion of the staff provisionally asked for by the Air Ministry. Since the date of the Memorandum referred to, all the meteorological services have become part of the Department of Civil Aviation. As regards the second part of the question, the Department of Civil Aviation does not undertake the training of pilots, but it licenses pilots possessing the qualifications prescribed in the Air Navigation Regulations.

Enforcement of Air Regulations

MR. JOYNSON-HICKS asked the Under-Secretary of State to the Air Ministry whether he is making any arrangement in the nature of an air police force for ensuring obedience to the Air Regulations?

Maj.-Gen. Seely: Arrangements have been made in order to ensure, as far as possible, that breaches of the Air Regulations are reported to the Controller-General of Civil Aviation. It is not considered that the expense involved in maintaining an air police force would be justified at the present stage.

Hostile Air Raids (Claims)

LIEUT.-COL. ASSHETON POWNALL asked the Prime Minister what action should be taken by the dependants of those killed in hostile air raids in order that their claims may be submitted to and settled by Germany, as provided by Article 232 of the Treaty of Peace?

Mr. Harmsworth: Applicants should send in particulars of their claims to the Foreign Claims Office, Foreign Office.

R.A.F. Air Division (Naval Staff)

MR. RAPER asked the Prime Minister for what purpose the Air Department of the Admiralty is maintained?

Mr. Long: I have been asked to answer this question. I would repeat the reply which I gave on July 31 to a similar question, that there is no Air Department at the Admiralty. There is an Air Division of the Naval Staff, which advises as to air operations affecting Royal Air Force units working with the Fleet. This division is manned by Royal Air Force officers lent by the Air Ministry. I might add that this arrangement was made to meet war conditions, and the question of the best means of securing the necessary close co-operation in peace-time is at present being considered by the two Departments.

Construction of Airships

CAPT. W. BENN asked the Under-Secretary of State to the Air Ministry whether he can make a statement explaining the Government policy relating to the transference of the construction of lighter-than-air craft from the Admiralty to the Air Ministry?

Maj.-Gen. Seely: I cannot yet add anything to the answer given on this subject by the Lord Privy Seal on behalf of the Prime Minister last Thursday.

Capt. Benn asked the First Lord of the Admiralty whether he can make a statement explaining the Government policy relating to the transference of the construction of lighter-than-air craft from the Admiralty to the Air Ministry?

Mr. Long: I am not yet in a position to add to the statement made by my right hon. friend the Leader of the House on Thursday last, July 31.

Discharges at Henlow Aerodrome

MR. TOWNLEY, on August 7, asked the Under-Secretary of State for Air whether he is aware that 50 per cent. of the men employed at the Henlow Aerodrome have received notice to leave on August 9, and the remainder to go shortly; and whether, especially as many of these men are ex-Service men, he will take steps to suspend this notice?

The Under-Secretary of State for Air (Maj.-Gen. Seely): I only received my hon. friend's question on entering the House, and have not had time to ascertain the full facts of the case. I am aware, however, that a large number of men at Henlow are under notice to leave owing to necessary reductions. I regret extremely the inconvenience and anxiety which must be caused to the men and their families by these dismissals at Henlow and elsewhere, especially as many of the men employed have served in the field, but the great reduction in the establishments and expenditure of the Royal Air Force render these hardships unavoidable. Fifty-two aerodromes, eleven seaplane stations, 147 landing grounds, and 1,899 hired premises have been closed since the Armistice, involving an almost unprecedented reduction in expenditure and labour employed in so short a period. I am making special enquiries at Henlow, and my hon. friend may rest assured that every effort will be made there and elsewhere to mitigate the hardships resulting from the necessary reductions, while maintaining the efficiency of the Royal Air Force, which are essential in the interests of economy.

Relinquishment of R.A.F. Aerodromes and Offices

CAPT. W. BENN asked the Under-Secretary of State to the Air Ministry what reductions have been made recently in the number of aerodromes in use and the hotels and offices occupied by the Ministry?

Major-General Seely: Between July 2 and August 6, 1919, one aerodrome, five seaplane stations and 13 landing-grounds have been notified to the

Directorate of Lands as available for relinquishment or to be disposed of, making a total of 52 aerodromes, 11 seaplane stations and 147 landing-grounds so advised since November 11, 1918. The Hotel Cecil, the only hotel now in the occupation of the Air Ministry, will be evacuated on August 13, 1919. The offices at 5, John Street, Adelphi, will be evacuated on August 9, 1919.

The following hotels and offices have been given up by the Air Ministry within the last five months :—

Cavendish Hotel, evacuated January 10, 1919.
4/6, Adam Street, evacuated March 22, 1919.
Adelphi Hotel, evacuated April 5, 1919.
5 and 7, John Street, Adelphi, evacuated April 5, 1919.
Covent Garden Hotel, evacuated April 14, 1919.

The number of hired premises in use by the R.A.F. at the date of the Armistice was 2,143 ; by August 1, 1919, 1,899 of these had been given up.

Damage by Aircraft (Insurance)

SIR H. NIELD asked the President of the Board of Trade whether the existing and current policies issued under the Government scheme of insurance against damage by aircraft entitle the holders to be indemnified against damage done by Government-owned aircraft exercised and controlled by members of the R.A.F. or other services of the Crown and by civilian-owned aircraft ?

Mr. Bridgeman : Damage caused by aircraft employed by the British Government is covered under the Government Aircraft Policy, but damage consequent upon the use of aircraft other than those under Government control or ownership is not so covered.

Civil Aviation Conditions

SIR HERBERT NIELD asked the President of the Board of Trade whether any licence or other permit is necessary to enable civilian-owned aircraft to be exercised and flown ; whether any regulations have been made with regard to the conditions under which such flying is authorised, and what, if any, security is required or other provision made for the payment of or indemnity against damage to life or injury to persons or property resulting from accidents caused by the fall of aircraft or from anything dropped from aircraft while in the course of flight ; and whether there is any and what provision for the identification of such aircraft in cases where the injury is caused by anything so dropped ?

Major-General Seely : The conditions governing civilian flying are laid down in the Air Navigation Regulations, 1919 (Statutory Rules and Orders, 1919, No. 525). These Regulations provide, *inter alia*, that all aircraft must be registered and bear a registration mark, that aircraft carrying passengers for hire or reward must be certified airworthy, and that all pilots flying aircraft must be licensed. There is no special provision in the Regulations as to liability in respect of accidents. Conditions are imposed as to the display of the registration mark with a view to facilitating the identification of aircraft. Damage caused by aircraft is recoverable by ordinary process of law as in the case of damage caused by any other means.

Anti-Aircraft Station, Shipbourne

MR. BENNETT, on August 8, asked the Secretary of State for War if there is now any necessity for the anti-aircraft station at Shiphourne, Sevenoaks ; and if he will give instructions for its early removal, inasmuch as the huts and gun prevent the villagers from using the village green for cricket and other accustomed sports ?

Mr. Churchill : Instructions are about to be issued for the abolition of the anti-aircraft station at Shipbourne.

Air Force Contracts

MR. RAPER, on August 12, asked the Under-Secretary to the Air Ministry what steps he proposed to take to punish all persons in or connected with the Air Force, no matter what their positions, found guilty of corrupt practice in connection with the Air Force contracts by the Select Committee on National Expenditure, and whether, in view of recent disclosures, he would now, without further delay, form a small committee of two or three members of the House having real business experience and two or three other experienced business men outside the House to supervise the placing and execution of all future Air Force contracts.

Maj.-Gen. Seely : Every possible step has already been taken and will be taken in future to bring to justice any person in, or connected with, the Air Force guilty of corrupt practices regarding Air Force contracts or in any other matter. I am not disposed to adopt the suggestion contained in the last part of the question. I intend to make a statement on the matter in the course of to-morrow's debate.

Mr. Raper : Does the right hon. gentleman propose to take steps to prosecute those referred to in the report of the Select Committee ?

Maj.-Gen. Seely : Since I have been at the Air Ministry, wherever there has been any case of corruption I have at once given orders that a prosecution shall take place, if a prosecution can lie. I propose to continue that practice.

Mr. Raper : Is it not a fact that, in connection with the instances mentioned in the report, the Government decided, for reasons of their own, not to institute proceedings ?

Maj.-Gen. Seely : No, Sir. I presume my hon. friend is referring to two cases. One was the case referred to by Sir John Hunter, in which I gave instructions myself personally that a prosecution was to take place if a prosecution would lie. I gave these instructions precisely twice to Sir John Hunter, who was then acting under my directions. The Lord Advocate for Scotland decided that a prosecution would not lie. So far as the Air Ministry is concerned the facts are as I have stated, that wherever there has been the possibility of prosecution a prosecution has been ordered. The other was the case of Miss O'Sullivan, who made allegations of corruption. The very day that these allegations were brought before the Select Committee, presided over by the right hon. baronet, the member for the City of London, I ordered an inquiry to be held, which is now proceeding. If there is ground for prosecution—that is, of course, a legal matter—that prosecution will take place.

Mr. G. Lambert : May I ask the Leader of the House whether if, with Mr. Speaker's permission, this matter is raised to-morrow as to the prosecution of these officials in the Air Service, the Lord Advocate will be here to defend his somewhat inexplicable action ?

Mr. Bonar Law : I shall make inquiry, but I entirely agree with my right hon. friend that a discussion on that point would be very ineffective unless we hear the Lord Advocate's own explanation of what are his reasons.

Mr. Billing asked whether the officers named by Sir John Hunter were still in the employment of the Air Service, and, if so, what positions did they occupy.

Maj.-Gen. Seely : I do not carry the facts in my mind, and I must have notice of the question as to the particular officers the hon. member refers to. But I repeat that our policy has been throughout—mine especially—that wherever there could be any question of improper or corrupt dealings a prosecution is at once ordered.

Mr. Billing asked whether, having regard to the fact that the only reason that these officers had not been prosecuted was owing to a technicality, the right hon. gentleman could see that if they occupied any position of trust they should be forthwith dismissed.

Maj.-Gen. Seely : Certainly not. Are we to assume that a man is guilty before he is found to be so by a process of law ? I cannot carry in my mind who all these people are, but in trying to do what is right in the interests of the State we must do right to the individual.

Maj.-Gen. Seely (in reply to a question by Mr. Briant): The information I received from the Lord Advocate was that a prosecution would not succeed. When it was suggested to me that possibly it might bring into disrepute the representatives of either Sir John Hunter or any other officials, I said at once that that had nothing whatever to do with the case, but I confess that I do not understand that particular point. The Lord Advocate is not present in the House, but no doubt it will be cleared up to-morrow. I say at once that such an idea never entered my head or the head of anyone responsible at the Air Ministry. All we want to do is to get at the truth.

Sir F. Banbury : This matter was the subject of inquiry so long ago as March. No inquiry was granted until June, and then the inquiry was commenced but was not finished, owing to the fact that Miss O'Sullivan had not signed her evidence, and no further steps were taken until it was made evident to the Air Ministry that inquiries were going on before the Select Committee, and it was then, and then only, on the 25th of last month, that an inquiry was instituted by the Air Ministry.

Maj.-Gen. Seely : I have said again and again in this House that if in this matter, which affects what is called the "Douglas-Pennant case," any specific charge of corruption could be made, it would be at once inquired into. I have again and again asked for a specific statement. It was not given. The moment it was given in response to a question asked by the Select Committee that very same day an inquiry was ordered.

Capt. Wedgwood Benn : Who is the Secretary of State for Air, and why is he not here to answer these matters ? Will he be here to-morrow ?

Mr. Bonar Law : He will certainly be here to-morrow, and I am quite sure my right hon. friend will be glad to have an opportunity of stating the policy of the Air Ministry in this matter.

Mr. Stewart : If there is any prosecution possible will it be under Scottish law or English law, and is the law of evidence the same in Scotland as in England ? No answer was given.

Mr. MacVeagh : Will the right hon. gentleman, in the inquiry which he is now conducting, inquire into the conduct of the official who threatened to dismiss Miss O'Sullivan for making this report ?

Mar.-Gen. Seely : Yes, certainly.

Lord Rohert Cecil rose, but the Speaker said that any further questions had better be left over for discussion the next day.

◆ ◆

Aerial Photography and Map Making

THE first annual dinner of photographic officers of the R.A.F. was held on Monday at the Café Royal, Major F. C. V. Laws presided, and among those present were Lieut.-Colonel J. T. C. Moore Brabazon, M.P., Major P. R. Burchall and Major Gamble.

Proposing the toast of "The Photographic Officers," the Chairman said that on the Western front it was recognised that British aerial photography was ahead of that of all the Allied forces and far in advance of that of the Germans. At least six months ago the German Air Ministry issued a statement that aerial photography was a science created by the war which they must not allow to slip from their fingers. He hoped the British Air Ministry would appreciate the value of the science as soon as possible. Every town, river, railway and road in the country ought to be photographed from the air.

The toast of "General Trenchard, Colonel Moore Brabazon and the Training Division" was also honoured.

32 Squadron, R.A.F.

OLD members of this squadron may care to know it is proposed to form an association for them, of which Lieut.-Col. T. A. E. Cairns, D.S.O., has consented to become President. Its headquarters are at 30, Bedford Row, London, W.C., where Mr. P. P. Nicholl is acting as Hon. Secretary, and he will be glad if all old members of the squadron will keep him posted as to their movements. He will also welcome photographs for the squadron album.

A Madrid-London Flight

A BRITISH aeroplane, piloted by Major de Havilland, which was flying from Madrid to London, descended near Cherbourg on Sunday evening. The machine left for London the next morning.

An Anglo-Spanish Aerodrome at Vittoria

THE arrangements for the starting of commercial air services in Spain are progressing and the arrival of Count Abliz at Vittoria to inspect the aerodrome established there by an Anglo-Spanish company is reported. It is also proposed to organise aerial tours.

From Madrid to Rome

ON a S.I.A. machine the Italian pilot, Stoppani, left Madrid at 6 a.m. on August 6 and landed at Centocelle aerodrome, near Rome, at 5.45 p.m. the same day. His route during the non-stop trip of 990 miles was Madrid, Gulf of Lyons, Marseilles, Genoa, Spezia, Pisa, Rome.

The King of Spain availed himself of this means to send greetings to the King of Italy.

Adventure with the Bolshevists

FROM a letter written home by Lieut. Lansdowne it appears that the machine in which he and Lieut. Marshall were flying was hit when over the Bolshevist Dvina lines, and they were forced to descend on the river.

Destroying their machine they tried to swim back to the British lines, but after covering a mile they were subjected to heavy fire and had to surrender. They report that they are safe and well.

SIDE-WINDS

THE King of the Belgians has conferred the honour of Commandeur de l'Ordre de Leopold II upon Sir Herbert Austin, managing director of the Austin Motor Co., Ltd., in recognition of "constant and generous help given to this country in the course of the War."

* * *

IT was erroneously reported in several papers that the 750 h.p. Fiat aeroplane, which recently flew from Rome to London, made a crash landing at the Marquise Aerodrome, near Calais, when leaving England. As a matter of fact, one of the most curious accidents which has ever occurred in connection with an aeroplane engine did necessitate a landing at the aerodrome in question. The induction pipe of the engine broke, necessitating a landing, which was made in the ordinary way and without any difficulty. The damage was quickly repaired, when the aeroplane continued its journey to Amsterdam, where exhibition flights are being given.

* * *

A STRIKING instance has just been afforded of the increase of speed in transport. Capt. Gathergood, winner of the Aerial Derby, carrying two passengers in an Airco 4A biplane, came through from Edinburgh to London on Tuesday week in a flying time of only 3¼ hours, averaging a speed of 120 miles an hour.

* * *

IN connection with the direct non-stop flight from London to Madrid made by the Napier-engined Alliance "Seabird" on July 31, an interesting point has been brought out by Mr. H. T. Vane, the managing-director of Messrs. D. Napier & Son, Ltd. The flight itself was accomplished in 7¾ hours—the cable announcing the arrival of the aeroplane at Madrid did not reach his office until 15½ hours after its despatch. The fact that the cable took nearly twice as long as the aeroplane to cover the distance, gives some idea of the possibilities of the aeroplane for commercial use.

* * *

THE annual sports of the Handley Page Social and Athletic Club on the club ground in Cricklewood Lane on August 5 attracted a good "gate," and St. Dunstan's and the local hospitals should benefit considerably. A very full programme had been arranged, and there was a continuous performance until the time came for Mrs. Handley Page to distribute the fine array of prizes to the successful competitors.

* * *

FROM the Aluminium Plant and Vessel Co., Ltd., of Point Pleasant, Wandsworth, S.W.18, comes a most useful catalogue giving particulars of their productions. It is arranged on the loose-leaf principle so that it is quite simple to insert new leaves as they are issued. Apart from illustrating and describing the many varied lines which are turned out by this firm, the book contains quite a deal of valuable information regarding aluminium vessels generally. No doubt the firm will be pleased to send a copy to anyone really interested if they apply to the address given above.

* * *

MESSRS. D. NAPIER AND SON, LTD., have produced a dainty catalogue, giving a full specification and particulars of the 450 h.p. Aero engine. Although this engine is in its youth, so to speak, it has already a fine list of outstanding performances to its credit. Not the least interesting part of the book is the copy of the official certificate of the altitude record made last January when a Napier-engined D.H.9, with two up, went to 28,000 ft.

* * *

A SUPERMARINE flying boat was flying each day at the Cowes Regatta, and the facilities offered were taken advantage of by members of the R.Y.S. and other clubs in order to view and follow the yacht racing from the air. It was found that this new attraction appealed very strongly to the many yachtsmen staying at Cowes for the week. On the evening of August 7 the supermarine flying boat was chartered by Col. Wingfield to fly to Portsmouth and circle over H.M.S. *Renown* as she left the harbour. He was thus able to take part in a final farewell, in the air, to H.R.H. The Prince of Wales, on his departure for Canada.

"Flight" Copyright

HANDLEY PAGE SOCIAL AND ATHLETIC CLUB SPORTS, AUGUST 5 : 1. The Prizes, which were at the finish presented by Mrs. Handley Page. 2. Finish of 880 Yards Cycle (Final)—1st, S. Hudson ; 2nd, D. H. Genner ; 3rd, F. G. Stevens. 3. D. C. A. Findlay winning the One-Mile Open Handicap. 4. The clown and his young companion amuse the crowd with a boxing match. 5. C. F. Davey winning the One-Mile Open Cycle Handicap. 6. Finish of 880 Yards Open Handicap —1st, H. H. Kidd ; 2nd, E. P. Donovan ; 3rd, J. Kilner

CORRESPONDENCE

HELPING TO CONSERVE THE INDUSTRY

[1978] No Department of Commerce has ever started under greater disadvantages than that seriously concerned with aeronautics. Prior to the War, a few firms, a very few, were desperately struggling to obtain and maintain a commercial foothold. These, with the experience which they had acquired by August, 1914, buoyed up and impelled by the almost unlimited purse and resources of the Government, promptly made good. Of necessity, however, there came into being, to meet the extraordinary requirements of the country, a large number of firms of mushroom growth. I do not refer in any sense to the very numerous engineering and woodworking firms who embarked upon aeronautical construction as a war measure and as a side line, many of whom are now abandoning, at all events for the time being, aeronautical construction, and reverting to their pre-War programmes, but to those firms whose sole occupation since their inception has been solely the manufacture or assembling of some aeronautical product.

It was obvious that for a very considerable period after the conclusion of Peace, many of those firms would be in perilous waters. That any considerable number of those should faint by the wayside would be a disaster to the trade at large, and to the nation, and the A.I.B. was formed with the intention of helping to steer these firms through the shoals into a safe harbour. It was felt that firms supplying raw materials to makers of component parts, and in turn that these makers of component parts who delivered their products on credit to the actual assemblers of the finished article needed a careful guidance, and the institution of a co-operative scheme which would prevent the inception of a panic.

Recollecting that the strength of a chain is the strength of its weakest link, it was hoped to prevent by foresight the collapse of any firm, or, if that could not be expected, at least to limit the mischief to a very small area.

My directors instruct me to invite through your columns the active co-operation and goodwill of all who are interested commercially in any degree in aeronautical developments.

Correspondence is invited from all such firms, and the aims and objects of the Bureau will be readily explained to all interested parties by

P. P. NICHOLL,
Secretary, Aeronautical Intelligence Bureau, Ltd.
20, Bedford Row, W.C. 1.

* * * *

PUBLICATIONS RECEIVED

Pigeon Service Manual: Royal Air Force. London: H.M. Stationery Office. Price 6*d.* net.

The Future of Aerial Transport. Reconstruction Problems No. 34. London: H.M. Stationery Office. Price 2*d.*

Catalogue

Aluminium Tanks, Vessels, etc. The Aluminium Plant and Vessel Co., Ltd., Point Pleasant, Wandsworth, S.W. 18.

* * * *

NEW COMPANY REGISTERED

WEST OF SCOTLAND AVIATION CO., LTD., Station Road, Eye, Suffolk.—Capital, £2,000 in £1 shares. First directors: T. H. French, F. W. French, R. W. Reeve and J. Fryer.

* * * *

IMPORTS AND EXPORTS, 1918-1919.

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916. see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; and for 1918, see "FLIGHT" for January 16, 1919.

	Imports.		Exports.		Re-exportation.	
	1918.	1919.	1918.	1919.	1918.	1919.
	£	£	£	£	£	£
January ...	49,402	555,989	24,765	57,571	—	—
February	51,941	453,822	13,545	57,972	—	—
March ...	47,930	704,424	11,451	72,716	1,000	400
April ...	33,342	97,662	10,815	25,433	—	—
May ...	942,866	136,631	67,224	38,428	—	—
June ...	864,296	1,410	35,658	41,526	—	—
July	1,834,293	136,463	10,800	41,290	—	—
	3,824,070	2,086,401	174,258	334,936	1,000	400

Aeronautical Specifications Published

***Abbreviations*:—cyl.=cylinder; I.C.=internal combustion; m.=motors.**

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published August 14, 1919

17,030. R. BOYLE and A. PAYZE. Fin surfaces of aeroplanes. (129,666.)
17,120. F. L. RAPSON. Means for propelling aircraft. (129,672.)
17,121. HIGHGATE AIRCRAFT CO. and F. HELLERS. Aircraft spars. (129,673.)
17,326. E. LETORD. Controlling-gear for aeroplanes. (129,681.)
17,327. E. LETORD. Support for radiators on aeroplanes. (129,682.)
17,328. E. LETORD. Connecting members for assembling and mounting aeroplane parts. (129,683.)
17,330. E. LETORD. Control mechanism for aero motors. (129,684.)
17,402. W. AND T. AVERY and H. BOLAS. Aircraft planes. (129,687.)
17,403. W. AND T. AVERY and H. BOLAS. Seaplanes or aeroplanes. (129,688.)
17,553. E. A. V. ROE, R. J. PARROTT and A. V. ROE AND CO. Hinged stabilising planes. (129,696.)
17,631. CELLON, LTD., and A. J. A. W. BARR. Doping aeroplane fabrics. (129,698.)
17,755. S. E. SAUNDERS. Alighting gear for aircraft. (129,705.)
17,940. SOC. ANON. DES ATELIERS D'AVIATION BREGUET. Ropes, wires or shrouds or aircraft. (129,711.)
17,975. AIRCRAFT MANUFACTURING CO., G. DE HAVILLAND and J. S. CHAPMAN. Fuel supply pumps for aero engines, etc. (129,713.)
17,994. E. MCGRUER. Aerial propellers. (129,714.)
18,166. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Indicator of variations in direction of travel of aircraft. (129,719.)
18,232. J. J. MAYROW. Frame members of aircraft. (129,723.)
18,246. A. E. BREWERTON. Gyroscopical direction-indicators. (129,724.)
18,292. F. W. LANCHESTER. Lateral plumb indicator for aircraft. (129,727.)
18,506. H. E. F. GOOLD-ADAMS and S. L. COLLINS. Balloons, etc. (129,732.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published August 14, 1919

8,270. W. S. COOKE and F. SALE. Inclonometer or inclinometer for aircraft, etc. (129,753.)
11,436. BOULTON AND PAUL, LTD., and J. D. NORTH. Control devices for aircraft. (129,781.)
11,489. C. A. CLEGHORN. Self-sealing petrol tanks. (129,783.)
12,636. A. A. HOLLE. Aerofoils. (129,834.)
13,191 and 13,192. BLACKBURN AEROPLANE AND MOTOR CO., H. BOOTH and G. BEAUMONT. Spars, struts and other structural members for aircraft. (129,845 and 129,846.)
14,638. R. MARSHALL. Control of aircraft. (129,861.)
17,252. J. BASSETT, G. E. D. SEALE and G. DAVIDSON. Heating appliances for aeroplanes, etc. (129,888.)
18,121. G. FERGUSON. Lateral inclinometer for aircraft. (129,895.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlix, l, li and lii)

NOTICE TO ADVERTISERS.

IN order that "FLIGHT" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships
36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates*:—

UNITED KINGDOM.	s.	d.	ABROAD.	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under war conditions.

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 556 (No. 34, Vol. XI.) AUGUST 21, 1919 [Weekly. Price 6d. Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.*

These rates are subject to any alteration found necessary under war conditions

CONTENTS

Editorial Comment: PAGE
  The Government Explanations .. 1103
  "Specific Cases" .. 1103
  Civil Aviation and Native Oil Fuel .. 1104
  The Territorial A.F. Idea .. 1104
  A Well-Earned Honour .. 1106
  Economy at the Wrong End .. 1106
  Prizes for Commercial Flying .. 1106
Flight—and the Men: Major ffiske .. 1105
Rules of the Air—Meeting another Machine .. 1107
Aerodromes for Civil Use .. 1109
The E.L.T.A. .. 1112
Royal Aero Club Notes .. 1118
The Cellulose Inquiry .. 1119
Civilian Flying .. 1120
Airships—Vickers—Milestones .. 1121
In Parliament .. 1131
Correspondence .. 1137
Side-Winds .. 1138

EDITORIAL COMMENT

The Government Explanations

WE cannot say we think the Government spokesmen shone at all brilliantly in the debate last week on the charges of extravagance against the Air Ministry. Both Gen. Seely and Mr. Churchill managed to show that the Committee on National Expenditure had been misled on certain matters of detail, but even here it had to be admitted that it was the Ministry's own figures which were to blame for any erroneous impressions. On the graver charges of want of economy and inefficiency in handling the nation's money we completely fail to see that any sort of explanation satisfactory to the public was forthcoming. It is true the Lord Advocate managed to persuade the House that he was not to blame in the matter of the failure to prosecute those connected with the alleged fraudulent conversion of public funds at Renfrew; but his speech was much more in the nature of a forensic triumph than a real vindication of his Department, and in face of Sir Wm. Hunter's reply, published on Monday, in which the Lord Advocate is practically given the lie direct, developments should be interesting. The public cannot be expected to accept legal casuistry in place of action, and we are still of the opinion that a strong *prima facie* case had been made out for the prosecution of those concerned. Certainly we have seen prosecutions, and successful prosecutions at that, entered on slighter evidence than seems to have been available in the case of Renfrew, and we remain of the opinion we expressed last week—that the failure to proceed was the outcome of a desire to keep back from the public the knowledge of how utterly inefficient was the supervision over the disbursement of public funds. Fortunately, action is to be taken in the civil courts for the recovery of a large sum of money over-paid to the contractor for the works in question, and it may be that during the hearing of this case sufficient evidence will be forthcoming to justify criminal proceedings against those who are alleged to have been guilty of fraud.

◆ ◆ ◆

"Specific Cases"

Gen. Seely, in trying to justify the Air Ministry, pointed to the sweeping reductions which have been made in the *personnel* of the R.A.F. since the Armistice. Twenty thousand officers have been demobilised, while of "other ranks" 203,000 out of 264,000 have returned to civil life. Out of 386 aerodromes and landing grounds 210 have been given up, and the staff of the Ministry has been reduced by 50 per cent. Of 2,143 hired premises and hotels 1,927 have been given up. "A greater economy in the public service has never been made in the same time" was his boast.

It is good news that the march of economy is proceeding as rapidly as Gen. Seely wants us to believe, but it must be pointed out that the *gravamen* of the charges against the Air Ministry was not that demobilisation and reduction to peace strength are not proceeding rapidly enough, but that during the War and since the Armistice public money has been shamefully wasted—thrown away with both hands, in fact. If the Air Ministry wishes us to believe that it is, by way of being a penitent, confessing its sins and pointing to a new mode of life, so to say, then we are willing to accept it in that rôle; but it seems to us that all Gen. Seely actually accomplished was to throw a certain amount of dust in the eyes of the House by pointing to the present record and ignoring altogether the main charges. It is an old game, and a very successful one as a rule. It seems to have succeeded more or less on this occasion so far as the House is concerned, but the comments of the Press on the lame explanations indicate that it has not come off so well outside.

◆ ◆ ◆

Civil Aviation and Native Oil Fuel

The success of civil aviation depends, if not mainly at least very largely, on adequate supplies of suitable oil fuel, readily accessible and cheaply obtainable. It is true that we have hitherto not felt an acute shortage, even during the War, though it is equally true that when the German submarine campaign was at its height there was grave cause for anxiety. It culminated in no disaster, as we know, but one of the prime lessons of the War was that of the necessity for us to render these islands as self-supporting as possible, not only in the matter of food, but of such essentials to the successful conduct of transport as oil fuel. There are, it is true, some things that it is physically impossible to produce, and in that we are not at all singular. It was the blockade which made it impossible for the Central Powers to obtain certain essentials that contributed in no small measure to their downfall.

Oil fuel, it scarcely needs to be said, has attained a position of almost prime importance in the life of the nation. Without adequate supplies of oil the whole of our transport system must break down hopelessly. There can be no development of aviation, either civil or military. Without it the Navy would be paralysed, and even our mercantile shipping would be seriously hampered. All these facts are so self-evident as to be truisms. Fortunately, the War has so driven home the realisation that oil is as essential to our existence as coal that we have really awakened to the necessities of the case, and are at last taking what seem to be adequate measures to develop the undoubted resources we possess within the confines of the British Isles, and, what is more and better, there is reason now to think that before very long we shall be as nearly self-supporting as need be. Apart from any success which may attend the boring operations of Lord Cowdray's company, of which very little has been heard lately, the reports which reach us of the development work proceeding on the Norfolk shales seem to promise excellent results. A number of borings have been sunk in this area, and in some cases liquid shale oil has been tapped at as little as 28 feet below the surface. It is pointed out that this oil must not be confused with crude petroleum, from which it differs both in colour and content. It is evidently a superabundance of hydrocarbon which the shale beds have been unable to take up.

Another remarkable discovery has been made at the test boring at Stow, on the edge of the field. Here the oil shales, at a depth of 130 ft., became of a richness approaching ozokerit, such as is mined in Galicia, but from the appearance even richer. The ozokerit seam at a greater depth became so waxy in its nature that at 200 ft. the core barrel became so firmly wedged that it was impossible to move the drilling rods, and farther sinking was impossible. Naturally, it will not do to assume too much from all these indications, but the main thing is that there is undoubtedly a vast store of oil contained in these shale beds waiting to be recovered. Nor is there any reason to quarrel with the estimates of competent scientists who appear to be satisfied that, properly worked, the Norfolk shales should make us almost independent of imported oil fuels. It will take a long time and entail a great deal of development work to bring about that consummation, and, in the meantime, it will perhaps be wiser to regard it simply as being certain that there is enough oil below the surface of the country to make a very appreciable difference to our situation. Which, apart from all other considerations, is excellent to contemplate when we regard the way in which the coal situation goes steadily from bad to worse.

◆ ◆ ◆

The Territorial A.F. Idea

Apropos our article on the formation of a Territorial Air Force in our issue of July 10, we have received a letter from a correspondent who requests us not to publish his communication, in which he complains that the R.F.C. Special Reserve has been very shabbily treated by the Government. He says that according to the terms of the pre-War arrangement, officers of the Special Reserve were to receive £150 per annum, provided they remained in the Corps for a period of four years, attended the annual manœuvres and kept themselves efficient in flying. Now that the War is over he complains, Special Reserve officers are given the choice of whether they will elect to receive a service gratuity on the general basis or take it in the form of deferred Reserve pay. "It is a case of deferred pay or gratuity, not both, though entitled to both," is the way he puts it.

We do not know whether our correspondent voices the general feeling of Special Reserve officers or not. If we thought he were alone in his grievance, we should probably not have referred to it, but as there may be others who feel the same way, we think we are justified in asking why there should be any grievance at all? Our correspondent endeavours to make the point that the £150 a year would have been payable even if there had been no war. Quite so. But he seems to forget that if there had been no war he and his fellow officers of the Special Reserve would not have been drawing active service pay for the past five years. They have received exactly the same service pay as regular officers of the R.F.C. and R.A.F., with the same allowances, all through the War. They are qualified to receive service gratuities on the same scale. The only doubtful point seems to be that of exactly why they are given the option of taking deferred pay in lieu of gratuity. That scarcely matters, however. But we really cannot see why Special Reserve officers should seriously expect to benefit over other R.F.C. officers to the extent of £150 a year during the whole period of the War. It is not at all in derogation of their services to the country that we say we can see no case for rewarding them to the tune of from £600 to £750 each for those services over and above the sums received by others.

One of the points our correspondent endeavours to make is that if it is decided to form a Territorial A.F. the Government should get away from the idea that it can treat its *personnel* as shabbily as it has treated the old Special Reserve. If and when the T.A.F. is formed its officers and men have no more to complain of than he discloses in his letter to us, we do not think there will be any lack of recruits.

Flight – And the Men

"Flight" Copyright.

MAJOR H. GUY FFISKE, of Messrs. Boulton and Paul, Ltd.

A Well-Earned Honour

We sincerely congratulate Sir W. Joynson-Hicks on the well-deserved honour bestowed upon him by the King. No baronetcy has been better earned in recent times than this. From the very inception of practical flight the new baronet has been identified very closely with its practical development, particularly as the Parliamentary champion of the freedom of the air and the aerial supremacy of this country. In the days before the War, when officialdom affected to be amused at the aerial developments which were going on before its eyes and when its policy was merely to watch what others were doing in the hope that if the seemingly impossible happened we might benefit from their experience, it was Mr. Joynson-Hicks, as he then was, who, in Parliament, voiced the opinions of those who believed in the new science and who warned the Government of what they were risking by neglecting the tasks which others were endeavouring to carry out. It was he who very shortly before the outbreak of war drew the attention of the public to our utter state of aerial unpreparedness, and convicted the Government of the day of an attempt to hoodwink Parliament and the people in the matter of the number of effective machines we possessed. During the War he took the lead in aerial matters in the House, and it was in no small measure due to his advocacy and insistence that the Air Board came into being and afterwards developed into the Air Ministry as we know it now. His record of service to aviation is one of which he may very justly feel proud.

◆ ◆ ◆

Economy at the Wrong End

It has been specifically stated by *The Times* that a Government decision has been taken which virtually means that the airship branch of the R.A.F. will cease to exist as a factor in the scheme of aerial defence. This decision is to the effect that no more airships are to be built, and even that work on airships now under construction is to be stopped. Further, it is rumoured that it is intended to wipe out the Civil Aviation Department.

It is almost impossible to believe either the one story or the other. The programme of rigid airship construction was revised after the Armistice and was brought down to the minimum basis required by the Navy for its progressive experimental work of peace time. If the decision then arrived at was right it is not wrong now, and if it indeed be a fact that it is again to be drastically revised—completely reversed would be the better term—all we can say is that the Government is playing fast and loose with national safety. During the latter period of the War, the airship rendered magnificent service and proved its worth for the duties it will in future wars be called upon to perform as a fleet auxiliary. That being so, it is abundantly clear that the Navy must have airships in addition to its establishment of heavier-than-air craft, and to cut down the establishment agreed upon as being necessary for peace time is a suicidal policy. It is all very well to argue that we need not fear another war or to say that in the event of the unexpected happening we can again create the necessary airship services, but we must never forget the price we paid in the late war for our unpreparedness to fight. It is cheaper far to spend money in peace time on preparing for war than to wait until war is upon us and be forced to make up the leeway under such conditions as confronted this country in 1914.

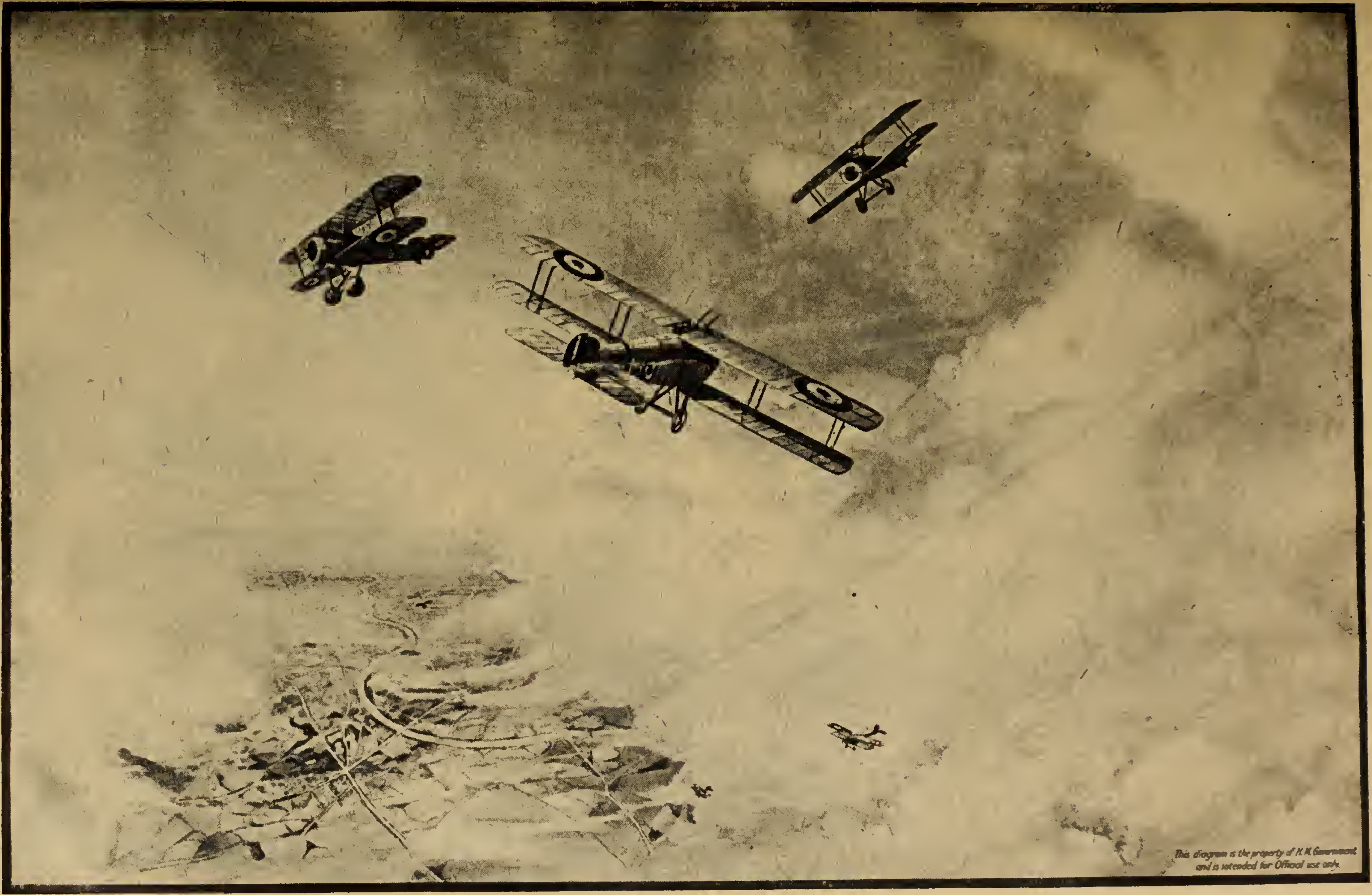
Apart from questions of Imperial defence, it is equally to be argued that the policy announced is unsound and parsimonious from the point of view of commercial development. Undoubtedly the airship has a great potentiality for commercial work, but aviation, both by aeroplane and airship, stands on the threshold of events. In the nature of present circumstances it must look to the State for a certain measure of support during the period of its infantile troubles. In thus stating the case we are by no means indulging in special pleading, since the principle has been admitted by the Government itself not once but many times. We have had it from high authority that not only is this so, but that the necessary support will be forthcoming, not because the Government admits the principle of subsidising industry at large, but because aviation stands in a different relation to the State than most other industries. It is agreed that it is essential from a number of viewpoints that this country should maintain its lead in the air, and, as we have said, it is also agreed that commercial aviation cannot stand alone for some time to come. It goes without saying, therefore, that the case for the keeping of the Government's pledge is overwhelming. We agree that there is urgent necessity for the exercise of the most urgent economy on the part of the State, but there are certain directions in which economy can only be practised as a policy of being penny wise and pound foolish. If these decisions which we are discussing have, indeed, been arrived at they would certainly come under this heading. Unfortunately, they are announced—though we hope erroneously—at a moment when Parliament is on the point of rising for the Recess, and thus they cannot be discussed until the House meets again in October. In the meantime, it is urgently to be hoped that both in Parliamentary and other interested circles, a strenuous campaign against this misplaced "economy" will be prepared. The Department of Civilian Aviation must stand.

◆ ◆ ◆

Prizes for Commercial Flying

It might be thought, at first sight, that the announcement made by Gen. Seely that the Government will devote £64,000 to prizes for commercial types of aeroplanes is in conflict with the policy of cutting down upon which we have commented. This is not so of necessity. We agree that the Treasury, in sanctioning the allocation of this money and the Air Ministry in asking for it, have shown a commendable sense of what is essential. The sum itself is one that could scarcely have been raised by private enterprise, nor, even if it could, do we think that the competitions which will be announced later would have commanded the same confidence under any other auspices than that of the Government.

The ideas underlying the grant are essentially sound. As Gen. Seely himself said, during the War the paramount necessity in aircraft was military efficiency, but for the successful development of commercial aviation the first essential is safety. Therefore, the main direction in which the prizes will be allocated is in the production of machines having a greater factor of safety and reliability than is possessed by even the most advanced types of to-day. It is impossible until we know exactly what the conditions are to be to do more than approve the basic idea which seems to underlie the action of the Air Ministry, and that we do most whole-heartedly.


This diagram is the property of H.M. Government and is intended for Official use only.

"RULES OF THE AIR—MEETING ANOTHER MACHINE."—If a change of course is necessary, turn to the right. *(Drawing prepared by the Air Technical Services for use at the R.A.F. Schools.)*

We have said that this grant is in no way in conflict with the decisions of misdirected economy to which we have referred elsewhere. With not the slightest desire to appear churlish, we must point out that the announcement of this encouragement programme at the present juncture may even have been calculated to assist in taking the raw edge off the other by enabling the Government to say to the critics of its "economical" policy: "See what we are doing for aviation." We do not like saying this, but the position seems to us to be so serious that it is essential that people should not have dust thrown in their eyes.

◆ ◆ ◆

The Meteorological Department of the R.A.F.

It is stated on good authority that arrangements are being made for the whole of the meteorological work of the Empire to be undertaken by the R.A.F. Hitherto the study of the weather has been the work of a number of different departments. At the outbreak of war the Meteorological Office was the only British Government organisation devoted to matters and problems connected with the weather. It was under the direction of Dr.—now Sir Napier—Shaw, F.R.S., one of the ablest meteorologists of the time, and was generally admitted to be among the very best organisations of its kind in the world. He it is who is designated head of the new Department. The despatch of the Expeditionary Force to France in 1914 necessitated the formation of a meteorological department to assist the high command, and this was accordingly formed, and proceeded overseas early in 1915. As the size of the armies grew this service was expanded, and became a section of the Royal Engineers, the commissioned ranks being drawn almost entirely from the professional staff of the Meteorological Office. It proved itself of the utmost value to the armies in France, Italy and Salonica. Again, in 1915, a certain number of the staff of the Meteorological Office were commissioned for service with the airship section of the R.N.A.S., and it was this service which ultimately formed the nucleus of the organisation which, after the fusion of the R.N.A.S. and the R.F.C. to form the Royal Air Force, became known as the R.A.F. Meteorological Service.

A few of these officers remained with the Navy, and now constitute the Naval Meteorological Service, though by far the great majority were transferred, as already stated, to the R.A.F. The arrangement forecasted appears to mean that the R.F. service and that belonging to the Navy will now, or in the very near future, pass over to the control of the R.A.F. This seems to be a very wise arrangement. The increasing importance of aviation and the extent to which it depends for success on accurate forecasting of the weather in any particular area lies behind the decision. The single department to be created will eventually form a branch of an international meteorological service, which will give the subject world-wide study and issue reports for the guidance of all. Plans are being made for the organisation of meteorological stations along the great Empire air routes, though how far these plans are destined to fructify is a matter which depends very largely on the attitude of the Treasury.

It is clear that it is work that will have to be done if aviation is to develop along its proper lines. It is of no avail to encourage the use of these routes if that use is to be made doubtful, or even impossible, by the want of reliable information as to the conditions likely to be encountered on any given day. It is not too much to say that the whole future of civilian flying—or Service aviation, for that matter—depends almost as much on the organisation and proper working of a world-wide meteorological service as upon an adequate supply of machines and trained pilots. The one is the complement of the other. As to the movement for co-ordinating the whole of our meteorological services, it is to be welcomed on every account. Instead of having two or three departments, all engaged on the same research work and issuing the same reports, covering a necessarily limited field because of inevitable overlapping, we shall have a single service, under a single head, working towards a single end.

The new Department will come under the Controller-General of Civil Aviation, with its headquarters, in all probability, at the Air Ministry, though it is understood that the expense of the service will be met by a special grant, and will not come within the Air Estimates.

A COMMERCIAL AIRCRAFT COMPETITION

In the House of Commons on August 14, Maj.-Gen. Seely, in reply to a question by Lieut.-Colonel Malone, made the important announcement that the Government proposed to organise a competition for commercial aircraft and that the prizes would aggregate £64,000. Gen. Seely's statement was as follows:—

"During the war the paramount necessity in aircraft design was military efficiency, but for the successful development of aviation the first essential is safety. The Government have accordingly decided to institute a competition with a view to obtaining a type giving greater safety. Any machine which succeeds in qualifying will represent a great advance in respect of safety and comfort over any machine at present in use.

"The Treasury have agreed to the competition, and I am sure that, even at this juncture, the House will not grudge the funds for prizes. Prizes will be offered for three types of aircraft—a smaller aeroplane, a larger aeroplane, and a seaplane respectively. In addition to the advantage to civil aviation, the lessons learnt will be of the greatest value to the Royal Air Force.

"The precise terms of the competition will be announced in a few days. If all the competitions are won, the amount required for prizes would be about £64,000."

A Medal for Darfur Operations

An Army Order announces that the King has been pleased to approve of the forces employed in the Darfur operations accepting and wearing the silver medal, with clasps, granted by the Sultan of Egypt. Those entitled to it include detachments of the R.F.C. who were at Rahad between March 1 and December 31, 1916.

The decorations, when ready for issue, will be forwarded to officers by the Secretary, War Office (A.G. 10), 27, Pilgrim Street, E.C.4, and to other ranks by the officer-in-charge of records concerned.

AERODROMES FOR CIVIL USE AND EMERGENCY LANDING GROUNDS

The Air Ministry state that the following lists are issued in order to provide the aircraft industry, pilots, and the public with information regarding aerodromes and landing grounds open to civil aviation, and the location of service stations which are not available to civil aircraft except in case of emergency. It should be clearly understood that these lists are purely provisional and are subject to alteration or addition from time to time. Such amendments will be duly published.

In those cases in which it is stated that "accommodation" does not exist, no facilities other than the actual landing grounds are available. No guarantee can be given at the present time that *personnel* to handle aircraft is available either at the Service stations or at the privately licensed aerodromes. The list of aerodromes published on April 25 as being available for civil aviation is now cancelled.

The schedule of prohibited areas published in Air Navigation Regulations, 1919, Schedule 6, remains in force for the present, but a revised list, considerably reducing the number of prohibited areas, will be issued shortly:—

Service Aerodromes only Available for Civilian Machines in Emergency

Aerodrome or seaplane station.	Nearest railway station and distance in miles.	Postal town and distance in miles.
Andover	Andover Junction (1½) (L. & S.W.)	Andover (2).
Baldonnel	Lucan (2) (M.G.W. & G.S. & W. Rlys.)	Lucan (2).
Bicester	Bicester (2) (G.W.R.)	Bicester (1).
Bircham Newton	Docking (4) (G.E.R.)	King's Lynn (14).
Biggin Hill	North or South Bromley (5) (S.E. & C.)	Bromley (5).
Bracebridge	Booltham (1) (G.N.R.) Lincoln (3) (G.N.R. & G.E.R.)	Lincoln (2).
Brockworth	Gloucester (4) (G.W.R.)	Gloucester (3½).
(S) Calshot	Brockenhurst (12) Southampton (15) (L.S.W.R.)	Southampton (15).
Cranwell	Caythorpe (4) (G.N.R.)	Grantham (10).
Croydon (Beddington)	East Croydon (2) (S.E.C.R.) (L.B.S.C.R.)	East Croydon (2).
Detling	Bearstead (2) (S.E.C.R.)	Maidstone (5).
Donibristle	Inverkeithing Bay (2) (N.B.R.)	Inverkeithing (2).
(S) Dover (Marine Parade)	Dover Harbour (¾) (S.E.C.R.)	Dover.
Dover (Swingate Downs)	Dover Town (2) (S.E.C.R.)	Dover (2).
Duxford	Whittlesford (2) (G.E.R.)	Cambridge (12).
Eastchurch	Queenborough (5) (S.E.C.R.)	Queenborough (5).
Farnborough	Farnborough (2) (L.S.W.R.)	Farnborough (2).
Flower Down	Winchester (3) (L.S.W.R.) (G.W.)	Winchester (3).
Ford Junction	Ford Junction (1) (L.B.S.C.)	Arundel (5).
Fowlmere	Royston (5) (G.E.R.)	Royston (4).
Frieston	Boston (5) (G.N.R.)	Boston (5).
Gosport	Fort Blockhouse (L.S.W.R.)	Gosport (½).
(A & S) Grain	Port Victoria (S.E.C.R.) (¼)	Sheerness (1¼).
Halton	Wendover (1) (G.W.R.)	Aylesbury (5).
Harlaxton	Grantham (4) (G.N.R.)	Grantham (4).
Hawkinge	Folkestone (2½) (S.E.C.R.)	Folkestone (2½).
Henlow	Henlow adjoining (M.R.)	Bedford (11)
Kingsnorth	Beluncle Halt (S.E.C.R.)	Chatham (4).
Larkhill	Amesbury (6)	Salisbury (12).
(S) Lee-on-Solent	Lee-on-Solent (¼) (L.S.W.R.)	Southampton (11)
Leuchars	Leuchars Junction (½) (N.B.R.)	St. Andrews (5).
(X) Manston	Minster (1) (S.E.C.R.)	Ramsgate (3).
Marske	Marske (1) (N.E.R.)	Whitby (18).
Martlesham Heath	Bealings (1) (G.E.R.) Woodbridge (4) (G.E.R.)	Ipswich (6).
Netheravon	Bulford (5) (L.S.W.R.)	Salisbury (13).
North Weald Bassett	North Weald Bassett (½) (G.E.R.)	Epping (2).
Old Sarum	Salisbury (4) (L.S.W.R.)	Salisbury (4).
Orfordness	Woodbridge (12) (G.E.R.)	Felixstowe (15).
(S) Portland	Portland (300 yards) (L.S.W.R.)	Weymouth (4).
Scampton	Lincoln (5) (G.E.R., G.N.R., G.C.R.)	Lincoln (6).
Scopwick	Scopwick (4) (G.N.R., G.E.R.)	Sleaford (9).
Shrewsbury	Shrewsbury (1½) (G.W.R.)	Shrewsbury (1½).
Smoogroo	Thurso (thence by boat) (G.N. of S.R.)	Kirkwall (8).
South Carlton	Lincoln (4) (G.E.R., M.R., G.C.R., G.N.R.)	Lincoln (3).
Spittlegate	Grantham (2) (G.N.R.)	Grantham (2).
Stonehenge	Amesbury (4) Salisbury (9) (L.S.W.R.)	Salisbury (8).
Suttons Farm	Hornchurch (¾) (L.T. & S.)	Romford (5).
Tangmere	Drayton (1) (L.B.S.C.R.)	Chichester (4).
(S) Tresco	Penzance (thence by boat) (G.W.R.)	St. Mary's (2).
Upavon	Pewsey (5) (G.W.R.)	Salisbury (15).
Weston-on-the Green	Bicester (6) (G.W.R.)	Bicester (4).
Worthy Down	Winchester (3) (L.S.W.R., G.W.R.)	Winchester (15).
Yate	Yate (1) (M.R.)	Bristol (9).

(S) Seaplanes only. (A & S) Aeroplanes and Seaplanes.
(X) Not available for civil use after 1919.

Service Stations Available also for Civil Use.

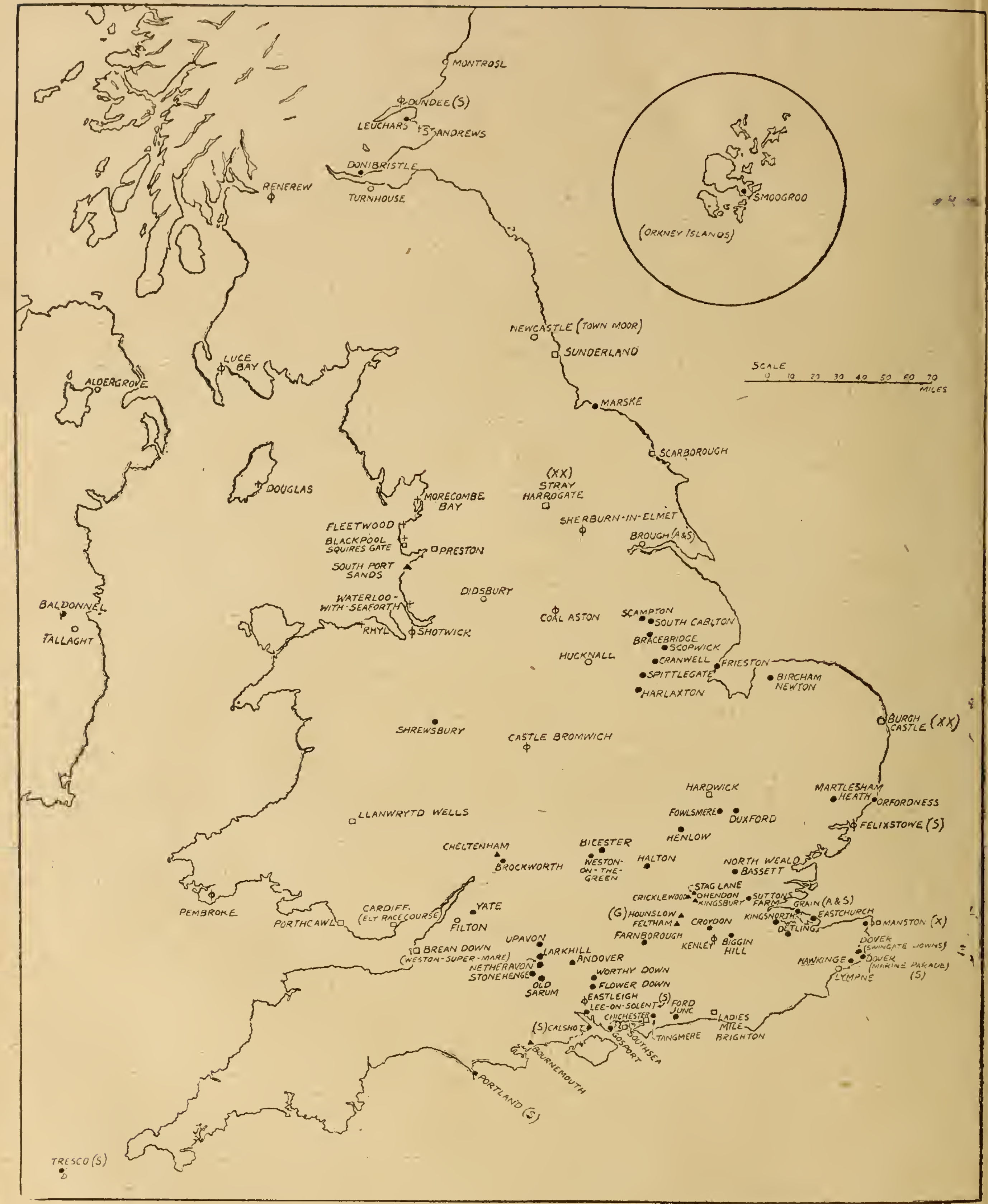
Castle Bromwich	Castle Bromwich (5) (M.R.)	Castle Bromwich (5).
Coal Aston	Beauchief (2½) (M.R.)	Sheffield (3).
(S) Dundee	Stannergate (½) (N.B.R.)	Dundee (2).
Eastleigh	Eastleigh (1½) (L.S.W.R.)	Eastleigh (1½).
(S) Felixstowe	Felixstowe (G.E.R.)	Felixstowe (2).
Kenley	Upper-Warlingham (1) (L.B.S.C.)	Kenley.
(*) Manston	Minster (1) (S.E.C.R.)	Ramsgate (3).
Luce Bay	Stranraer (5) (G.S.W.R.)	Stranraer (5).
Pembroke	Pembroke (5) (G.W.R.)	Pembroke (4).
Renfrew	Fultar Street (1) (N.B.R.)	Glasgow (5).
Sherburn-in-Elmet	Sherburn-in-Elmet (1) (G.N.R.)	Selby (6).
Shotwick	Queensferry (1) (L.N.W.R.)	Chester (6).

(S) Seaplanes only.
(*) Included in "B" List during 1919 only.

Stations Temporarily Retained for Service Purposes, but Available also for Civil Use.

Aldergrove	Aldergrove (¼) (G.N.I.R.)	Antrim (4).
(A and S) Brough	Brough (¼) (N.E.R.)	Hull (12).
Didsbury	Didsbury (1) (M.R.)	Manchester (3).
Filton	Filton (1) (G.W.R.)	Bristol (5).
Hendon	Hendon (1) (M.R.)	Hendon (1).
Hucknall	Hucknall (1) (G.C.R.)	Nottingham (6).
Lympne	Westenhanger (1) (S.E.C.R.)	Hythe (4).
Montrose	Montrose (1) (N.E.R.)	Montrose (2).
Newcastle (Town Moor)	West Jesmond (½) (N.E.R.)	Newcastle-on-Tyne (2).
Tallaght	Dublin (7) (G.S. & W.R.)	Dublin (7).
Turnhouse	Turnhouse (1) (N.B.R.)	Edinburgh (6).

(A and S) Aeroplanes and Seaplanes.



Map showing the situations of aerodromes for civil use and emergency landing grounds. The signs used are: ● Service aerodromes only available for civilian machines in emergency. ϕ Service stations available for civil use. ○ Stations temporarily retained for Service, but available for civil use. ▲ Civil aerodromes already licensed. □ Aerodromes licensed for certain machines only (see list). + Sands. (S) Seaplanes only. (A and S) Aeroplanes and Seaplanes. (×) Not available for civil use after 1919. (× ×) Licensed for all but large types of aircraft. (G) Government-owned London terminus.

Civil Aerodromes Already Licensed

(A) *Aerodromes at which Accommodation Exists.*

(*)Hounslow	Hounslow Junction (1) (L.S.W.R.)	Hounslow (2).
Bournemouth	Bournemouth (3) (Central (L.S.W.R.)	Bournemouth (3).
Cricklewood	Cricklewood (½) (M.R.)	Cricklewood (½).
Cheltenham	Churchdown (2) (M.R.)	Cheltenham (4).
Feltham	Feltham (½) (L.S.W.R.)	Feltham (½).
Kingsbury	Hendon (½) (M.R.)	Hendon (½).
Stag-lane	Edgware (½) (M.R.)	Edgware (½).
Southport (Sands)	Hesketh Park (¾) (L. and Y.)	Southport (1).

(*) Government owned, London terminus.

(B.) *Aerodromes licensed as suitable only "for Avro 504 K and similar types of aircraft," except in a very few instances accommodation does not exist, The licences have also been issued for limited periods only.*

Blackpool (Squire's Gate).	Waterloo Road, Blackpool (2½) (L.N.W.R.)	Blackpool (2½).
Brean Down, Weston-super-Mare	Bleadon and Uphill (1¼) (G.W.R.)	Weston-super-Mare (2).
(*)Burgh Castle	Belton (1) (G.E.R.)	Belton (1).
Cardiff (Ely Racecourse)	Ely Station (½) (G.W.R.)	Cardiff (7).
Chichester	Chichester (1½) (L.B.S.C.R.)	Chichester (1¼).
Hardwick (near Cambridge)	Lords Bridge (3) (G.E.R.)	Cambridge (6).
Ladies' Mile, Brighton	Preston Park (3) (L.B.S.C.R.)	Brighton (3).
Llanwrtyd Wells	Llanwrytd Wells (½) (L.N.W.R.)	Llanwrtyd Wells, Breconshire (½).
Manstone (near R.A.F. aerodrome)	Minster (1) (S.E.C.R.)	Ramsgate (3).
Porthcawl	Porthcawl (1) (G.W.R.)	Bridgend (5).
Preston	Preston (1½) (L.N.W.R.)	Preston (1).
Scarborough	Scarborough (1½) (N.E.R.)	Scarborough (1).
Southsea	East Southsea (½) (L.S.W.R.)	Southsea (½).
(*)Stray, Harrogate	Harrogate (½) (N.E.R.)	Harrogate (½).
Sunderland	Monkwearmouth (1) (N.E.R.)	Sunderland (1½).

Situated on Sands—Not available at High Tide.

Blackpool	Waterloo Road (½)	Blackpool (1½).
Douglas (I. of M.)	Douglas (¼) (I. of M.)	Douglas (½).
Fleetwood	Fleetwood (½) (L.N.W.R.)	Fleetwood (½).
Morecambe Bay	Morecambe (½) (L.N.W.R.)	Morecambe (1).
Rhyl	Rhyl (½) (L.N.W.R.)	Rhyl (½).
St. Andrews	St. Andrews (½) (N.B.R.)	St. Andrews (½).
Waterloo-with-Seaforth	Bootle (1) (L. and Y.)	Bootle (1).

(*) Licensed for all but larger types of aircraft.

At present there are about a dozen aerodromes which are not permanently required for Government purposes. In some cases the buildings, with the land on which they stand, may be acquired without the aerodromes. The property includes the seaplane station in the Shetlands, which cover an area of 12½ acres, and the Gullane aerodrome, in Haddingtonshire, whose area is 318 acres. The Disposal Board of the Ministry of Munitions has information, which is obtainable at Charing Cross Buildings, London, W.C. 2.

◆ ◆ ◆ ◆

British Flying Boat Visits Helsingfors

Some further details of the trip of the flying boat to Helsingfors, the capital of the new Independent State of Finland, have been given by Major W. G. Sitwell, D.S.C., the commander.

The flying boat used for this trip is interesting as being actually the first F 5 flying boat produced, and was built by the R.N.A.S. at Felixstowe three years ago. New engines of the Eagle VIII Rolls Royce type had, however, been installed. In addition to Major Sitwell, who navigated the boat, the crew consisted of Capt. C. E. Bailey, R.A.F., the pilot, an engineer, and a wireless operator.

The start was made from Felixstowe on July 19, and course set for Copenhagen via Texel, Cuxhaven and across the Kiel Canal—the first occasion on which a British flying boat has flown over it. Rain storms and strong head winds were encountered, and visibility was bad, but this first stage was accomplished in 7 hrs. 35 mins., the engines running beautifully throughout.

Peace night was duly celebrated in Copenhagen and the flight resumed the next morning for Reval. Again strong head winds were met with, and as petrol threatened to run short a course was set towards Stockholm. On the west side of Gotland, however, a following wind was picked up and the flight was continued to Reval, which was reached at 6.15 p.m. on July 20.

Great enthusiasm was manifested by the population at Reval on the arrival of the British flying boat, and considerable delight was expressed by British residents and Naval officers there at receiving a supply of the previous day's English newspapers, which Major Sitwell had brought with him, since the minimum time required for delivery of mails is nine days.

On July 21 the last stage of the journey was flown in much improved weather and the total journey of over 1,100 miles from Felixstowe to Helsingfors was completed in 16 flying hrs., a remarkably good achievement in view of the weather conditions encountered.

A very warm reception was accorded to the British flying officers and crew by the Finns, and official and private entertainments were arranged during their stay. The Cross of the White Rose of Finland was conferred upon Major Sitwell and Capt. Bailey.

Facilities were accorded for inspection of the flying boat, and demonstration flights were given each day to prominent Finns and representatives of the Finnish Press. Among those taken up were: Herr Castren, the Premier; Gen. Kivekas, Chief of Staff of the Finnish Army; Herr Holsti, the Minister of Foreign Affairs; and the Ministers of Commerce, of Communications and Aviation.

All these were much impressed with the possibilities of the British flying boat for transport in Finland and neighbouring countries, and expressed the hope that the visit was but the prelude to the opening of regular communication between Great Britain and Finland.

Passenger Flying Forbidden in Denmark

A message from Copenhagen states that the Minister of Justice has published an order forbidding aviators to fly with passengers. Aviators who wish to fly to Denmark must obtain the permission of the Minister of Justice, which must be asked for when their passports are vised.

French Air Losses

Official statistics issued in Paris last week show that from August 4, 1914, to November 11, 1918, the losses of the aviation service in the army zones were 1,945 pilots and observers killed, 1,4,61 missing, whose death may be regarded as certain, and 2,922 wounded. Outside the army zones 1,927 pilots and observers were killed, bringing the total losses in killed and wounded up to 7,757. On December 1, 1918, the full strength was 12,919 men, so the war losses represent 61 per cent.

Figures have also been publised which show that the production of aeroplanes was 3,460 in 1915, 7,552 in 1916, 22,751 in 1917 and 34,219 during the first nine months of 1918. Similarly the number of workers employed on building aeroplanes grew from 12,650 on January 1, 1915, to 30,960 on the same date in 1916, 68,920 on the same date in 1917, 131,551 on the same date in 1918, and 186,003 on November 2, 1918.

Mails by Aeroplane to Steamer

From New York comes word that the first delivery of mails by aeroplane to a steamship leaving for Europe was accomplished on August 14, when an aeroplane, leaving at 1.30 dropped, at 2 p.m., a mail on board the Adriatic, which had left New York at 12.30 p.m.

Cheaper U.S. Aerial Mails

An order has just been issued by the U.S. Postmaster-General reducing the rate of postage by aerial mails to 2 cents per ounce, which is the regular rate for first-class mail matter. Aircraft are thus placed on the same footing as other means of transportation of the mails.

A German Exhibition

At the Leipzig Fair, to be held from August 31 to September 5, there will be an aircraft section, in which the majority of the German aircraft firms have promised to exhibit.

The E.L.T.A. SHOW

Owing to the unprecedented cable and postal delays the following notes arrived too late for inclusion in last week's issue of Flight.—Ed.]

From the popular point of view the Eerste Luchtverkeer Tentoonstelling Amsterdam (First Air-Traffic Exhibition), or E.L.T.A., as it is called from the initial letters of its title, looks like becoming a great success. By ferries, steamers, barges towed by tugs, motor boats and craft of all descriptions, the populace of Amsterdam, and of all Holland, for that matter, flows in a daily stream across the Ij from the various piers in de Ruyterkade. Already on the way to the landing wharf one sees the first signs of the exhibition in the form of a couple of Avros, a B.A.T. "Bantam," and a machine which at first one fails to identify, but which later is discovered to be an L.V.G., disporting themselves over the canals and harbours of Amsterdam. Nor is the interest confined to those actually on their way to or from the exhibition. In the town itself there is an epidemic of crick in the neck, caused by constant watching of the sky, and although at the time of writing, the exhibition has only been open for a little over a week, it has had already great educational value, and the Dutch version of the man in the street is quite familiar with the various types, and may be heard to call out—correctly—the names of the machines as they appear between the house-tops of a *straat* or *gracht*. Even in the train, on the way up from the coast, people are asking one another whether they have been, or are going, to the *tentoonstelling*. It cannot be denied that the popular interest in the show is caused to a very great extent by the fact that there is an aerodrome adjoining the exhibition, to both of which the price of admission gives access.

If, as already pointed out, the exhibition is of great popular interest, which is undoubtedly the case, the same can scarcely be said of it when regarded from a technical point of view. This is, of course, chiefly due to the short time that has elapsed since the signing of the Armistice, which has prevented most manufacturers from finishing their post-War designs in time for the exhibition. Also, at the moment of writing, many of the stands are in a state of unpreparedness, owing to the fact that many of the exhibits have not yet arrived, or are in the process of being unpacked or erected.

For this, strikes, transport difficulties and other forms of peace-time frightfulness are mainly responsible, the task of getting the exhibits to the grounds having been, in the case of many of the crews, of herculean magnitude. Thus, to take the case of getting a fairly large machine erected, there are no special derrick facilities, and it is mainly a matter of manpower to get the *fuselage* lifted on to trestles and the undercarriage and wings fitted. To add to the difficulties, most of this work has had to be done with the aid of a great percentage of unskilled labour, to whom, in the case of all but native exhibitors, the giving of orders has had to be done in a curious mixture of English, French, Dutch and a form of Pidgin English invented for the occasion, plus gesticulation according to the requirements of the immediate operation in progress. The situation has been somewhat relieved, however, by the fact that there is a great number of Dutch people connected with the exhibition, in various capacities, who speak English, French, and German fluently, and who are ever ready and willing to render assistance. With their aid the work progresses, and by degrees each stand gradually emerges complete. As regards the difficulties that attended the bringing into the exhibition of very large machines, these will be referred to later.

Although forming parts of the same show, the exhibition proper and the flying ground are best dealt with under separate headings.

THE AIRCRAFT EXHIBITION

The building containing the aircraft and accessories is a large two-span structure, built entirely of wood, as structural steel parts could not be obtained. Its two main doors face towards a large open space, surrounded on the other three sides by the various offices of the direction and management of the exhibition. It might be mentioned that the main building was constructed in two months, which is something of an achievement in a country that is generally thought to take things easily and not to let itself be hustled.

As Germany is excluded, by the terms of the Peace Treaty, from exhibiting—to our mind, a mistaken policy—the aircraft show is represented, at the time of writing at any rate, by four countries :—England, France, Italy, and Holland. As it forms a large percentage of the show,

The British Section

will be dealt with first. In connection with the machines it is worthy of note, and rather significant, that they have, almost without exception, been flown across to the exhibition. In this way very considerable time has been saved, amounting in many instances to days, or even weeks.

The Aircraft Manufacturing Co. (Airco),

owing to lack of space, has not been able to show a complete machine, but this is to a great extent made up for by the astounding variety of exhibits displayed on this stand. The centre of attraction is formed by an Airco (D.H.) 16, which is minus its wings but otherwise complete. It is fitted with a Rolls-Royce engine which has seen a great amount of active service, although the casual onlooker would scarcely guess it, as the engine has been cleaned up and painted until it looks like new. The whole machine is very highly finished, what with polished aluminium, glossy enamel and plated fittings and exhaust pipes. The luxuriously finished cabin has seating accommodation for four passengers, the seats being arranged in pairs, of which the seats of each are facing, and staggered in relation to, one another. This feature of the Airco 16 was shown in a photograph published in Flight recently. For communication with the pilot there is a small door in the front wall of the cabin, through which the foremost passenger can give his orders to the pilot. For flying at night the machine is provided with a generator which furnishes current for the navigation lights as well as for the bulbs illuminating the cabin.

In addition to the Airco (D.H.) 16, there is shown on this stand a number of Airco metal fittings and other parts, and the rear portion of a *fuselage*, showing the detail construction. A Napier "Lion" attracts a great deal of attention, as the "broad arrow" type of aero engine evidently is not a familiar sight in Holland.

Another exhibit on the Airco stand which is greatly appreciated is a large glass case containing an excellent model of the Hendon Aerodrome, and a number of small-scale models of Airco machines and of a kite balloon. There is even a neat little scale model of a Hucks starter. A number of large coloured photographs of Airco machines completes the exhibits of this firm. On the aerodrome, however, there are two Airco machines, a 4A flown over by Capt. Saint and a 9 brought across by Mr. Lawford.

The British Aerial Transport Co.

is showing two machines, one a B.A.T. "Bantam with 170 h.p. A.B.C. "Wasp" engine, and the other a diminutive monoplane, called the B.A.T. "Crow," with 30 h.p. A.B.C. 2-cyl. "Gnat" engine. The former machine is well known to our readers, as it was described in Flight recently. It is painted in white, as is also the "Crow," and looks very graceful and pleasing to the eye.

The B.A.T. "Crow" is, probably, the smallest man-carrying aeroplane in the world. To those who remember the early days of flying, this machine may, perhaps, be described by saying that it is a Santos Dumont "Demoiselle," designed in the light of modern aeronautical knowledge. The Demoiselle, it may be remembered, was a short-span monoplane, with the pilot placed in a seat below the wings, immediately behind the propeller. This, in effect, is the arrangement of the B.A.T. "Crow," although naturally the detail design and construction is hugely improved.

The A.B.C. Gnat engine is mounted on the leading edge of the wing, and drives a small Ebora tractor screw of about 5 in. diameter The fuel tank is mounted on top of the plane, and is divided laterally, the oil being contained in the smaller front part, while the rear portion of the tank carries the petrol.

As already mentioned, the "Crow" is a monoplane, and it should be added that the wings are of the cantilever type, with no external bracing. The consequence is that the machine can be dismantled or erected in a few minutes by undoing half-a-dozen bolts. It consists, in effect, of two units: The planes, and the tail planes and booms and the car. The wings, being of the cantilever type, are tapered from root to tip, and are fitted with *ailerons* for lateral control.

Two tail booms, also cantilever beams, of built-up rectangular section carry at their rear end the tail surfaces, and in front are bolted to the wing spars. There is a small symmetrical tail plane and a divided elevator. The vertical fin extends above and below the tail plane, and to it is hinged the rudder. In its present form it would appear that a twisting stress on the tail might be transmitted to the wings and cause trouble, but we understand that in the next machine of this type the tail boom bracing will probably be somewhat altered to overcome this difficulty.

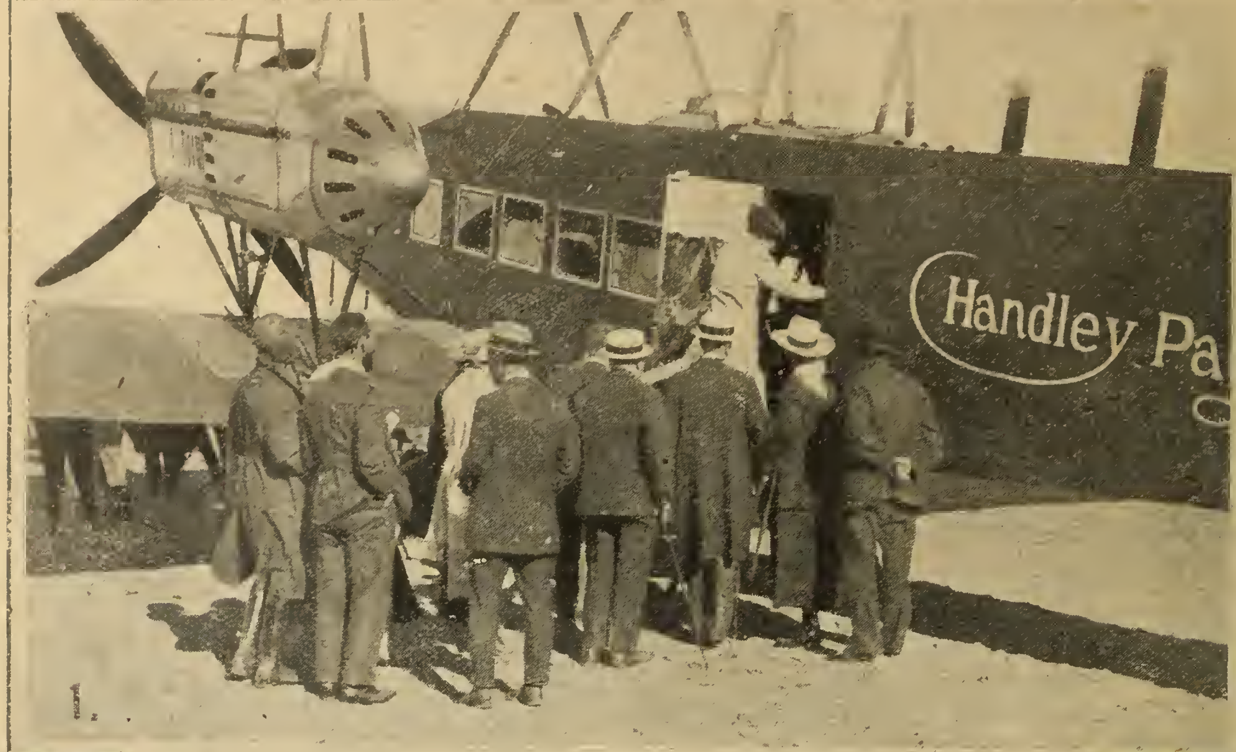
The pilot, as in the case of the Demoiselle, is seated below the wings, but is sheltered to a greater extent than in that machine, being installed in a small *nacelle* not unlike a sidecar for a motor cycle. The controls are of the stick type. The *nacelle* is carried on six steel tubes of circular section, coming down from the wings. Passing through the bottom of the *nacelle* is a flat laminated spring of wood, which carries at its ends short stub axles for the wheels. To the casual observer this arrangement may appear somewhat inadequate, but it should be remembered that the machine is extremely light (the weight empty is about 220 lb.), and that, therefore, the under-carriage need not be particularly strong, especially as the pilot is seated almost on the ground, and, hence, can judge his landings to a nicety. As she stands, and with a pilot of average weight, the "Crow" weighs, we believe, about 7 lb. per square foot of wing area, and about 10 lb. per horse-power, so that, judging by these figures, the performance should be very good. The machine has not yet been flown, but in view of the fact that the petrol tank is mounted on top of the centre section, *i.e.*, at a point where the lift is probably greatest, the wing loading may prove somewhat on the heavy side, and it might be found advisable to increase the wing area of the next machine slightly.

On account of its diminutive size, the "Crow" is one of the attractions of the show, and we understand that an enormous number of enquiries regarding price has been received. The first of these came from a Dutch carpenter working at the exhibition, who quite seriously asked the price as he wanted one of these machines. For use in Holland it is a question whether it would not be possible to design the little *nacelle* as a boat or float, thus enabling the machine to start from and alight on the rivers and canals with which Holland is so plentifully supplied. The flying tests of the "Crow" will be awaited with interest. On the aerodrome are two B.A.T. machines, a "Bantam" and the second machine of the F.K. 26 series.

The Blackburn Stand

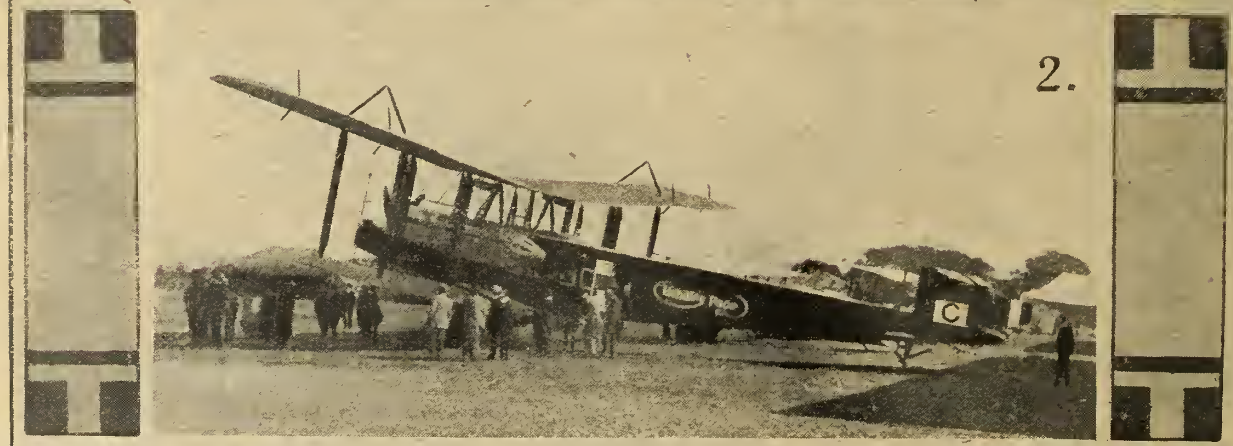
The Blackburn Aeroplane and Motor Co., of Leeds, have no space on their stand for exhibiting complete machines. Instead, they are showing three very good scale models. One is of a Blackburn "Kangaroo" (commercial type), with its *fuselage* made deeper in the centre to form a cabin for the passengers. The second model is of a "Kangaroo" type of machine fitted with floats instead of wheels, while the third is a model of a flying boat. On the aerodrome there is now a "Kangaroo" which on Friday and Saturday, August 8 and 9, was flown over from Leeds to Amsterdam by Mr. Kenworthy, who will be remembered as a pre-War pilot at the Beatty School of Flying at Hendon, accompanied by five passengers. The machine left Leeds on Friday, and flew to Hounslow, where the usual formalities were attended to. It then left for Amsterdam *via* Belgium, but was overtaken by darkness and had to land at Brussels, where it arrived at 8.30 p.m. The news of its landing quickly spread, and next morning King Albert of Belgium came out to inspect it. After giving an exhibition flight over Brussels, the "Kangaroo" left for Amsterdam covering the distance between the two cities in 1 hour 35 minutes. A safe landing was made at Amsterdam in spite of the somewhat soft ground, and Mr. Kenworthy succeeded in bringing the machine to her hangar without sinking in, the *modus operandi* being to taxi very fast right up to the tent, thus keeping a fair amount of the weight on the wings and but little on the wheels.

AT THE E.L.T.A.; Major Draper's flying on the B.A.T. "Bantam" is easily one of the greatest attractions of the E.L.T.A. aerodrome. The photograph on the left shows a little group in front of the B.A.T. four-seater. 1. Van Laar; 2. v. Baumhauer, of Van Berkels Patent; 3. Mrs. Noorduin; 4. Mr. Noorduin of the B.A.T.; 5. Major Draper; 6. Mr. F. Koolhoven; 7. Mr. A. Mees. On the right, the party which flew across from England to Amsterdam in the Vickers Vimy-Commercial. 1. Lebret; 2. Capt. Cockerell, the pilot of the machine; 3. Mr. W. Mullens, who "filmed" the trip; 4. Mr. K. Muller; 5. Mrs. Mullens; 6. Mr. J. Luger, and 7. Mr. Hans Martin.

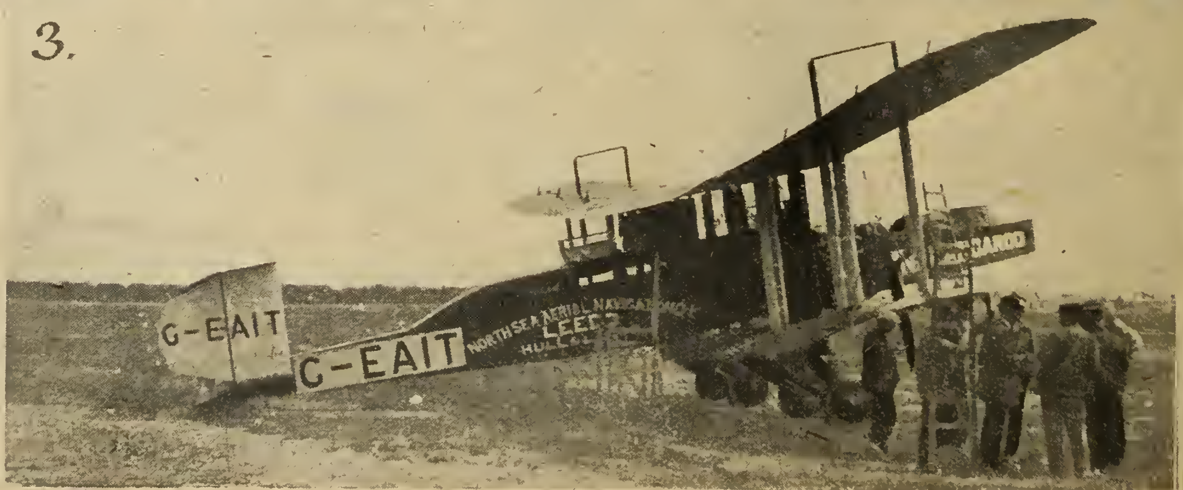


1.

2.

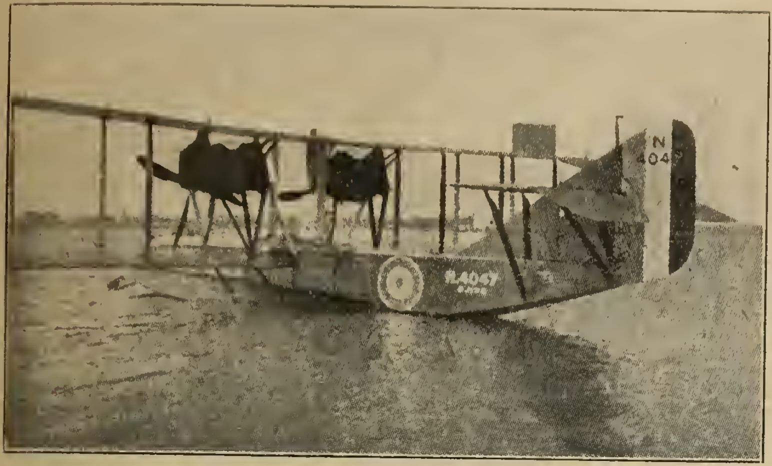


3.



"Flight" Copyright

BRITISH MACHINES AT THE E.L.T.A. : 1. Visitors are interested in the Handley Page cabin ; 2. The Handley Page passenger machine ; 3. A Blackburn Kangaroo fitted with a cabin.



A GOSPORT-BUILT FLYING BOAT OF THE F TYPE : This machine, which still belongs to the R.A.F., flew across from England, and is now anchored in the IJ.

THE GOSPORT AIRCRAFT CO.

At the time of writing, the exhibits on this firm's stand consist chiefly of large panels giving particulars of the various types of Gosport flying boats. As these particulars were published in our issue of July 31, 1919, there is no need to repeat them here. One of the Gosport flying boats arrived by air on August 8, and was anchored in the Ij, close to the exhibition, where it was in the company of a large British Royal Air Force flying boat, also, we believe, built by the Gosport firm, although technically belonging to the Air Force. During Saturday and Sunday the small Gosport boat made flights over the river and harbours, to the great enjoyment of the Amsterdammers, who look with interest on any craft connected with water transport, and especially so when such craft combines water and air transport. The little Gosport flying boat gets off very well on the smooth waters of the Ij, and this firm, as being the only one to have a flying boat in commission at present, should do very good business in Amsterdam. During last week this boat was brought up to the show and placed on the Gosport stand.

HANDLEY PAGE, LTD.

This firm is represented, at the actual exhibition, by one machine only, but what the exhibit lacks in numbers it makes up for in size. The machine is one of the V 1500 types, with four Rolls-Royce Eagle engines. The starboard wings are folded back, but even so, the machine towers over the adjoining stands and passages. The V 1500, as so many other machines, was flown across *via* Brussels, the various stages being covered in the following times:—London to Brussels, 2 hours 40 minutes; Brussels to Soesterberg, 1 hour 25 minutes; Soesterberg to Amsterdam, 25 minutes, giving a total flying time of 4½ hours, as against the 20 hours or so taken by the train-and-steamer mode of travel. Considering the load which the H.P. can carry, this speaks well for the future of commercial aerial transport.

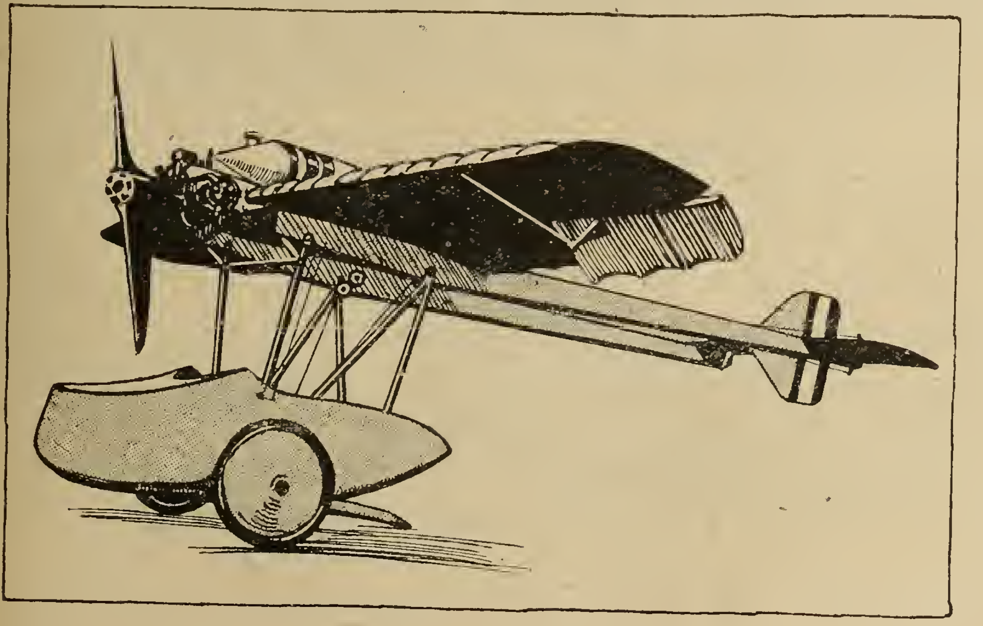
On landing, the Handley Page proceeded to sink into the soft ground of the aerodrome, but luckily no damage was done. There still, however, remained the question of how to get the machine into the exhibition building. In order to do this, it was necessary to take down a portion of the board fence surrounding the aerodrome, to take down the ticket offices in front of the forecourt of the exhibition and other office buildings, and, finally, a portion of the front of the exhibition building itself. All this was done, and the buildings erected again behind the machine. There is certainly this advantage in its size, that there is no fear of anybody coming along after dark and purloining the Handley Page.

Naturally, this huge machine attracts great attention, and there is always a big crowd around it, clamouring to be permitted to look through the trap door in the floor of the *fuselage*. Mr. Cogni, who is in charge of the H.P. exhibit, is kept busy answering questions, which he does with unfailing good nature, in spite of the fact that some of the queries are not exactly calculated to improve his temper. One bright youth quite seriously expressed the opinion that the machine would fly very lop-sided with one pair of wings sticking back alongside the *fuselage*. Mr. Cogni agreed that probably it would. Generally speaking, however, the public is showing a very intelligent interest in the various machines exhibited, and the publicity value of the aero show is indubitable.

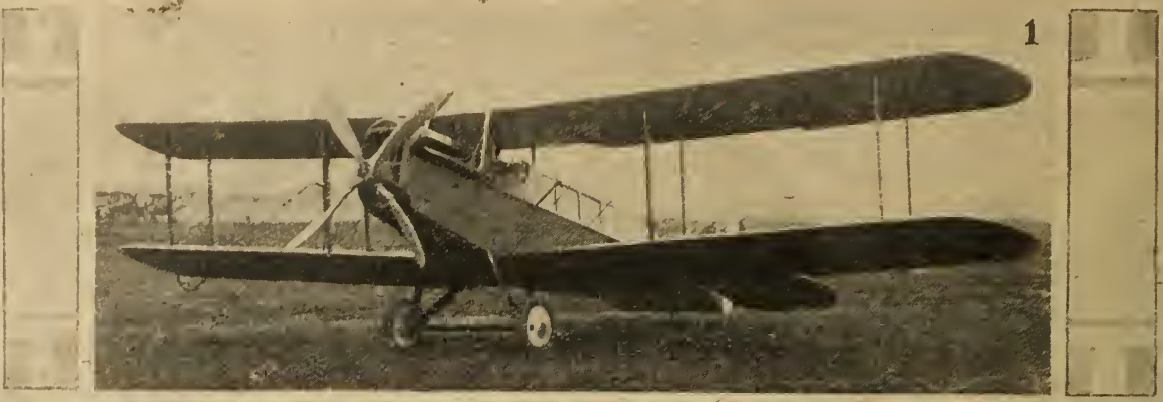
On the aerodrome is one of the 2-engined H.Ps. of the O-400 type, similar to those delivered to the Chinese Government. It has a luxuriously fitted-up cabin seating 14 passengers, who look down upon the country below through a series of windows in the sides. There are curtains over the windows, and for use at night the cabin is lighted by electricity. The machine is also provided with all necessary conveniences. Owing to the present soft condition of the aerodrome, the machine is not doing any flying, but as soon as the ground has hardened sufficiently, there is not the slightest doubt that it will be kept very busy carrying passengers.

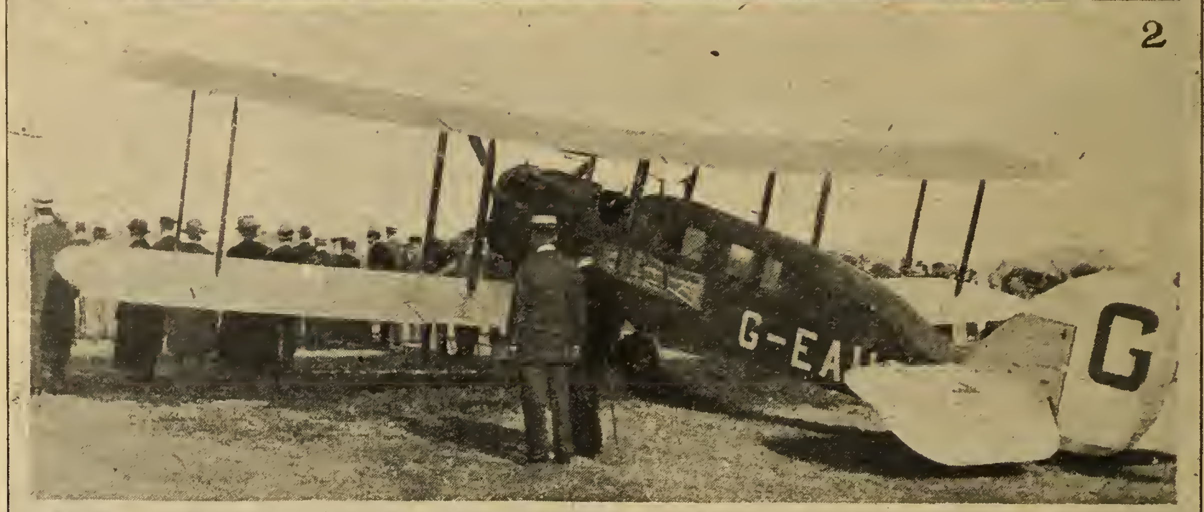
A. V. ROE AND CO., LTD.

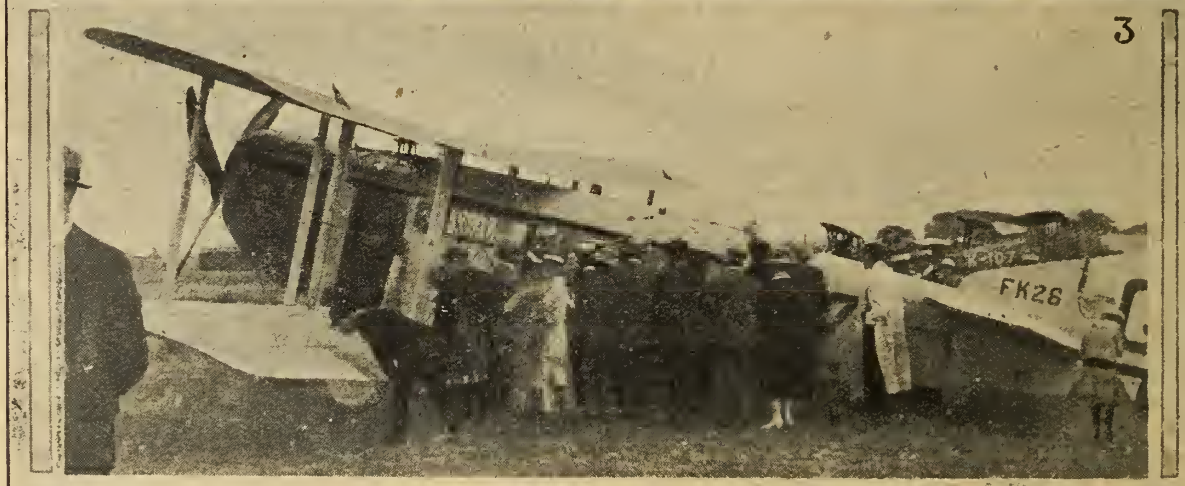
On the Avro stand, at the time of our visit, there was little to be seen except two gentlemen trying to comfort one another

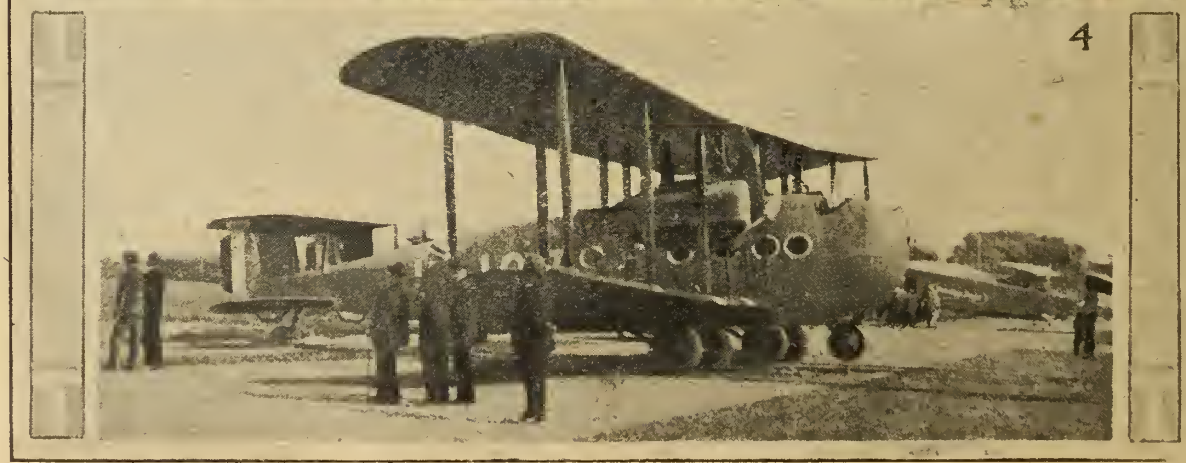


The B.A.T. "Crow": This little machine, fitted with a 2-cyl. A.B.C. "Gnat" engine, attracts great attention at the E.L.T.A. Show. Briefly speaking, it is a "Demoiselle" brought up to date.

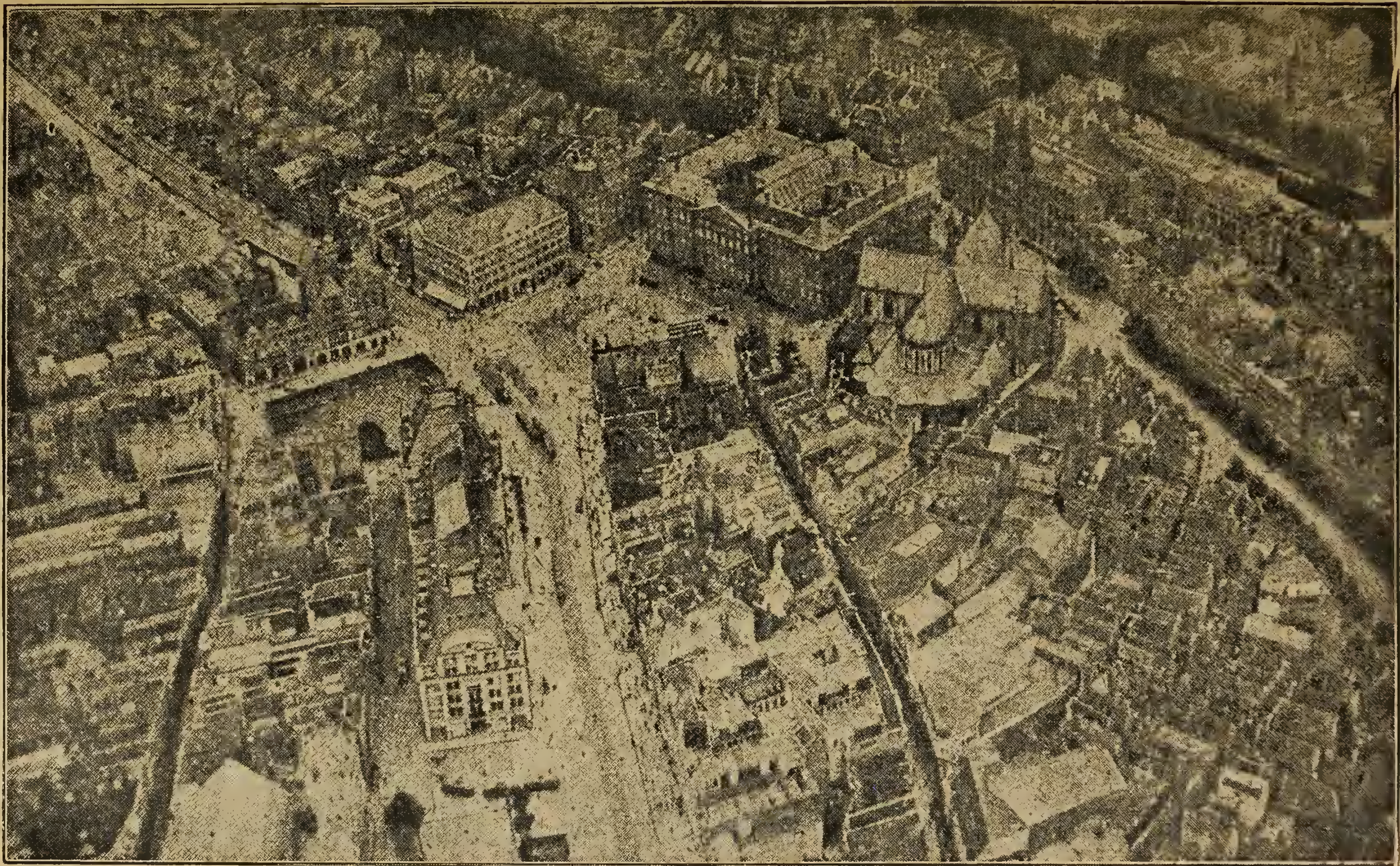
1


2


3


4


SOME MORE BRITISH MACHINES AT THE E.L.T.A. AERODROME : 1. The Airco 16. This machine is shown on the Airco stand minus its wings ; 2. The Airco 4A ; 3. The Bat F.K. 26. Note the gentleman examining an aileron hinge ; 4. The Vickers Vimy-Commercial. "Flight" Copyright.



AMSTERDAM FROM ABOVE: The wide street running down the middle of the foregound is Damrak. The square in the centre is Dam, with the Royal Palace, behind and to the right of which may be seen the post and telegraph office. (Courtesy *Het Leven*) with assurances that tomorrow would surely see the arrival of the set of scale models of different Avro machines which they had been awaiting all these dreary days. It was even thought just possible that the little Avro Baby described in FLIGHT recently might be represented at the show before it closes. It seems a pity that it has not been possible to get the Baby to Amsterdam in time for the opening of the show, as this little low-power machine would undoubtedly have appealed tremendously to the Hollanders, especially if they could have had an opportunity of seeing her flying at the aerodrome first. However, the fates have decreed otherwise, and one can only hope that an engine may be obtained in time to have one of the babies there before the closing of the exhibition. If the Avro stand inside the exhibition was suffering from certain shortcomings, for which, needless to say, those in charge were in no wise to blame, these were more than made up for by the Avros on the aerodrome, which were to be seen in the air at all times of the day, and night.

VICKERS, LTD.

The greatest attraction on this stand is, undoubtedly, a Vickers Vimy with two Rolls-Royce engines, similar to the machine on which Capt. Sir John Alcock and Lieut. Sir A. W. Brown flew across the Atlantic in 16 hours. Used as they are to slow water transport, it is inevitable that a machine which has to its credit a sea voyage of such length accomplished in such incredibly short time should appeal to the Hollanders. Also in a sense they felt that the achievement was to a certain extent their own, as there is a Dutch branch of Vickers, Ltd., known as Nederlandsch-Engelsche-Technische Handel Maatschappij, with offices at Vickers House, Hague. The Vickers Vimy has already been described in FLIGHT, under Vickers "Milestones," to which we would refer readers for details. Another item in which great interest is shown is the fore part of the *fuselage* of the "Vimy Commercial." This machine also was described in FLIGHT recently, and it is only necessary to point out certain minor alterations that have been effected since the publication of this article. Thus it might be mentioned that the chairs with which the luxurious cabin is now provided are of the wicker work type, and, being somewhat lower than those originally fitted, are, if anything, rather more comfortable, while giving a slightly better view. Another improvement has been effected by transferring the entrance door from the front to the rear of the cabin. With the door in front it was found that the proximity to the revolving airscrew was rather closer than was desirable, and therefore when changing passengers it was necessary to stop the port engine. By now placing the door at the rear of the cabin, behind the trailing edge of the wings, not only may both engines be kept running throttled down while changing passengers, but also the door is actually a good deal lower here in relation to the ground, and it is therefore even easier to enter or leave the cabin than it was before.

Of other items on view on the Vickers stand mention may be made of a model of the "Vimy" standing inside a model Richards hangar, and of a larger scale model of a Vickers "Valentia" flying boat. In addition there are numerous samples of various kinds of Vickers high-speed steels, parts of a Wolseley "Viper" engine, and finally a number of excellent photographs. Out on the aerodrome is a Vickers Vimy-Commercial, to which reference will be made later.

(*To be concluded.*)

THE ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS

HOUSE COMMITTEE

A MEETING of the House Committee was held on Tuesday, August 12, 1919, when there were present:—Mr. J. H. Nicholson, in the Chair, Mr. Ernest C. Bucknall, Capt. R. L. Charteris, Mr. H. J. Corin, Mr. C. G. Greenhill, Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., and H. E. Perrin, Secretary.

COMMITTEE MEETING

A meeting of The Committee was held on Wednesday, August 13, 1919, when there were present:—Brig.-Gen. Sir Capel Golden, K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Lieut.-Col. Spenser D. A. Grey, D.S.O., Lieut.-Col. F. K. McClean, Brig.-Gen. E. M. Maitland, C.M.G., D.S.O., and H. E. Perrin, Secretary.

New Members.—The following New Members were elected:—

Capt. John Alan Bott, M.C.
Major William Grahame Chambers, R.A.F.
Donald Robert William Gedge.
Lady Sybil Grant.
Lieut. Edgar Wikner Percival, R.A.F.
Lieut. Reginald James Read, R.A.F.
Major Henry Joseph Cecil Smith, R.A.F.
Capt. Francis Edward Fitzroy Smith, R.A.F.
Lieut. Kenneth George Withers, R.A.F.

Flying Services Fund.—On the recommendation of the Flying Services Fund Committee, Col. C. R. Samson, D.S.O., was appointed to fill the vacancy on the Flying Services Fund Committee caused by the resignation of Col. R. H. More.

British Record for Speed in a Closed Circuit.—The following British record for speed in a closed circuit was granted:—

	Speed in a Closed Circuit.			
Date.	Pilot.	Machine.	Motor.	Miles per hour.
June 21, 1919.	Capt. G. H. Gathergood.	Airco 4	Napier Lion, 450 h.p.	129.3

Jacques Schneider International Race

The following entries have been received:—

GREAT BRITAIN: Sopwith Aviation Co., Ltd., Kingston. Biplane (450 h.p. Jupiter "Cosmos"); pilot, Mr. H. G. Hawker.

Supermarine Aviation Co., Ltd., Southampton. Single-seater pusher type flying boat (450 h.p. Napier "Lion"); Sq.-Com. B. D. Hobbs, D.S.O., D.F.C.

A. V. Roe and Co., Ltd., Manchester. Single-seater float machine (Siddeley-Deasy "Puma"); Capt. Hammersley.

Fairey Aviation Co., Ltd., Hayes. Seaplane (450 h.p. Napier "Lion"); Lieut.-Col. Vincent Nicholl, D.S.O.

FRANCE.—Three entries (particulars not yet available).

ITALY.—"Savoia."

The race will take place on Wednesday, September 10. The course is 200 nautical miles, exclusively at sea, in a circuit of about 20 nautical miles, embracing Bournemouth, Swanage and Christchurch.

Messrs. S. E. Saunders, Ltd., of Cowes, have kindly placed their sheds and slipway at the disposal of the Club for the competing machines.

Australian Government £10,000 Prize for a Flight from Great Britain to Australia.

The following entries have been received:—

Lieut. Bert Hinkler.
Lieut. C. Kingsford Smith and Lieut. V. Hendle.
Mr. Harry Alexander Rigby.
Alliance Aeroplane Co., Ltd.
Martinsyde, Ltd.

The attention of the competitors is drawn to the following supplementary regulations:—

(1) No start will be permitted until subsequent to September 8, 1919.

(2) Machines must have a flying range of at least 500 miles.

(3) A competent navigator must be carried, who may be the pilot.

(4) Competitors must satisfy the Royal Aero Club that landing places are available.

(5) At the request of the Australian Government it has been decided that the motor or motors may be changed *en route*.

Air Navigation Regulations and Free Ballooning

The Royal Aero Club has received a letter from the Air Ministry, stating that the revision of the Air Navigation Regulations as affecting Free Ballooning is under consideration.

In the meantime, the Air Council will, on the application of the Club, consider any special exemption required.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary

THE CELLULOSE INQUIRY

At last the report of the Committee appointed to inquire into the formation and financial arrangements of the British Cellulose and Chemical Manufacturing Co., Ltd., and associated companies, and upon their relations with Departments of the Government in connection with the supply of dope, has been issued as a White Paper. It may be recalled that about a year ago the affairs of this company and the relationship between it and various Government Departments in connection with the production of dope were the subjects of much criticism in the House of Commons and the Press, the discussion having been raised by a report from a sub-committee of the Committee on National Expenditure. So strong was the feeling that the Chancellor of the Exchequer asked Lord Sumner, Lord Inchcape and Lord Colwyn to undertake further investigations. The general conclusion is that, though appearances a year ago justified suspicion, careful examination led to the conclusion that it was without foundation.

The Committee point out that the delay in presenting their point has been due partly to the unexpectedly protracted and elaborate investigations of the company's books by Messrs. W. B. Peat and Co., and to the difficulty in securing the evidence of Dr. Camille Dreyfus.

We regret that it is impossible to reprint the report of the Committee in full, but below we give some salient extracts from the report :—

The company was registered in England as a private company on March 18, 1916, with the object of undertaking the manufacture of cellulose acetate and other chemical substances. It was to acquire the Dreyfus British patent rights. It was promoted by Lieut.-Colonel Walter Grant Morden (then Staff Officer to Sir Sam Hughes, the Canadian Minister of Militia), Sir Arthur Trevor Dawson (a director of Vickers, Ltd.), and Mr. Edward Robson (a director of Pinchin, Johnson and Co., Ltd.).

At the outbreak of war the use of cellulose acetate and certain necessary solvents in the manufacture of "dope," for aeronautical purposes was not widely known, and, indeed the aeroplane programme itself was then on a small scale. After the outbreak of war, however, its value was more fully realised, and with the increasing growth in the aeronautical programme the question of supply became important. There were three well-known sources of supply, namely, the Bayer Company of Germany, the Usines du Rhône of France, and the Cellonite Co. (Dreyfus and Co.), of Basle, Switzerland. The Bayer Co. was obviously not available to this country, whilst France would naturally have the first call on the output of the Usines du Rhône.

A considerable part of our inquiry related to complaints made in the interest of the British chemical trade that, instead of having recourse to British manufacturers, or at least giving them an opportunity of sharing in the supply of the desired British product, the Department favoured foreign chemists, entrusted to them the exclusive supply of cellulose acetate, and disregarded the fact that there were numerous objections taken both to the quality of their product and the great delay in the fulfilment of their promises.

That British manufacturers could have overcome the difficulties and have attained the necessary skill and experience in no very long time we need not and do not doubt, but to the time so required there had to be added the further time requisite for equipping the necessary plant on a sufficient scale in the middle of the war. Experience showed that in the case of this kind of plant, as of so many others, that further time would be long. The inquiries made by the Department showed that no chemical concern possessed a plant in being which could have been utilised rapidly for the production of any considerable quantity of cellulose acetate, and although several were confident that they could have reached the manufacturing stage quickly, there was only too much risk that they might be disappointed. Several factories were inspected, and we have taken evidence as to the results of the inspection. The responsible officials came to the conclusion that, if contracts were placed with new manufacturers, there would be much delay in obtaining deliveries, and we are satisfied that they had materials before them from which such an opinion might reasonably be formed, nor have we sufficient grounds for holding that opinion to have been wrong.

Another point, in respect of which the course pursued by the Department has been open to criticism, is that the Government was made exclusively dependent for its supplies of acetate upon a company of whose prior production complaints had been made, and that no provision was made for a spare or emergency source of supply of cellulose acetate. There is, however, less in all this than might appear at first sight. Since July, 1915, the Government had been more or less committed to the Dreyfus product. Whatever objections had been taken to it when supplied from Switzerland, we were told that the cellulose acetate made at Spondon was favourably reported upon and proved to be satisfactory. In some cases of objections taken, the evidence suggests serious doubt whether they were justified at all. The delays in getting the Spondon factory to work had come to an end, and from the middle of 1917 onwards supplies came forward regularly and in increasing quantities.

We are of opinion that nothing amounting to favouritism of the company has been shown by the Aircraft Department. It is undoubtedly the fact, as has been shown above, that from the commencement Dr. Dreyfus, and subsequently the company, received support and assistance from Government officials and became, in fact, the sole source to which the Service looked for supplies, but we think the reasons for this are definite. It is worthy of comment that, notwithstanding the transfer of the Aeronautical Department from the War Office to the Ministry of Munitions, and the subsequent change of official *personnel,* the same policy was adopted, namely, to develop to the utmost capacity the resources of the company's works. An allegation was made to us that the company took employees of the Department into its pay. The authority for this was said to be a statement made by a former employee of the company, but when the latter attended before us he not only declared that the allegation itself was unfounded, but added that he had never made such a statement to our informant. As to an allegation made to us that a subordinate supply officer had received from the company an offer of post-war employment, we have carefully considered the above allegation as against the supply officer concerned, and have come to the conclusion that the evidence before us does not justify it.

In conclusion, we will refer to the criticisms made upon the company last year, which were the origin of the present inquiry. After the publication of the Select Committee's Fifth Report, it is plain that criticism was particularly attracted to the two facts, that the company had received much official support, including loans of public money, priorities, contracts and an Excess Profits Duty concession on the one hand, and, on the other, that its sixpenny shares appeared to be assumed to have become quickly worth £14 10s. each. Hence a connection between these facts was strongly suggested, which alike involved the personal credit of the managers of the company's affairs and of the Departmental officials concerned. The contrast between the nominal capital of the original company and that of the parent company is indeed so glaring that, for much of the criticism to which they have been exposed, we think that the promoters and others connected with the company's financial arrangements have only themselves to thank. In other respects, however, less than justice has been done them. If all the facts, which we have sifted with so negative a result, had been available last year to the critics of the company and its proceedings, we think that their conclusions would, to say the least, have undergone large modification.

It is satisfactory to be able to report that, in our opinion, there has been neither favouritism nor corruption, and that the official action taken has been throughout such as appeared to the Departments concerned the best that was open to them under the circumstances.

* * *

Huns Over Denmark

Denmark is much concerned with German aerial activity in defiance of international law, reported the *Daily Mail* correspondent at Copenhagen on August 15. Two new cases occurred that day. Two abandoned German aeroplanes were found in Danish territory. Two women have been detained on information that smuggling has been going on for some time.

A second breach led to the arrest of a German named Thiele, who was recently refused permission to establish a factory in Denmark to turn out 200 aeroplanes. He desired to establish no fewer than 60 routes linking up the Danish islands. So he evaded the Danish ban by flying the first batch of four machines into Denmark, intending to add gradually to this number.

CIVILIAN FLYING

HOUNSLOW

The following cross-country flights were successfully carried out on Avros during the week:—1 to Chatham and return, 2 to Brighton and return, 2 to Isle of Wight and return, 1 to Hamble and return, 1 to Swansea. A five-seater Avro was sent over to Eastney Fair for four days, during which time it made 124 flights and took up 388 passengers.

BLACKPOOL, ETC.

Flying has proceeded as usual at Blackpool during the past week. The weather has been ideal for the "wakes," and large crowds gathered daily to watch the machines. After spending several days in aeroplane gazing they pluck up courage, and, having decided that flying is perfectly safe, they decide to try the air themselves. The Avro five-seaters are doing the bulk of the work, people seeming to prefer the side by side seating family party type of machine to the tandem seater.

Flying has taken place daily at the other Avro stations at Rhyl, Windermere, Southport, Douglas (Isle of Man), etc., and August passenger traffic looks like setting up a big record.

DOUGLAS

Avros are reported to be as busy as ever at Douglas, round-the-island flights being the latest idea. The first newspaper to arrive by air has been presented to the local museum.

Lieut. Moxon has an ideal spot for pegging his machines down, outside the Castle Mona Hotel, just off the promenade, where other but less up-to-date means of transport, such as cars and cabs, are also parked!

THE NOTTINGHAM FLYING WEEK

The flying scheme for taking between 2,000 and 3,000 passengers at Nottingham in the middle of September is maturing. The proceeds are to go to a local charity, and it is intended to use the Forest in the centre of the city for the flights which are being arranged jointly by Sir Jesse Boot and the Avro people.

SWANSEA

The change in the weather of the last few days has made no appreciable difference in the enthusiasm of Swansea for flying. In fact, the low clouds have offered the Avro company an opportunity for showing their enterprise, and a speciality has been made of trips to view the lovely cloud effects over the mountains.

Two minutes after leaving Brynmill sands the earth disappears from view and a remarkable range of cloud mountains stretching interminably in all directions takes its place.

The high winds have not kept the pilots indoors, and many a passenger has expressed the opinion that on a quiet day flying is monotonous compared to the thrills of flying low over the sands travelling at well over 100 miles per hour.

A large percentage of the passengers take stunting tickets, and frequently the streets are blocked by crowds of holiday makers staring upwards to see a free exhibition of trick flying.

A new five-seater has now arrived, and picnic parties are often to be seen, armed with thermos flasks, alighting from it on the beautiful sands of Caswell and Rossilly Bays.

Llanwitydd Wells is to have its Avro daily for passenger flights, many of which have already been booked.

In connection with this, a most attractive daily excursion has been arranged. No finer scenery can be found in Great Britain than will be enjoyed by the lucky passengers over the Black Mountains.

WESTON-SUPER-MARE

One Avro was in commission here during the week and took up 228 passengers. A good many others, especially one-day trippers from Cardiff, wanted to fly, but had to be disappointed. Another machine, a three-seater, will be available in the coming week, which will relieve the pressure somewhat.

MARGATE

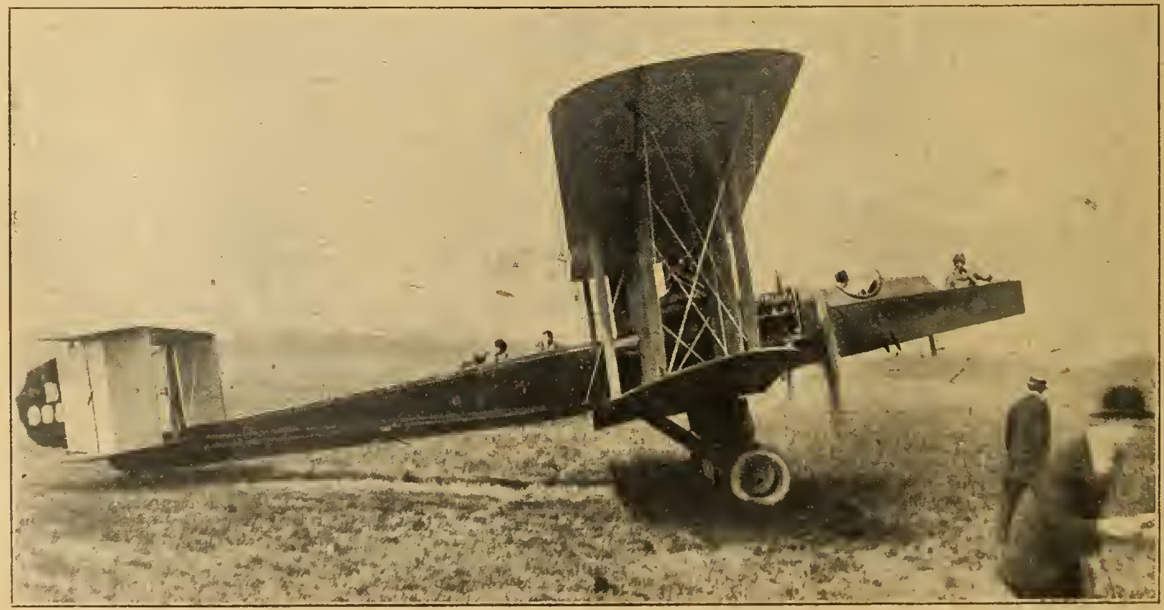
Flying during the past week has been exceptionally good, the passengers taken up by the Avro machines numbering no less than 232. Arrangements have been made for trips to Folkestone, and these have been in good demand. An Avro now makes trips from Herne Bay on Wednesdays and Thursdays.

SOUTHAMPTON

Saturday last saw the inauguration of the Supermarine flying boat service to the Isle of Wight. The two machines taxied round from their base at Woolston to the Royal Pier, and were kept busy for some time taking prominent officials for trips over Southampton Water. Among others who went aloft were the Mayor and Mayoress of Southampton, the Mayor of Winchester, the Sheriff, the Chief Constable, and many Councillors, including the only lady member, Mrs. Welsh. The programme went off splendidly under the direction of Mr. Hubert Scott-Paine (Chairman and Managing Director of the Supermarine Aviation Co.) and Squadron Commander B. D. Hobbs, D.S.O., D.F.C., was piloting one of the flying boats.

One day last week, when the motor launch service at Ventnor looked like being held up owing to a shortage of petrol, one of the Supermarine flying boats saved the situation by carrying over a sufficient supply of "Shell" motor spirit to enable the service to carry on. It is believed that this is the first instance of delivery of petrol by air.

◆ ◆ ◆ ◆



A HENDON PASSENGER CARRIER.—One of the Grahame-White Blackburn "Kangaroos."

AIRSHIPS

"MILESTONES" (AIRSHIPS)

VICKERS

Following up our series of Vickers' "Milestones" (dealing with the heavier-than-air section of this firm) which appeared in FLIGHT *for June 12th last, we give this week particulars of the airships produced by Messrs. Vickers, Ltd. Attention may be drawn to the article on "The Possibilities of Airship Transport Services" which appeared in* FLIGHT *for February 13th last* et seq. *dealing with the subject as reviewed by Messrs. Vickers, Ltd.*

The present airship department was formed in April, 1913, when Vickers, Ltd., were requested by the British Admiralty to put forward proposals for an experimental rigid airship to be of the same size and general type as the types of Zeppelin airships then in service in Germany, and for three non-rigid airships of the "Parseval" type.

At this time, no design data for rigid airships was available, the only information in our hands being a few general exterior photographs of some of the D.E.L.A.G. passenger Zeppelin airships. The firm's representatives visited such of the German airship sheds as were accessible, and picked up such particulars as could be obtained from casual inspection of the exterior of these ships.

It is difficult, when so much knowledge is now available, to realise the magnitude of the problems required to be solved in this initial work. No particulars of weights or of the detail design of the ship components being available, it was necessary to make tentative designs of all parts of the ship in order to obtain approximate data on which the final design could be based. Even the general principle of construction of the hull framework of the German airships was not known, and many different systems were investigated before the final design was determined.

It was specified by the Admiralty that the most important feature of this ship was that she could be specially strong so as to serve primarily as a ship for training crews for subsequent airships, and for this reason it was necessary that she should be designed so as to be able to withstand, without vital damage, shocks and bumps which would be sustained in bad landings. It was also desired, in order to make the ship as simple to handle as possible in getting away and landing, that swivelling propellers should be fitted to the forward car which would enable the ship to be landed by bringing her over the landing ground and pulling down by the propellers whilst she had positive lift, thus making landing a much simpler and safer operation than having to land whilst under way, as is necessary without swivelling propellers.

By the end of 1913 a final design was submitted to the British Admiralty, which, with minor modifications, was approved, and a contract arranged with Vickers, Ltd., for building an airship at Barrow-in-Furness. This airship was subsequently numbered R 9, and was the first rigid airship to be delivered to the Naval Service.

R 9 Class Rigid

The construction of R 9 was commenced at Barrow at the beginning of 1914, when workshops were equipped at Cavendish Dock for the structural work, and half of the old airship shed there partitioned off for the fabric work on the gasbags and outer covers, etc. Experimental work was started on the building of hull girders, but great difficulties were experienced in the manufacture of the thin and light "Duralumin" sections required. At first it was found practically impossible to produce straight angles and channels, and it was only after a long time, and at great expense, that these difficulties were overcome, and the manufacture of girders was enabled to proceed.

In March, 1915, instructions were received from the British Admiralty that the construction was to be suspended, as it was then thought that the war would be over in a few months, and the Walney building shed was commandeered by the Royal Naval Air Service for a flying station.

After the remarkably effective work done by the German Zeppelin airships with their fleet at Jutland and elsewhere, it was decided by the British Admiralty that R 9 should be completed, and to put in hand further rigid airships of an improved type. The resumption of the construction was greatly impeded owing to a considerable quantity of the previously completed steel wires and other materials having deteriorated during storage, and having to be replaced. The designs of R 9 were at this time completed, and all the difficult manufacturing problems solved, and it only remained to carry on the completion of the airship, which eventually left Barrow on April 4, 1917, after carrying out very successful flight trials over Morecambe Bay.

From that date until the present time, this airship has been stationed on the East Coast of England, and in the words of the Admiralty "has proved to be not only invaluable for the training of officers and men, but also in assisting to carry out the patrol of the East Coast."

Hull Structure.—As previously stated, it was required by the Admiralty that this airship should be designed specially strong enough to be able to stand the rough handling due to inexperienced crews, and consequently the ship could only be made specially strong at the sacrifice of lifting capacity, speed, and performance. After considering various alternative systems of design, it was decided that the most suitable arrangement was to build the hull structure with an exceptionally strong keel girder running along underneath to form a backbone which would take the shocks of landing and distribute them equally over the length of the hull structure, and obviate the risk of serious local damage.

After consideration of various schemes, the keel was eventually designed as a triangular structure built up with steel and "Duralumin" tubes, with ball joints to allow facility of alignment and adjustment. Original types of joints and girders, and a simple method of assembling the former, were evolved by Messrs. Vickers.

The hull structure above the keel was then built of such strength and design as to form a framework to contain the gasbags.

The cars containing the machinery, etc., were suspended from this keel girder in which also all the petrol tanks and ballast bags were carried. The keel served to distribute all the weights over the hull structure.

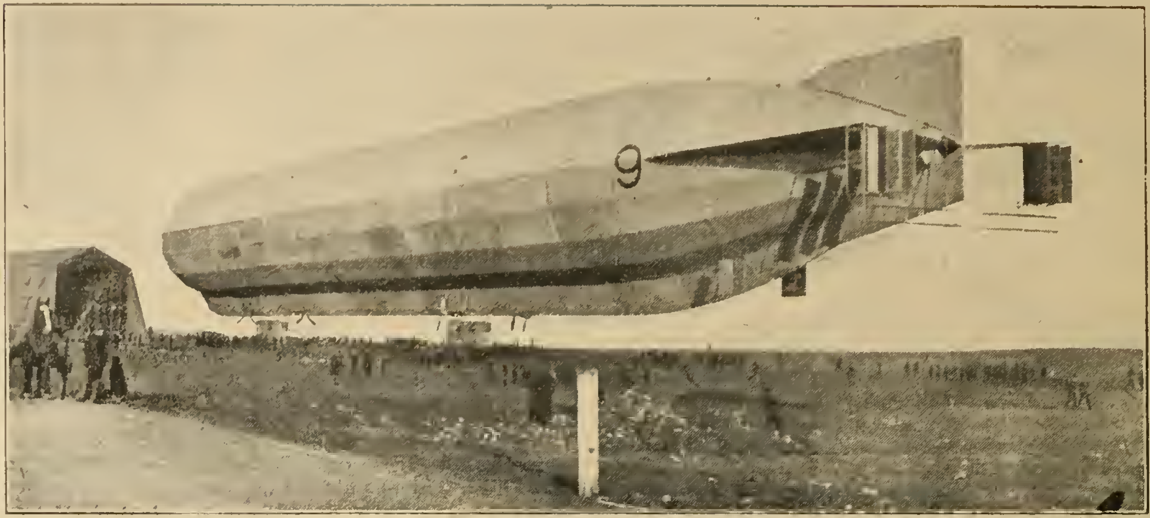
In deciding the shape of the hull, it was resolved as preferable to make the structure with as great a length as possible of parallel diameter with a good-shaped nose and stern end, it being considered for the first ship that it would be much better to obtain relative simplicity of design and manufacture rather than attempt a good streamline shape with a consequent complexity in design and erection.

There are two cars slung underneath the keel, viz. :—

(*a*) *The Forward Control and Machinery Gear*, which is divided by bulkheads into a control compartment and machinery compartment. The control compartment is of a suitable size to contain all the navigating and other controls, and it is provided with a large number of Triplex glass windows to enable the pilot to have a good all-round vision. The machinery compartment contained two engines driving the overhead swivelling propellers.

(*b*) *The Aft Car.*—This car was similarly divided into a control and machinery compartment to the foward car. The control compartment was fitted with duplicate controls to those in the forward car, to form an auxiliary or emergency control station.

The cars were of a moderately good streamline shape as limited by the requirements of a simple constructional design,



The first Vickers Rigid to be put into Service, the " R. 9."

and were provided with double water-tight bottoms to enable them to float on the sea. Inflated buffer bags were also provided under each of the cars to act as shock absorbers when landing on the ground.

Machinery Installation.—The forward machinery car was fitted with two 180 h.p. each " Wolseley-Maybach " engines, driving through clutches, bevel gears, and vertical shafts to overhead swivelling propeller gear, supported from the keel girder. This swivelling propeller gear was of a special design, covered by Vickers' patents, which enabled the propeller torques to be balanced so as to enable the A-bladed propellers to be swivelled easily by hand gear when the engines were driving at full power. The arms of the swivelling gear were so mounted as to enable them to be rotated completely round whilst driving at full power, so enabling the thrust to be changed from ahead to astern, up or down, or in any intermediate direction immediately, by the control of the pilot.

The engine fitted in the aft car was a 240 b.h.p. " Maybach," driving a two-bladed propeller mounted at the aft end of the car through a reduction gear-box.

Cabin.—A cabin was provided at the middle of the keel girder giving ample room for the wireless cabin and for sleeping and messing quarters for the crew.

Gasbags.—In the gasbags of this ship the novel system of lining rubber-proofed cotton fabric with an inside layer of gold-beaters' skins was tried for the first time, and was found to be a great success, giving the gasbags a much greater gas tightness than has hitherto been attained.

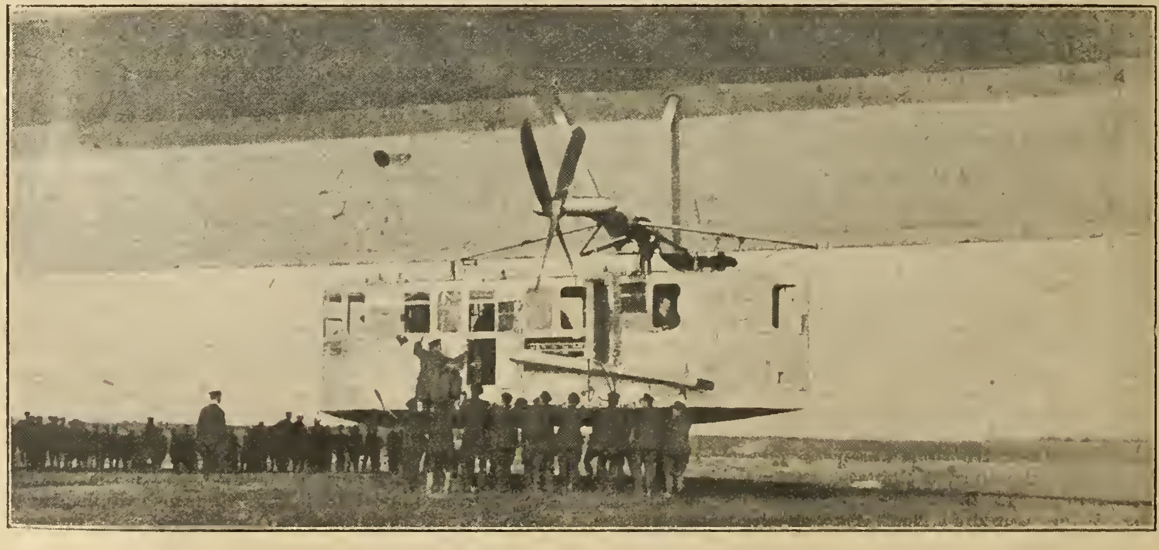
Outer Cover.—The outer cover was doped fabric, laced tightly in place, and on the upper part of the ship was covered with aluminium dust to serve as an insulator to prevent superheating of the gas by the sun's rays.

Mooring Gear.—This airship was provided with mooring gear to enable her to be moored from the ground or at sea by means of a sea anchor.

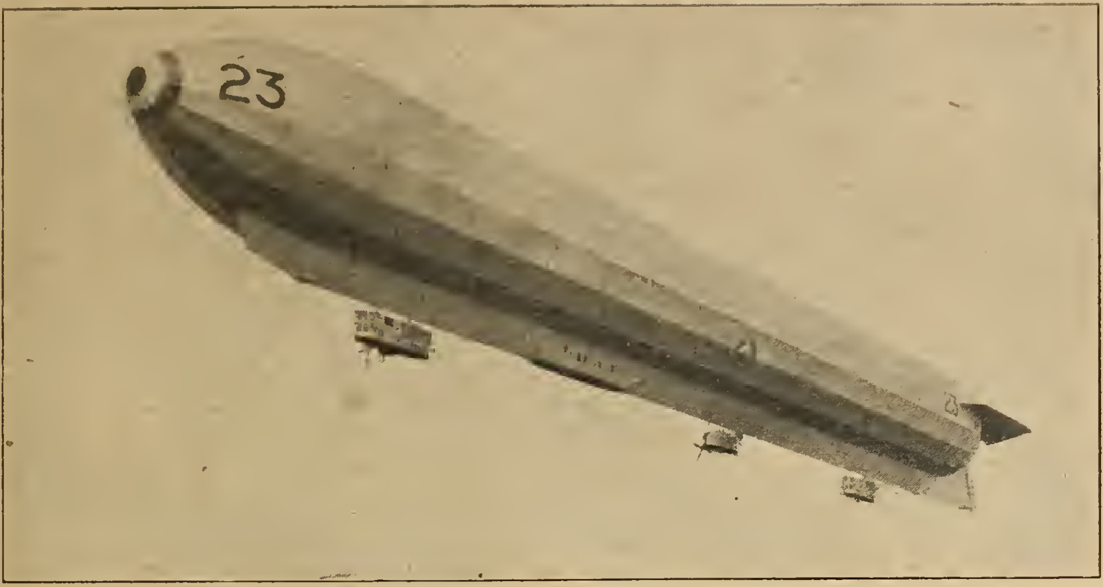
Electric Lighting.—Electric lighting supplied by current from an engine-driven dynamo was provided.

Telephones.—Telephones were fitted between all important stations on the ship.

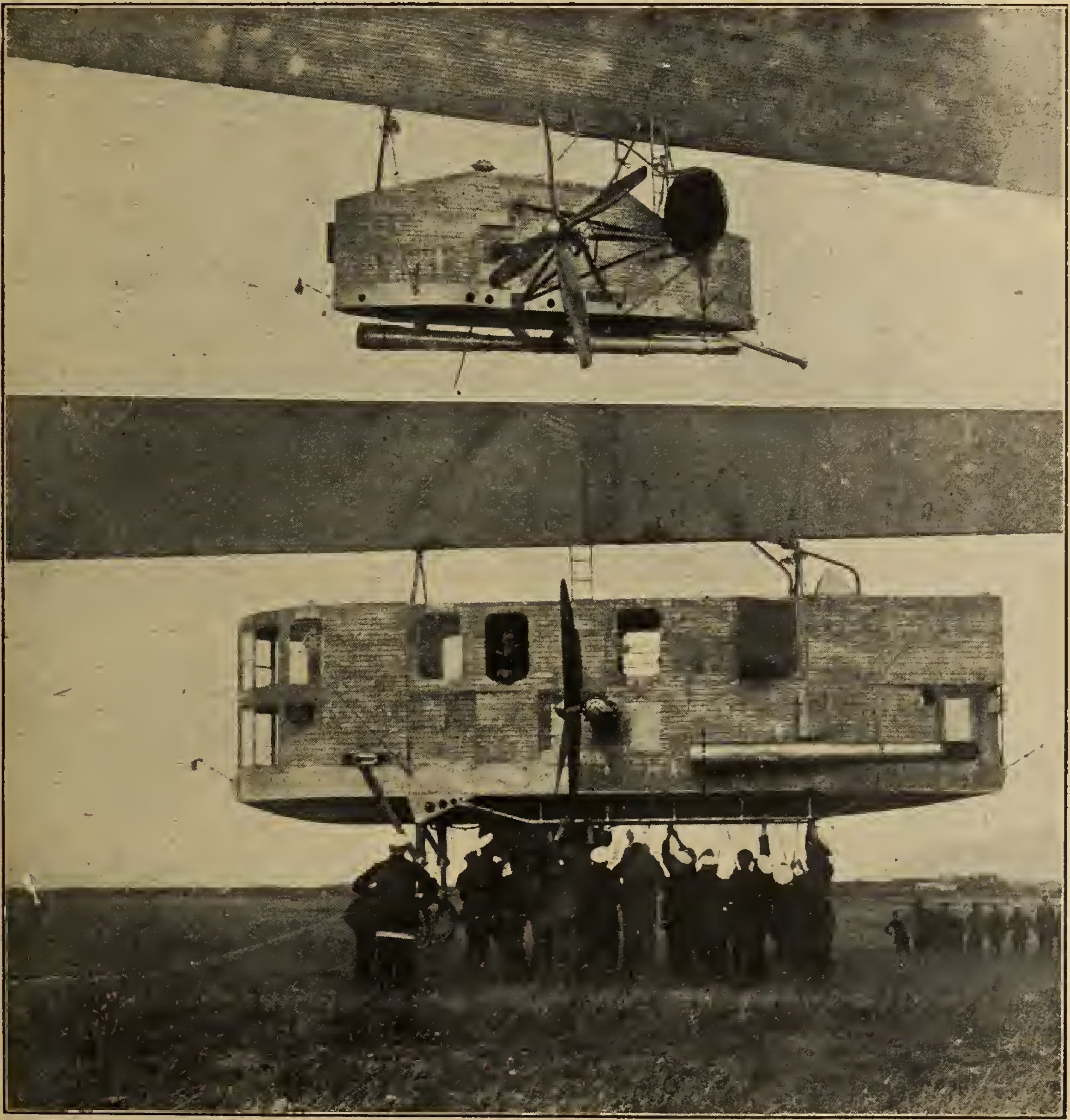
Performance Since Delivery.—This airship has given satisfaction on her acceptance trials and subsequently in service, which is particularly satisfactory in view of the fact that she is the first rigid airship designed and built in Great Britain. Since delivery she has been employed primarily in training crews for the later ships which have been built, and in this connection swivelling propellers have been found to be especially valuable in obviating bad landings. She has also carried out long patrols over the North Sea, and has been seen over London from time to time. Latterly she has been utilised for carrying out valuable experiments in connection with systems of mooring airships out both on sea and land.



The forward gondola of the " R. 9."



The " R.23," a modification of the " R.9."



The central (top) and aft (bottom) gondolas on the "R.23."

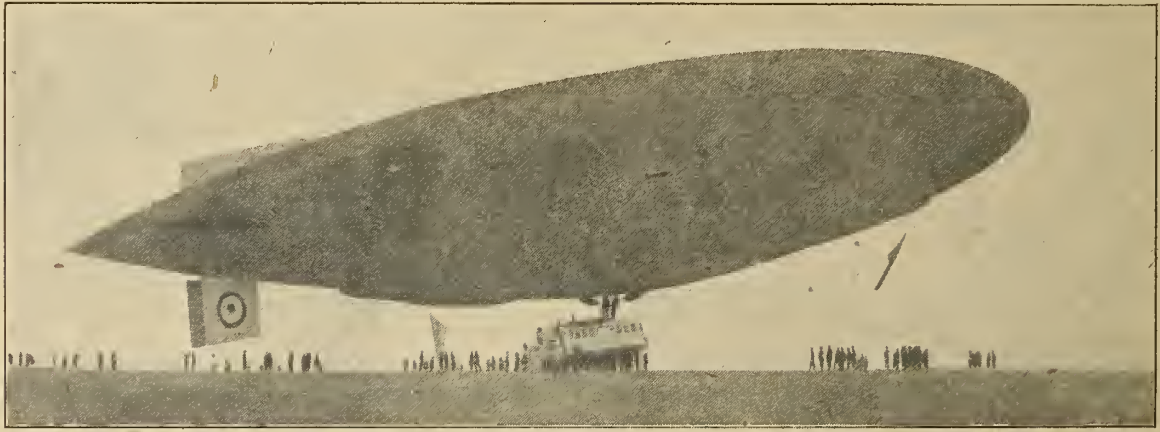
"Twenty-three" Class Rigid

When airship construction was resumed at the latter end of 1915, it was decided by the Admiralty to build rigid airships of an improved R. 9 type, and in order to develop resources for an airship construction, the Admiralty decided that Messrs. Beardmore and Co. and Messrs. Sir W. G. Armstrong, Whitworth and Co. should also take up this work, and accordingly orders for vessels were placed with Vickers', Ltd., and them.

The whole of the designs and working drawings were prepared and circulated to the other builders by Vickers', Ltd. They also placed all their experience and the knowledge derived from the costly and difficult initial experimental work entirely at the disposal of the two competitive firms starting in this industry.

Further, in order to assist the other firms to get ahead with their work, Vickers undertook to supply them with all the bracing pieces, stampings, and forgings, required for the hulls of their first ships, and also, in the case of Armstrongs, supplied them with all valves, controls, tank fittings, and other mechanical gear complete ready for the ship, together with all gasbags, outer covers, and other fabric work.

The airships of this "23" class built to Vickers' design have since commission been engaged on sea patrol work, and have taken a prominent part in the patrol of the North Sea and in convoying shipping. The two airships of this Class, Nos. R.23 and R.26 built at Barrow, were delivered in October, 1917, and March, 1918, respectively. These airships have frequently been seen over London, and R.26 took part in the surrender of the German submarines at Harwich. This ship made a record flight of 41 hours.



The Vickers-Parseval-Type non-rigid.

The construction of these airships was ordered at the beginning of 1916. The Admiralty requirements were that they should be built with the greatest possible speed, and it was therefore decided that the ships should be built of an improved R.9 design, and as much as possible of the design in that ship should be adopted so as to enable the work to proceed with the least possible delay in getting out new designs.

These ships were also required to be suitable for use by inexperienced crews and therefore were required to be exceptionally strong and constructed with a strong keel backbone in the same manner as in R. 9, but it was desired as far as possible, within the limitation of time, that the design should be improved so as to give greater lifting capacity and increased speed. To attain this end, the following modifications to the R.9 design were embodied.

Whilst retaining the same dimensions and general construction of the hull, the capacity was increased from 800,000 cubic feet to 900,0000 cubic feet by slightly lengthening the ship and putting a fuller shaped stern-end which enabled the increased capacity to be attained. The design of the keel, whilst being on the same principle, was greatly improved in detail, so that the same strength was attained with considerable saving of weight.

To attain the higher speed, four engines were installed, giving a total power of 1,000 b.h.p. instead of the total brake horse-power of 600 as fitted on R.9.

Swivelling propellers on an improved design were fitted on the forward car as it was still considered desirable to retain these for facilitating landing.

The arrangement of the cars is as follows :—

A forward control and machinery car with the general design as those on R.9, but improved in general construction. One engine of 250 h.p. driving the two swivelling propellers, which, however, were carried from the car structure instead of from keel, as in R.9.

The design of these swivelling propellers embodied the Vickers' patent principle of balancing the propeller torques to facilitate control, but the detailed design was greatly improved, giving a much lighter construction.

Amidships Machinery Car.—This car contained two 250 h.p. engines carried athwart ships, each driving through a shaft and bevel gear a fixed propeller carried on outrigger brackets.

Aft Car.—The aft car was of the same general construction as the forward car, and contained auxiliary controls in the control compartment. The machinery compartment contained one 250 h.p. engine driving direct through reduction gear a two-bladed propeller mounted at the aft end of the car.

The remainder of the airship generally was in principle the same as R.9, but all details considerably improved both as regards weight and efficiency.

Performance Since Delivery.—The acceptance trial flights of those airships were very satisfactory, the speed attained being somewhat in excess of that guaranteed.

Since delivery they have been employed on the patrol of the East Coast, and the North Sea, and have served to train a number of crews for future larger rigid airships. They have also been used for carrying out various experiments on alternative methods of mooring ships out in the open, both from land and sea.

R.26, before leaving Barrow, was used to carry out a systematic series of trials to obtain information and data to develop a theory of the stability and controllability of rigid airships.

"Thirty-three" Class Rigid

These airships are of about 2,000,000 cubic feet capacity, and orders were placed with Vickers', Ltd., Armstrongs, and Beardmores, in November, 1916. The latter two firms having large enough sheds, were in a position to proceed immediately, but the Walney shed not being large enough, Vickers were not able to start erection until the new shed at Flookburgh near Barrow, then being designed, could be completed. They, however, proceeded with the manufacture of material and girders, etc.

When in September, 1917, the work on Flookburgh site was stopped on account of the acute shortage of steel at that time, arrangements were made for the erection of this ship to be taken over by Short Brothers of Bedford, and for the components to be made by Vickers.

All the material, therefore, that had been prepared was handed over to Short Brothers.

Vickers' R.80

R.37 having been transferred to Short Brothers, Vickers were without further work to proceed with on the completion of R.26, and Flookburgh shed and aerodrome being stopped, they were restricted to a size of airship that could be built in Walney shed.

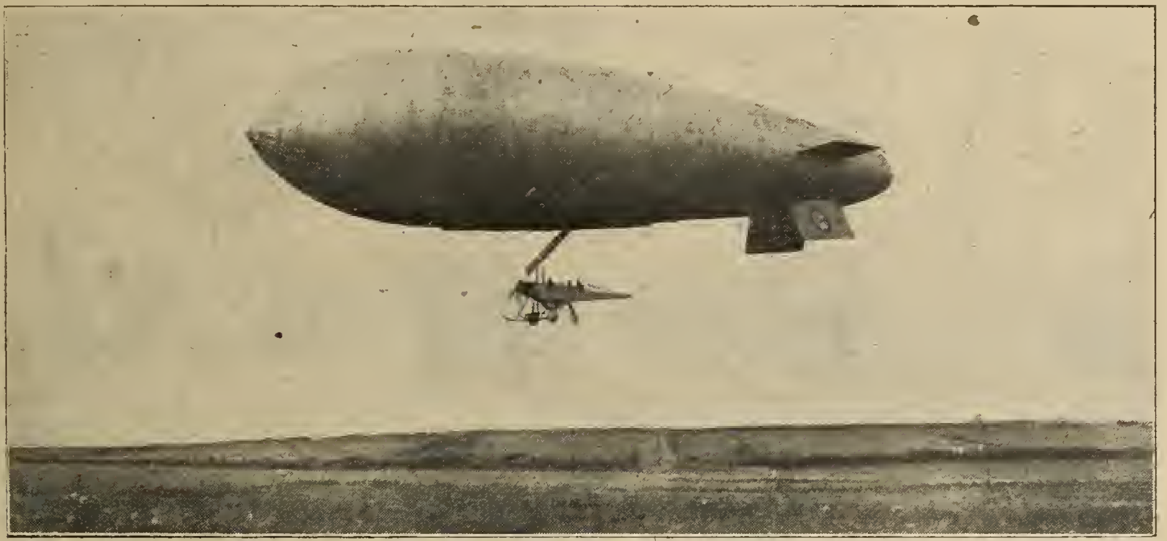
They therefore prepared designs for an airship of the largest possible size that could be built there, and embodied in this design all the best features obtained from the German "33" Class, and also the improvements suggested by experi ence gained with airships of R.9 and R.23 Classes in service.

As they were given a free hand in the design without unnecessary restrictions as to strength, such as were imposed in "23" Class vessels, a design was produced which for its size was considerably more efficient than any other rigid airship, in both weight and general design.

An order for one ship to this design was placed in November, 1917, and this airship is now ready for trials.

Special Features of the Design

Hull.—The shape of the hull, which is based on the results of all the best types of airships known, and also on a lengthy series of model experiments—is considered to be the most perfect known streamline shape, which therefore enables the ship to attain its speed with the least possible power. In addition to the general improvement in the design of the hull structure referred to above, many detailed improvements have also been introduced in the design of the girders, joints, and in the system of wiring. The hull is also provided with a new type of gun position carried at the aft end, and also a special gun platform on the top suited to carry heavy calibre guns. The design of these special gun positions are also covered by Vickers' patents. The hull is provided with bow mooring attachments on the Vickers' patent principle, which enables the ship to be moored out from a mooring tower in such a manner that the ship is free to turn in any direction and lie with the wind, thus enabling her to be moored out in safety even under the most severe weather conditions.



The Vickers " S.S " type non-rigid (" Blimp").

Gasbags.—The gasbags in this airship are made under a new system patented by Vickers', Ltd., which enables them to be constructed of the lightest possible weight, whilst at the same time giving extremely good gas holding properties.

Controls.—Special consideration has been given to the design of all control gear for steering and controlling gas discharge, etc., and the results of over five years' experience in design and working has been taken advantage of in R.80 designs, the most important feature of which is that all controls are carried from the car to the hull in an accessible shaft which gives them complete protection from the weather whilst enabling all parts of the control gear to be accessible during flight, a feature which has not been evident in any of the other airships yet built.

Cars.—Four cars are attached to the hull, viz. :—

(*a*) *Forward control car and machinery car,* which are flexibly connected together to form one streamline body.

(*b*) *Two wing cars* for machinery only, attached on opposite sides of the airship.

The control car is of sufficient size to contain all the navigating controls and instruments and the navigating crew, with provision to give sufficient room and convenience for their comfort. The wireless cabin is also fitted in this car.

The forward machinery car carries two engines arranged *en echelon* driving one direct driven propeller at the aft end. The driving gear is so arranged as to enable the propeller to be driven either by one or both of the engines.

The wing cars each contain one engine driving direct a propeller at the aft end and at engine speed without reduction gear. Reverse gear is fitted to these propeller drives for use when the ship is landing.

The most careful consideration has been given to the design of the cars and by making them of a perfect streamline shape, the head resistance is cut down to a minimum whilst at the same time the engineer crew are provided with a degree of comfort and convenience which has not hitherto been attained. The structural system on which the cars are designed also enables the weight to be cut down to a minimum whilst giving greater strength and rigidity of structure than the usual design. A special type of buffer bag and buoyant covering is fitted to the forward car and also to each of the machinery cars. These buffer bags are of such a nature as to enable the airship to float on the water and also gives considerable cushion effect to absorb the bump when landing on the ground. The nose of the car is also so arranged with windows as to give exceptionally good all-round vision for the navigating officers.

Machinery Installation.—This airship is fitted with four "Wolseley-Maybach" engines of 240 h.p. each. This design is developed from the German "Maybach" engine, of which Vickers', Ltd., obtained the manufacturing rights before the War. This engine has been specially developed for airship work, and gives a high degree of reliability and a very low petrol consumption which, together with the capability of running continuously for long periods, are the essential characteristics for airship propulsion.

The transmission machinery designed by Vickers', Ltd., has been based on the experience in previous airships, and gives the best possible performance consistent with absolute security from failure and breakdowns. The gears have been designed on the results of a long series of experiments on the strength and endurance of gear teeth running under the conditions prevailing in an airship.

Many other improved features in the machinery installation have been embodied in this airship.

Non-rigid Airships, P.6 and P.7 (Parseval Type)

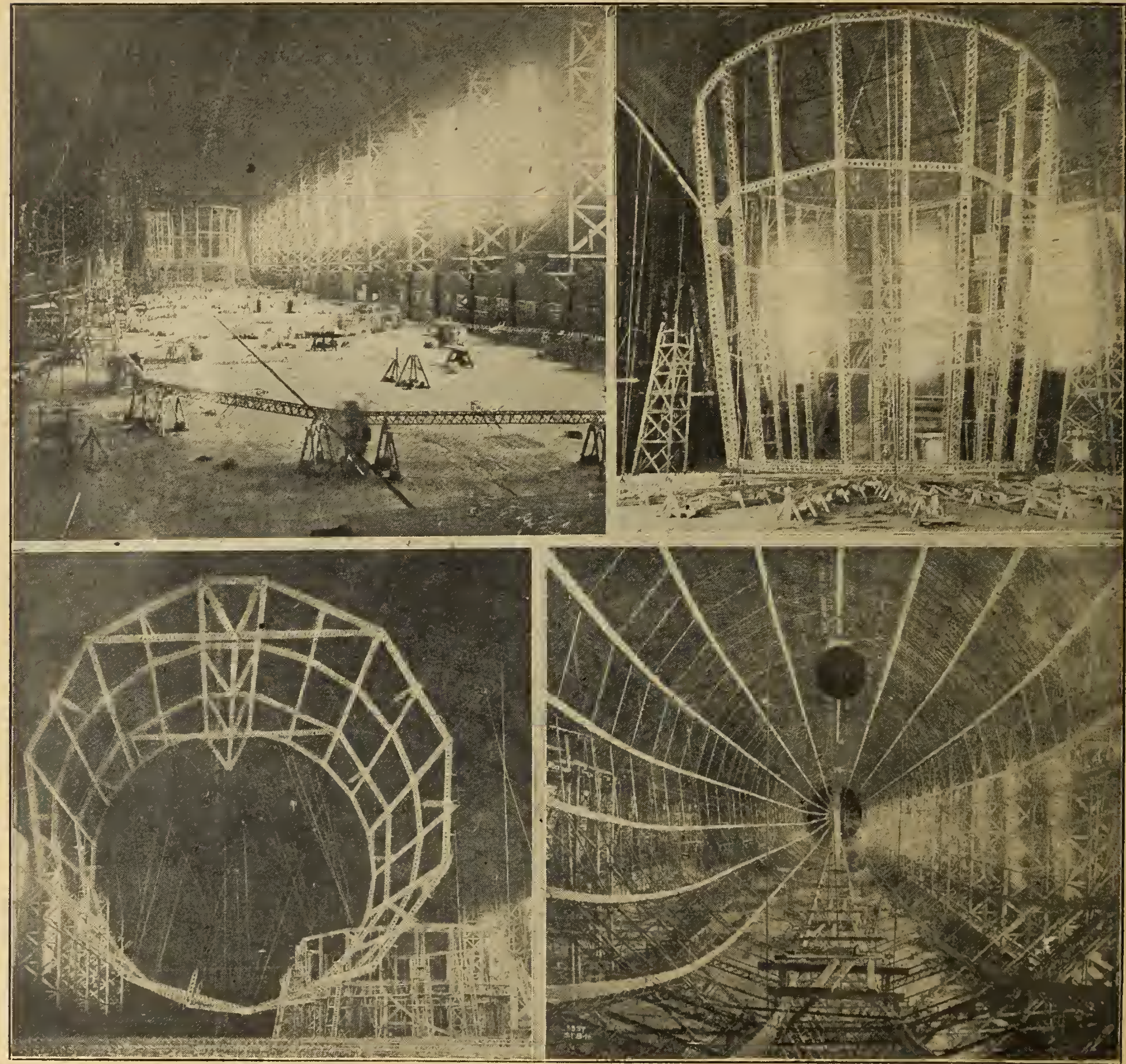
In 1914, when the Admiralty decided to put in hand a programme of airships for the British Navy, it was decided to obtain large non-rigid airships of 360,000 cubic feet capacity and after consideration of the various types of non-rigid ships then in use, the "Parseval" type was adopted as being suitable, and orders were placed in October, 1913, with Vickers', Ltd.—who held the British patents for the "Parseval" envelope—for airships of this type. The first of these airships, P.5, was to be built by the "Parseval" Co. at Ritterfeld, Germany, and flown over to England. The others were to be built by Vickers', Ltd., at Barrow. Owing to no facilities being available in this country to manufacture non-rigid envelopes of this size, it was decided that the first envelopes should be made by the Parseval Co., and that spare envelopes should be made by Vickers', Ltd., as soon as their fabric factory was in working order. The design of these airships was based on that of previous ships built by the Parseval Co., but with radical alterations to suit the requirements of the Admiralty. The most important of these were the following:

Swivelling propellers were to be fitted to facilitate handling and landing of these ships by inexperienced pilots, and the cars were to be specially designed of a very robust construction to enable them to stand heavy landings on the ground, and also were to be fitted with a watertight double bottom to enable them to land on the sea.

The shape of the envelope was greatly improved from that of previous "Parseval" airships as the result of a series of model experiments carried out by the Parseval Co. at Gottingen, Germany. The system of weight distribution to the envelopes was a new system recently brought out and patented by the Parseval Co. In this the car was hung from a relatively small suspension gurt on the underside of the envelope from which the weight was distributed over the whole surface of the envelope by means of a system of "trajectory" bands, beyond serving to distribute the weight and reducing the bending moment in the envelope with a consequent reduction in the inflation pressure required, also considerably strengthened the fabric to resist tearing, etc. The nose was re-inforced by a series of steel tubes to prevent it being pushed in by the air pressure when flown at full speed.

The ballonets were provided, of a total capacity of 30 per cent. of the gross value of the envelope, and an air pressure of 25 m/m in these served to keep the envelope in perfect shape. With the ballonets of this size, the ships were enabled to rise to a height of 10,000 feet. The envelope was provided with the usual gas valves, ripping panels, and other fittings, and was also fitted with a gun platform on the top of the envelope reached by an access tube through the envelope.

The car was a very strong and rigid structure built with a "Duralumin" framework and plating. It was constructed



Four views showing the progress in the construction of a Vickers rigid. Reading from left to right, at the top the transverse frames being assembled on the floor, and a completed section of hull in vertical position. Bottom, a completed section lifted and turned over ready for laying on the erecting cradle, and view looking down inside the completed hull structure.

with a watertight bottom to enable it to land on the water, and with a very strong substructure construction to enable heavy landings to be affected without damage.

The body of the car was divided into two compartments, viz. :—

(*a*) The control compartment, in which were fitted all the navigating controls and a small wireless cabin ; and

(*b*) The machinery compartment, in which were fitted two "Maybach" engines of 160 brake horse-power each, together with auxiliary machinery.

Petrol and oil were carried in aluminium tanks carried inside the car substructure where also the ballast was carried in fabric bags.

The two "Maybach" engines of 180 h.p. each were fitted side by side in the machinery compartment driving the overhead swivelling propellers through bevel gears and vertical shafts. The two propellers were arranged to swivel together with hand control from the control compartment. An air blower to inflate the ballonets was fitted in the machinery compartment and arranged to be driven alternatively from the main engines or by small auxiliary engine which was fitted. This auxiliary engine also drove the lighting dynamo.

The envelope was provided with the usual mooring ropes and handling lines.

Envelopes for Non-rigid Airships.—A number of envelopes of various types and sizes for non-rigid airships have been made at Barrow and Douglas, Isle of Man.

Considerable assistance was given to the British Admiralty when they launched their programme for S.S. and C.P. airships. For instance, in the case of the C.P. ships which had "Astra-Torres" envelopes, sets of templates were made which were distributed to other competing firms to enable them to manufacture.

Gasbags for Rigid Airships.—The gasbags for nearly all the rigid airships of "23" Class were made at the Douglas factory, and large numbers of other gasbags have been made for other Admiralty airships built by other firms, as well as the airships built by Vickers', Ltd.

Experimental Work Carried on by Vickers', Ltd., in Connection with the Mooring of Airships.

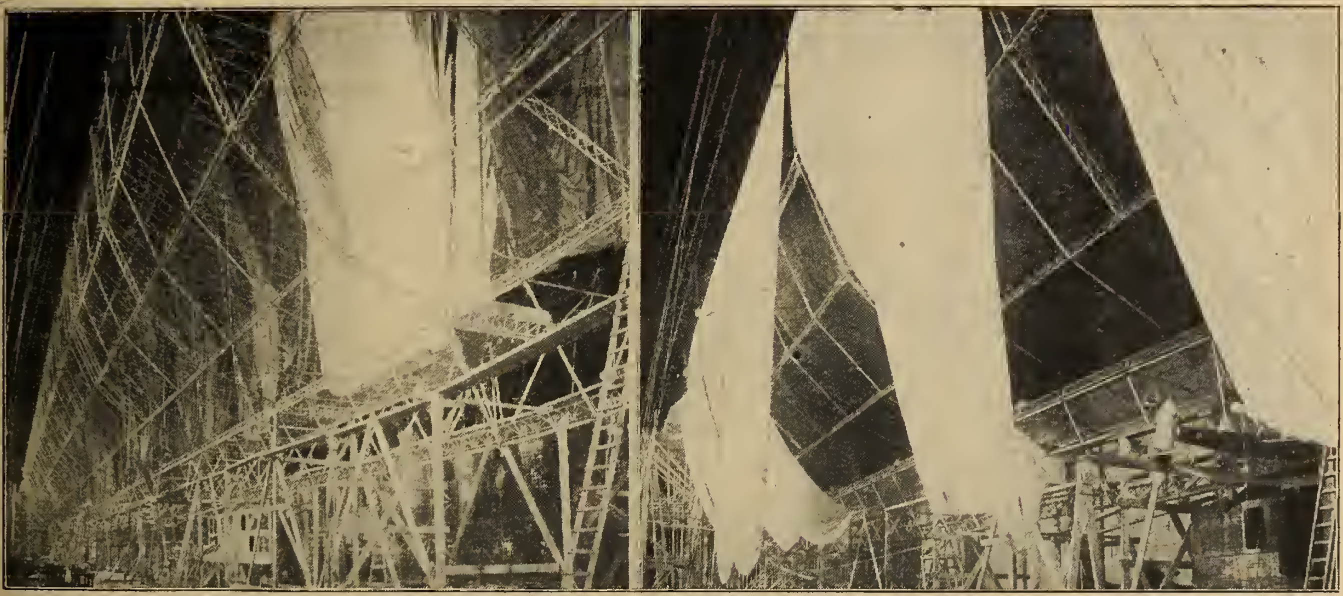
The question of mooring aircraft in the open without the protection afforded by sheds or screens has occupied the attention of airship pilots and designers ever since the time when it was realised that lighter-than-air aircraft had a practical future before them. Numerous experiments have been carried out in the past with varying degrees of success, and while it is not the purpose of the present note to refer to these in detail, it is worthy of remark that Vickers', Ltd., acting in conjunction with the Admiralty, were the pioneers of mooring for rigid airships as far back as the year 1911, when H.M.A. No. 1 was moored out on the water for three days to a floating mast in Cavendish Dock, Barrow-in-Furness.

No further experiments were carried out until quite recent times when the problem of housing non-rigid airships of the "Sea Scout" type became acute owing to the fact that the number of ships required for sea patrol duties actually exceeded the number of sheds which could be erected for their accommodation.

At the end of 1917, therefore, Messrs. Vickers were invited to co-operate with the Admiralty in the endeavour to find a successful solution to the problem, and eventually orders were given for the design and construction of two mooring stations. The first of these comprised a method suggested by Vickers', whilst the second embodied the ideas of Brig.-Gen. Masterman, R.A.F.

Proposal one was completed, and a ship put out for trial in March, 1918. Although this experiment was not completely successful, much useful information was gained, full advantage of which was taken in completing the station for proposal two.

Proposal two was completed, and a ship put out for trial



THE VICKERS RIGID AIRSHIPS : On the left, gasbags being inflated in position, and on the right the outer covering being attached to hull.

Performance After Delivery.—These two airships were used for coast patrol work on the East Coast and carried out a great number of night cruises.

Non-rigid S.S. Type Airships

These small airships were of the same general type as the early British Sea Scout airships.

The envelopes are of a streamline shape and the cars are suspended by flexible wire ropes attached to suspension patches suitably distributed over the envelope. The latter are provided with the usual gas valves, ripping panels, and other fittings.

Car.—The car was a standard B.E. type aeroplane chassis without the wings, etc., and was fitted with a single engine of 80 brake horse-power driving a tractor screw.

The ballonets were kept inflated by the air stream from the propeller which was intercepted by a scoop pipe suspended from the envelope.

Performance After Delivery.—It is understood that these small airships have been employed for anti-submarine patrol in the Mediterranean.

Other Airship Work

Kite Balloons.—Some of the earliest kite balloons made in England were made at Barrow, and a subsequent contract was obtained for 26.

in May, 1918. The scheme proved at once to be an even greater success than the most sanguine had hoped for. The experiment was subsequently transferred to an air station, where a succession of ships have been moored out almost continuously to the mast built by Vickers', Ltd., from June, 1918, to the present date. The degree of success obtained may be gauged from the fact that these ships have encountered, without accident of any kind, all varieties of summer and winter weather, including the wind velocities up to 55 m.p.h. during the autumn, and a severe snowstorm during the past winter months.

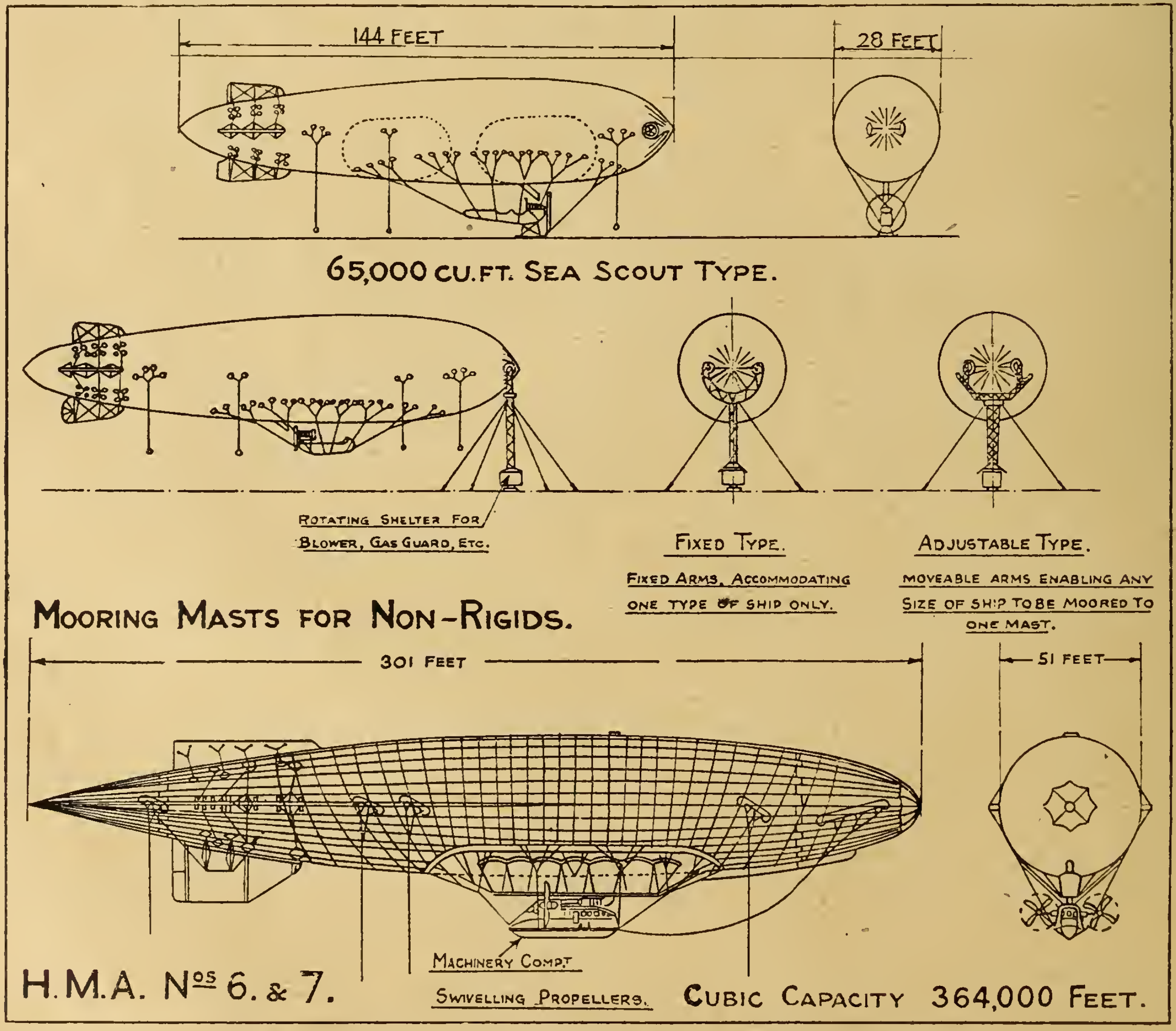
In view of their unique experience in the mooring of aircraft, a request was made early in 1918 that the firm would put forward proposals for the application of mooring to the largest type of rigid airships. After a considerable amount of preliminary investigation, a scheme was produced which not only provided for the mooring of the ships, but also enabled them to be landed at the mast, or released for flight, entirely by mechanical means, thus obviating the handling party of 300 to 400 men previously required to carry out these operations. This scheme, worked out in conjunction with Admiralty officers, was submitted to the Admiralty in March, 1918, and received immediate approval as being the most promising proposition hitherto put forward in this connection.

An order was accordingly placed with the firm, and a ship selected for the necessary adaptation to carry the mooring appliances.

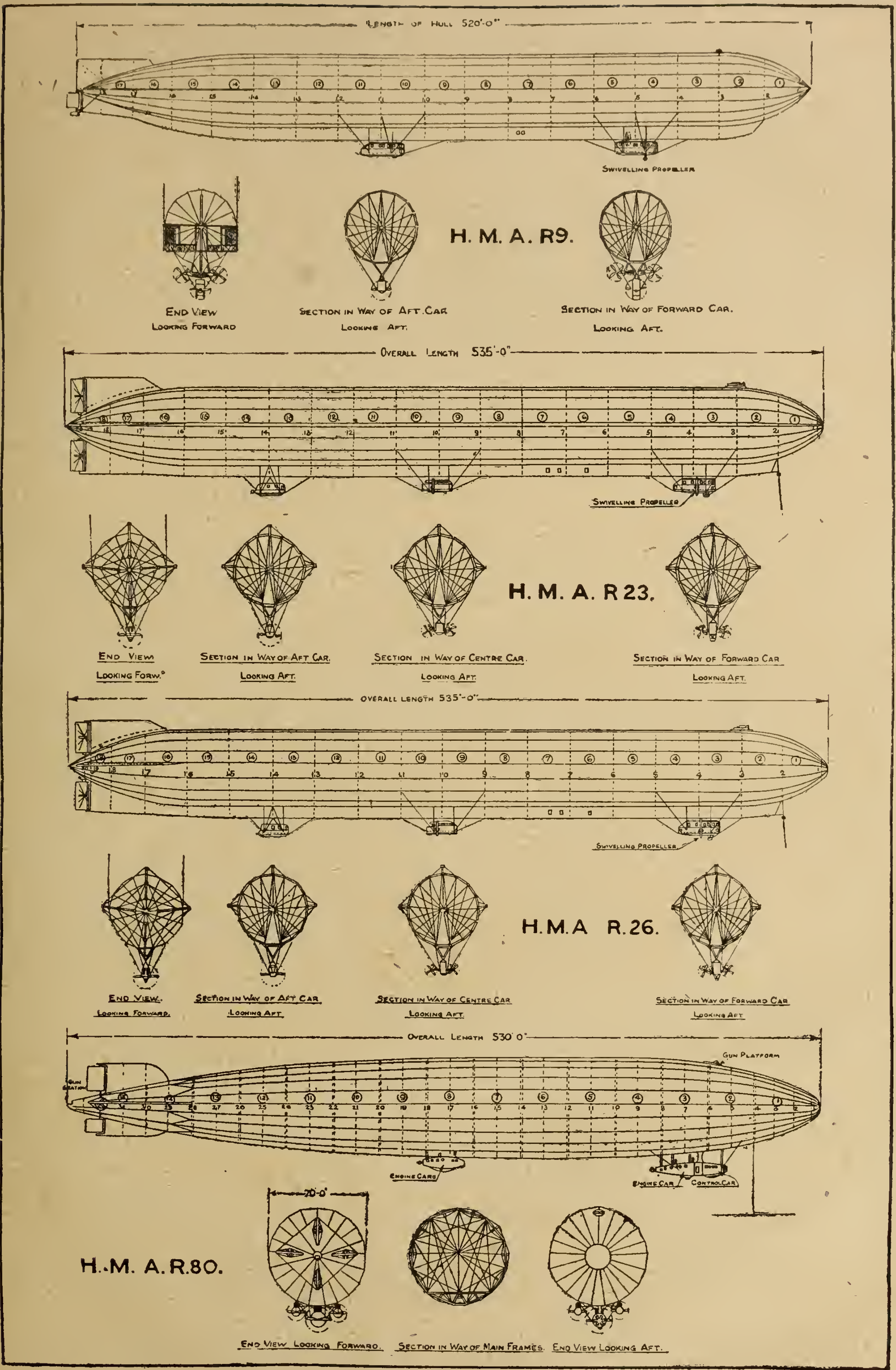
Type and date delivered.	Length.	Width.	Height.	Gross Gas capacity.	Gross total lift.†	Disposable lift.‡	Total max. h.p.	Make of engines.	Speed.			Endurance.			Crew carried.
									Full power.	Normal power. (⅔)	Cruising power. (⅓)	Full power.	Normal power. (⅔)	Cruising power. (⅓)	
	ft.	ft.	ft.	cu. ft.	Tons.	Tons.			m.p.h.	m.p.h.	m.p.h.	hrs.	hrs.	hrs.	
R.9 (rigid), March, 1917 ..	520	53	76	800,000	24	5·2	600	Wolseley-Maybach.	45	38	32	18 (500 miles)	26 (1,000 miles)	50 (1,600 miles)	14
R.23 (Sept., 1917) R.26 (April, 1918) } Rigid	535	53	75	900,000	27	6·3	1,000	Rolls-Royce.	55	48	38	18 (1,000 miles).	26 (1,250 miles).	50 (1,900 miles).	—
R.80 (rigid)	535	70	85	..	..	..	..	..	..	..	..	..	..	..	..
P.6 (Aug., 1917) P.7 (Mar., 1918) { Non-rigid }	312	57	70	360,000	11	3·1	360	Maybach.	42·5	36	28	24 (1,000 miles).	36 (1,300 miles).	70 (1,950 miles).	—
S.S. (non-rigid)	140	32	45	70,000	lbs. 4,750	lbs. 1,800	80	..	45	..	(⅔) 35	(800 miles).		(1,000 miles).	2

† At 68 lbs. per 1,000 cub. ft.

‡ Disposable lift is that available for fuel and oil, stores, crew, and passengers.


144 FEET
28 FEET
65,000 CU. FT. SEA SCOUT TYPE.
ROTATING SHELTER FOR BLOWER, GAS GUARD, ETC.
FIXED TYPE.
FIXED ARMS, ACCOMMODATING ONE TYPE OF SHIP ONLY.
ADJUSTABLE TYPE.
MOVEABLE ARMS ENABLING ANY SIZE OF SHIP TO BE MOORED TO ONE MAST.
MOORING MASTS FOR NON-RIGIDS.
301 FEET
51 FEET
MACHINERY COMPT.
SWIVELLING PROPELLERS.
H.M.A. Nos 6. & 7.
CUBIC CAPACITY 364,000 FEET.

THE VICKERS NON-RIGID AIRSHIPS: General arrangement drawings of S.S. and Parseval type ships, and mooring mast.



THE VICKERS RIGID AIRSHIPS : General arrangement drawings of R. 9, R. 23, R. 26 and R. 80.

LONDON–PARIS AIR SERVICE

Monday next is to see the inauguration of the first regular daily international air service. It will be between London and Paris, the "port" at this end being Hounslow, while Le Bourget, near Paris, will be the French station. The service will be run by Aircraft Transport and Travel, Ltd., the machines being of the Airco 4A and Airco 16 types, fitted with Rolls-Royce engines. The 4A type will carry two passengers. Comfortable seats with tables are provided, and there is a certain amount of room available for baggage. They will be covered in from the wind, and passengers can travel in their ordinary clothes, and read and write, play cards, or do business on the way over.

The machines will start from each end, each day at midday, weather permitting, and it is anticipated that the journey will take about 2½ hours. The American Express Co., 6, Haymarket, S.W. 1, have been appointed booking agents, and arrangements will probably be made to convey passengers from their office to the aerodrome, and similarly motor cars will take passengers from the French aerodrome to Paris. The fare for the single journey will be twenty guineas. Parcels will also be conveyed by the service, and they can be delivered either at the Hendon aerodrome by 11 o'clock in the morning, or at the depôts to be established in the City, where they will be collected daily. The rates will be 7s. 6*d*. per lb., with a sliding scale down to 3s. 6*d*. per lb. for parcels weighing more than 1 lb.

The pilots chosen for the service include Major Patteson, M.C., A.F.C., who was the first to organise the route to Paris for the Air Ministry last year, and who brought Marshal Foch to this country; and Captain Gathergood, A.F.C., an experimental air pilot engaged by the Air Ministry, who won the Aerial Derby round London a short time ago. All the others are pilots of experience.

In addition to this daily service it is proposed to run a weekly service of Farman "Goliath" machines, each carrying twelve passengers. They would fly from Paris to London on Thursdays and return on Fridays. In the event of this arrangement proving popular the service may be extended.

◆ ◆ ◆ ◆

Sir H. Trenchard Promoted

It was announced by the Air Ministry on August 19:—

"H.M. the King has been pleased to approve the promotion of Air Vice-Marshal Sir H. Trenchard, K.C.B., to Air-Marshal, with effect from August 11, 1919."

The Royal Aeronautical Society

It is announced by the Royal Aeronautical Society that H.R.H. the Prince of Wales has been graciously pleased to signify that he will act as patron of the Society.

Brig.-General R. K. Bagnall Wild, C.M.G., R.E., has been elected Chairman of the Society for the ensuing year. A branch of the Society, with Sir William Beardmore as Chairman, has been formed at Glasgow. Mr. J. Buyers Black is the Hon. Secretary, and the offices are at 4, Jane Street, Blythswood Square, Glasgow.

Relinquishment of Landing Grounds by R.A.F.

The Air Ministry announces that the following stations and landing grounds have been relinquished by the R.A.F.:—

Stations

Torquay (seaplane).
New Romney.
Seaton Carew (seaplane).
Tipnor (kite balloon base).
Sheerness (kite balloon base).

Landing Grounds

Lower Beeding	Sussex.
Earnley	Sussex.
Kingshill (West Malling)	Kent.
Blackneath (Colchester)	Essex.
Plungar	Nottinghamshire.
South Cave	Yorkshire.
Bishopton	Durham.
Cairncross	Berwickshire.
Burnham-on-Crouch	Essex.
Broomfield (Chelmsford)	Essex.
Appleton Wiske	Yorkshire.
Ponteland	Northumberland.
New Chapel	Surrey.

Weather Experts' Conference

Arrangements have been made to hold a conference of representatives of the Meteorological Services of the British Dominions in London from September 23 to 27.

Information has been received that the following official meteorologists of the Dominions beyond the seas will be present:—

Capt. A. J. Bamford, Director of the Meteorological Service of Ceylon; The Rev. D. C. Bates, Director of the Meteorological Office of New Zealand; Mr. H. A. Hunt, Director of the Weather Bureau of the Commonwealth of Australia, Melbourne; Mr. H. Knox Shaw, Director of the Meteorological Service of the Public Works Ministry, Egypt; Mr. C. Stewart, Chief Meteorologist of the Union of South Africa; Sir Frederick Stupart, F.R.C.S., Director of the Meteorological Service of Canada; Dr. G. T. Walker, C.S.I., F.R.S., Director-General of Indian Observatories.

The subjects to be considered will include:—

(1) The meteorological arrangements for the exchange of observations by wireless at comparatively long distances. Specification of observations for the surface and the upper air, with the codes for transmission; (2) The consideration of instruments and material for the investigation of the upper air; (3) The selection of stations of the Reseau Mondial for the purpose of the general climatology of the globe. (*See* Reseau Mondial 1911-12-13, M.O. publication 207 g., 214 g.); (4) The provision of current meteorological information for the main air routes of the world; cooperation in the investigation of the meteorological conditions of aerial navigation; (5) The Trade Routes and the meteorological survey of the oceans by observations transmitted by radio-telegraphy from ships.

Cross-Country Races from Hendon

It has now been decided to postpone the Hendon-Brighton-Hendon race, which was provisionally fixed for August 30, until later in the season, and the Hendon–Manchester–Hendon race, fixed for September 20, has also been put off. It is possible that the "Pratt's" Trophy and prizes may be devoted to an international race and reliability trial for commercial machines over a course from Hendon to Paris and back. This competition would take the place of the Hendon–Manchester race.

The Irish Aerial Derby

In connection with this event, some details of which were given in our last issue, we now learn that the fastest time for the course of 102½ miles was made by Lieut. W. A. Roberts, who was eventually placed third on the handicap. His time was one hour and six minutes, representing an average speed of 92·8 miles per hour. His mount was an Avro, fitted with a 130 h.p. Clerget. Avros secured first, second, third, fourth and fifth places in the race.

London to Copenhagen

On Monday morning a large Handley Page, piloted by Major Tryggve Gran, arrived at Copenhagen, having flown across from London. The machine left Cricklewood on Sunday at 9 a.m. and crossed to Holland, and a brief call was made at the Soesterberg aerodrome. It then went across Holstein to the Baltic, when, owing to contrary winds, it landed at Bagenkop, South Langeland. The next morning it went on and landed on the Island of Amager, south of Copenhagen. There were seven passengers on board, including Mrs. Gran, Capt. Steward, and Capt. Meisterlin. It is intended to continue the trip to Christiania and Stockholm.

The Avro Baby at Amsterdam

The Avro "Baby" which won the sealed Handicap at the Aerial Derby in June is now on view at the E.L.T.A. Exhibition at Amsterdam. She was piloted across last week by Captain Hamersley. The stage from Hounslow to Brussels was made in 2 hrs. 50 min., which speaks well for the 35 h.p. Green engine with which this machine is fitted.

Kent Air Stations

Admiral Sir Doveton Sturdee, Commander-in-Chief at the Nore, with the approval of the Air Ministry, has cancelled the orders issued by him in March, 1918, under the Defence of the Realm Regulations, prohibiting approach to the air stations at the Isle of Grain, Eastchurch, Leysdown, Manston, and Westgate and the Kite Balloon Station at Sheerness.

Kronstadt Again Bombed

British aeroplanes again bombarded Kronstadt on August 13, hits being observed on the forts, and a benzine depôt is believed to have been set on fire, while a wide area of the town is said to have been destroyed.

The Finnish General Staff reports that two British aeroplanes crashed at Koivisto or Kaviskaia, but the casualties are not reported.

AVIATION IN PARLIAMENT

Air Ministry Contracts

IN the debate on the Consolidated Fund Bill, on August 12, the Under-Secretary of State for Air (Major-Gen. Seely) said :—It may be for the convenience of the House if I make a statement on certain points on which I promised to give the House information, notably with regard to the reduction in expenditure of the Air Ministry, and also with regard to certain specific complaints. I do not propose to deal with the questions raised yesterday with regard to Sir John Hunter, for I have nothing to add to or to subtract from what I then said with regard to my responsibility in that matter, which will be dealt with by my right hon. friend the Lord Advocate at a later stage. With regard to the other matters, the House will remember that when I was appointed to my present office I was enjoined to preside over the Council and to be responsible for all the business of the Council.

Therefore, I could not disclaim responsibility for what is happening now, even if I wished to do so, which I certainly do not. I do not propose to deal with any of the pre-war contracts or war contracts. I was away from the House, and, indeed, from this country, at the time. All that can be dealt with better by those who have knowledge of the facts. What I think the House will want to know is, is extravagance going on now, and if it is, why it is not checked, and are those who are responsible for such extravagance being properly punished ? I propose to deal with that to-day in as short a time as possible. First, as to the charge of general extravagance levelled against the Air Ministry, let me say, although the point has not often been raised in this House, it is constantly raised outside, that we are extravagant in that we put up estimates of £66,000,000. I stated to the House in the most explicit terms when I introduced the Air Estimates that a great proportion of that £66,000,000 was due to the finishing up of war contracts. It has been said again and again that the £66,000,000 has no relation whatever to the ordinary Estimates for the Ministry. When it is reflected that at the time of the Armistice we had more than 250,000 men, and we had arrangements to produce 50,000 aeroplanes per year, it is apparent that when the war stopped suddenly on November 11 you could not wash out the whole of that gigantic expenditure all in a moment. This £66,000,000—and I know every member of this House knows this, though it is not sufficiently realised outside—is the charge which we have to bear, not for maintaining a normal Air Force—that is only a portion of it—but owing to gigantic expenditure due to the great war, in which the Air Force cost a great deal of money and in which, I venture to say without fear of contradiction, it contributed in large degree to the victory that we won.

What have we done to reduce since the Armistice ? At the date of the Armistice there were 30,000 officers ; to-day we have demobilised 20,000 of those, so that is 20,000 out of 30,000. Of other ranks, including cadets, we had 264,000 at the date of the Armistice ; we have demobilised 203,000 of those. So rapid a reduction in any force I should think there has never been, certainly in the history of this country. Of aerodromes and landing grounds we had, at the date of the Armistice, 386, of which we have given up 210. On that I may say, in passing, that the giving up of this large number makes it much more difficult for the airmen to find suitable landing grounds in some parts of the country. I would like here publicly to acknowledge the great assistance rendered to me and the Air Ministry by the lord-lieutenants of counties and the chairmen of county councils and others who are arranging emergency landing grounds to fill the gaps. To return to the reductions, the staff of the Ministry in all departments at the date of the Armistice was 806. Although we have great responsibilities, as I will presently show, that number is now reduced to 402—that is, reduced by half. Of hired premises and hotels, we had at that time the enormous number of 2,143, of which 1,927 have been given up and 37 more are in process of being given up. I claim, taking the figures I have given, and I do not think they can be challenged, that so great an economy in a public service has never been made in the same time.

As to the number of the Women's Royal Air Force, I cannot give the exact figure at the moment, but I can give the approximate number. They have been reduced by not quite half, but they are going to be reduced much more, to about 3,000, including all the work of domestic service, for which women are more suitable than men, whether disabled or otherwise. That is in process of being done. It will be apparent to the House, with this extraordinarily rapid reduction from 264,000 to 60,000 in a few months, that you want a large staff of clerical people to deal with that demobilisation. I have shown the great economies that we have made, but on general charges of extravagance all that I ask is that specific cases shall be shown. I cannot get specific cases. People say, "The workmen are not doing a full day's work." I deeply regret that if it is so, but that is not under the control of the Air Ministry. The statement that the labourers are not doing a full day's work is a wrong criticism to charge to the Air Ministry. It has nothing to do with the Air Ministry as such. It is general war weariness, which is found in all walks of life. I want specific cases. No doubt the House will remember that three—I think only three—specific cases have been ventilated in the House and in the Press, and I propose to deal with those three. The first was the statement in a letter to *The Times* that aeroplanes were being recklessly destroyed, and that the most horrible waste was being committed at Farnborough, and that comment raced throughout the length and breadth of the land, that we were burning aeroplanes and taking no steps to save money. One can speak best of what one has seen oneself. I went down there, and I can assure the House that, being familiar with salvage dumps, I have never seen so well-organised a business as what is going on at Farnborough now, and what was going on then. Far from it being reckless destruction and haphazard burning, the officer in charge was a man who had made a speciality of salvage work, and had earned the thanks of his superior officers in France owing to his great skill and the saving of millions of money to the public by his salvage. He has organised the thing to such a pitch that not one penny piece is lost. I invite any hon. gentleman who has the time to go and look at it. Here we have this vast number of aeroplanes beyond requirements. It has been said by my right hon. friend the member for the City of London's Committee that it might be cheaper to burn the aeroplanes. Indeed, I am not sure that it would not be ; but it would be a very bad example. We are trying our very best to get what value we can at Farnborough. This most expert young officer, with a staff of men who know the job, are taking out each particular little bit of the aeroplane that can be sold, putting it aside in its appropriate box, selling it to those who will purchase to the best advantage and making a business which he assures me does just pay. I am not sure that it will be found, when the full accounts are made up, that it does pay to go through this elaborate business, but at least we have saved tens of thousands, probably hundreds of thousands of pounds, by the meticulous care shown by these people at Farnborough in the difficult art of breaking up an aeroplane and salving the parts that are the most valuable, putting them in places where they can be put up to action, and generally making a wise economy in every direction.

The next case is a small one ; but if I deal with small cases it is because I cannot get hold of big ones. It is the cost of Air Ministry cars. My right hon. friend's Committee investigated the question of the cost of the Air Ministry cars. The question of how many there should be is another matter. In point of fact, there were 68 ; there are now 22. There were 33 of what are called allotted cars, for officers going to particular places ; there are now only six. The number is reduced, as will be seen, to one-third in the one case and to one-fifth in the other.

My right hon. friend asked for the cost of these motor cars. I have here the document that was presented to me. It deals with the R.A.F. Transport, London District, and gives the number of vehicles, with a statement of what these vehicles are doing. Most of them are clearing up—for example, the Cadet Distribution, Hampstead ; the Technical Department, R.A.F., Stores ; and so forth. There were about 40 or 50 cars at the Air Ministry at that date. Turning over the page, in order to see what the cost was we find that the cost per week worked out at £2,000. Now comes the mistake, which would be comic if it had not caused such very bad results to a Government Department which is trying to do its best to economise. The transport of the London district is known as the "Kennington Area." In the Kennington Area there are two garages, one known as the Kennington Garage and the other as the Belvedere Road Garage, Kennington. All this is set forth in the document. Turning over the page to see the total cost, you find the estimated weekly expenditure of the London Mechanical Transport Section, Kennington. My right hon. friend, by some extraordinary mistake, assumed that this expenditure was to be divided up amongst what are called the touring cars only, and not amongst the total of 238 vehicles. Any man with an ounce of sense in his head would, of course, have said that a sum of £2,700 for a motor car for a year looks very strange, and surely there must be some mistake. I have no doubt that my right hon. friend must have thought so at the time, but the Report went out, and every newspaper in the land deduced from it that the cost of running a motor car was £2,700 a year. I pointed out that the error made was a ridiculous one, and perhaps might have been due to the fact that the word "Kennington" was not known to include Belvedere Road also ; but I said I relied upon the Committee to make the point clear. In point of fact. I have been at some pains to get at what the cost of a motor car is, and I believe the cost of running one works out at £593.

The next specific allegation relates to Blandford. The *Times* went so far as to say :—

> "The Air Force in particular squanders in a manner which deserves and should receive the severest condemnation. Only yesterday we published a letter stating that in a single camp at Blandford the Air Force is still employing a thousand girls, many of them are conveyed thither in railway trains and omnibuses. The permanent buildings in the camp have only recently been completed, together with a special railway. The story recalls the Slough scandal, and indicates that there is some ground for suggesting that parallels to Slough can be found all over the country."

Can anybody imagine a more scathing condemnation ? I found time to get down to Blandford on Saturday. I knew most of the facts, but I thought the House would wish me, in a matter of this importance, to give them first-hand information. The allegation made is that it is worse than the Slough scandal. I do not know that Slough is a scandal, but that implies that, in the view of those who wrote it, it is a disgraceful waste of public money. It is said that we should receive the severest condemnation.

The R.A.F., as I have told the House, comprised at the Armistice nearly 300,000 men and officers. We must have a depôt for them. It was decided to place this depôt at Blandford. Was Blandford a good place to put it ? It was. As the event proved, it is one of the healthiest places in England. Was it right to put the railway there ? It would have been criminal folly not to put the railway there. The railway must have paid for itself as a continuous concern over and over again. The next thing is that the girls are brought to their work, and you have to pay 4*s.* 7½*d.* a day for them. First of all, why are they brought there to their work ? Because the record office is there. The record office should be at the depot. When the Armistice came, would it have been wise to get rid of the record office ? It would have been madness. The whole of the pay, pensions, gratuities, and records of every kind in regard to every one of those 250,000 men depend upon accurate book-keeping at the depôt. As any ordinary clerk would not know it is not work that anybody can do. Of course, we had to keep the girls on, and we could not put them in the camp as there was no room for them. What was the alternative ? It was to remove the camp to where the girls came from. We went into the facts and discovered that that would cost much more. Of course if we had to spend 4*s.* 7½*d.* on every girl each day it would have been more expensive. It is not so. Really it cost only £4 5*s.* 3*d.* for three months, which works out at 11·3*d.*

Another statement is made as to the number of vehicles. It is said that there are nearly as many motor vehicles at Blandford as when the camp was full. It is not true. There were 133 in use, and now there are 33. The lorries only take the girls from the station to the camp and back. I have estimated the actual cost and on one computation it works out at 2¾*d.* and on another at 6*d.*

We went into the cost and we found it more expensive to move the camp, especially as the camp will very shortly be moved to Uxbridge, when the demobilisation is complete.

There is an exceptional difficulty in the case of the Royal Air Force in returning from a war basis to a peace basis. It is quite different to the other forces in that, first of all, so great a proportion of our costs is the cost of material, whereas, in the case of the War Office especially, the cost of the men is a much larger proportion. Secondly—and this is more important—we have not got a permanent air force. We are building up the new force at the same time as we are reducing the old. It is an extraordinarily difficult task, and I say frankly that the proper criticism to direct against me, and a thing of which I am undoubtedly guilty, is that, in desiring to carry out my duty, I have reduced too fast.

Running through all these comments which have been raised not only in this House but in the Press, I see an idea—that, after all, the Air Force may not be worth while. It is sometimes definitely asked, "What is the good of this Royal Air Force ? Is it worth while keeping it ? It is fantastic to suppose that you must spend millions of money on an Air Force." That is really to forget the immediate past. I know no one forgets it in this House. It is to forget the present and the future. Take the present only. The R.A.F., I can claim, has already this year saved millions of money and thousands of precious lives. Take the case of Afghanistan. Compare the late rebellion with what happened in 1879. Lord Roberts, than whom there was never a more efficient commander, especially in India, conducted that campaign with extraordinary skill, but it cost £14,000,000 to the Indian Government, let alone what it cost us, and thousands of precious lives. This year again the Amir was deposed and another proclaimed a Holy War, just as before, attacked our frontier posts and called on his subjects to drive us out of India, incidentally, of course, driving out, not so much ourselves, as others. I am not here to say that the Air Force stopped the War, but I am here to say that a great many wise men think so. I will only read what two of them have said. Sir William Birdwood, whose knowledge of India in recent years is unrivalled, said the other day in public :—

> "The moral effect of the aeroplane on the tribes (of Afghanistan) must have been tremendous, and it would probably save India scores of rupees and shorten what might otherwise have been a long war."

Then Gen. Sir O'Moore Creagh, the late Commander-in-Chief in India, on another occasion said :—

"With regard to the effect of aeroplanes on war, it was no doubt perfectly true that had aeroplanes existed at the time of the Afghan War in 1878, instead of that war lasting two years, it would have lasted two months at the very outside, and much money and many valuable human lives would have been saved."

I do not think anybody who studies the facts can doubt that the power of the air to save life and treasure is immeasurable, and we must have an Air Force, and a good Air Force. The parallel of Egypt is even more remarkable. We had a rebellion in Egypt, and the censorship was then on. The rebellion was of a most dangerous description, and all communications were cut, railways, telegraphs, telephones, and no communication of any kind was carried on for several days except by air. It was a well-fomented, well-organised rebellion, very much like the previous rebellion, though more formidable, when Lord Wolseley conducted what has been called the model campaign for swiftness and economy, the campaign of 1882—a man of extraordinary genius for that kind of war, and, as I think, for all kinds of war. He conducted that brief campaign, in which most of the troops were only there for a couple of months, and he crushed that dangerous rebellion, but in that short time it cost us £1,800,000. What did our Air Force cost us during the same period in Afghanistan and Egypt? It is difficult to compute, because they had to be there in any case, and in ordinary practice flying they do not use so much, but they use a great deal of the materials that they use in war, but I told those who engage in these matters, finance and other branches, to make me the largest estimating they could, and they put it at £43,000, against £14,000,000; £43,000 against £1,800,000. That would not be a just comparison, for, of course, other troops co-operated, but if it be true, as is indicated, that it was the bombing that stopped the Afghan War and that it was the aeroplanes that quelled the Egyptian Rebellion, it is not too much to say that this country has been saved tens of millions of pounds by having a fairly efficient Air Force. I say fairly efficient, because I know that in India there was much left to be desired in the aeroplanes there. They had all been required on the Western Front, but had there been an efficient force, as we could have had had there not been a Euorpean War just before, the cost would have been far less and the result would have been far more decisive.

Sir D. Maclean: The only point that we are trying to elucidate here is as to whether this £60,000,000 or £66,000,000 which has been granted to the Air Force is being wisely and economically spent. My right hon. friend said that these touring cars, cars for personal use, have been cut down to somewhere about six. We are delighted to hear it, and I only want to know when that reduction took place, because I find in this Report, which has been issued as late as August 7, that there is an estimate as to what it cost up to March, 1919, and it gives the total cost and also the total number of cars, at the risk of wearying the House I will read the particualrs. It says that in March, 1919, there were: Crossley touring cars, 19; Ford touring cars, 19; Rolls-Royce touring cars, 2; Daimler touring car, 1; Rolls-Royce Limousine, 1; Rolls-Royce laudaulettes, 4; Crossley laudaulettes, 27; Ford laudaulettes, 6; a total of 79. The estimated cost was in round figures £71,000, excluding spare parts (other than tyres) and materials used for repairs and renewals of vehicles, maintenance and repair of buildings and plant, and depreciation of vehicles. What that amounts to I do not know, but I am pretty sure I am well within the mark when I say it is at least £10,000.

There are just three points I shall endeavour to make as briefly as possible, and they appear to me to be these. First, that this work carried on at Renfrew was carried on under conditions which, to put it mildly, have given rise to the deepest suspicion, so much so that my right hon. friend the Lord Advocate, in the official communication which was sent on his behalf on March 6, 1919, said this:—

"Further, a prosecution would reveal what appears to be inefficiency and absence of control on the part of the representatives of the Ministry on the spot."

There is no doubt at all of inefficiency and absence of control. This Select Committee have heard the witnesses, and what is their decision? With regard to this undertaikng, Sir John Hunter made a general statement that 70,000 men were not earning their wages, and he goes on further to state that so much was his sense of public duty aroused, that he got a firm of measurers to measure up the work. I would explain that measurers in Scotland correspond to Clerk of Works or surveyors here in measuring up work. He said:

"A firm of measurers was engaged by me, and their work is now practicaly complete, and it appears that already there is a sum of about £60,000 charged by the contractor to the job which cannot be accounted for."

I pass on to the other part of the case. It seems to me extraordinarily difficult to avoid the conclusion that here, at any rate, we have come upon something which requires an immense amount of explanation. I quite agree with what my right hon. friend said, that it is rather difficult to bring specific cases. The whole machinery lies with the Government, and it is a very difficult job, as I know from this side of the House, to get together material upon which one feels justified in making a charge, or even asking for an investigation. The public is at a great disadvantage in these matters.

The position which is taken up with regard to two ladies, Miss O'Sullivan and Miss Douglas-Pennant, is also one which requires very adequate explanation. They took a very proper view—this is a woman's job dealing with the question of women's clothing; why not let women inspect? It was even said that 12 women could do what 40 men were not doing very well. No satisfaction comes from protest, and the whole thing is finally left in a way which, to put it mildly, is unsatisfactory to the last degree. The question I want to address to the Government in regard to that point is this. The matter cannot be left where it has been left by this Report, or even by any statement made in this House. It ought to go much further, and it can. There are a lot of public-spirited Members of this House who are quite willing to give up something of the vacation to take up the matter here and get to the bottom of it. And, whatever happens, I beg again, let us have publicity. If there is nothing in these things, that will satisfy the public, but if you have a half-shade of semi-privacy, you will not allay suspicion, and labour and other unrest.

The Lord Advocate (Mr. Clyde): A true appreciation of what took place, a true understanding of the position, can only be arrived at when the facts surrounding the documents are placed before this Committee. That is what I propose to do now. The Renfrew aerodrome was contracted for. There were really two separate parts of the contract, though I am not going into any of the details. The Renfrew aerodrome was contracted for under a contract originally made by the War Office, and subsequently taken over, and retrospectively reconstituted by the Air Ministry. The original contract was somewhere in 1917—I think near the end. I am not sure of the exact dates But the reconstitution of it was on February 8, 1918. That I do know. By the end of the year 1918 the Air Ministry, after the work had gone on for something like a year and a half—at any rate, the Air Ministry was administrator on its behalf—became aware that the affairs of the contractor were in a state of extreme mismanagement. The information put before me was that as a result of inquiries which he made at that stage—the work having been going on for about a year and a half or more—he had satisfied himself that there was some £50,000 or £60,000 of public money spent for which there was no work to show. I had that information presented to me about the end of 1918. The matter upon which my Department—the Criminal Department in Scotland—was approached by Sir John Hunter had, however, no direct connection with that situation at all. I am afraid that almost anyone who read this Report would imagine that the £50,000 or £60,000 of public money, which Sir John Hunter complained of was lost, was then the subject of, or was to be the subject of, contemplated criminal proceedings. That is altogehter a misunderstanding of the situation. The only information lodged with my Department in reference to criminal proceedings had regard to two paltry sums of £89 5*s.* 2*d.* and £196 19*s.* 3*d.*, or in all £286 4*s.* 5*d.* It is upon the fate of the contemplated proceedings in reference to these two sums, and to these two alone, that the whole of the matter of the second and third pages of the Report of the Committee is devoted.

What was the information laid before my Department? It was that these two sums have been fraudulently misappropriated by four subordinates on the Renfrew contract. They were persons who had to do with the cash and business management side of the contract, and the charge was that these four, or one or other of them, had pilfered the cash of the contract and had fraudulently misappropriated to themselves these two sums. As soon as that charge was lodged with my Department I immediately instructed a full criminal investigation through the ordinary channels of criminal inquiry commonly used in Scotland, and the four persons accused were immediately arrested. They were, as usual, required to make a declaration. They all did so, and none of them confessed anything whatever with regard to the charge. The investigation was carried out sometime between the middle of December and early in February, and what were the facts that that investigation disclosed?

The Committee will readily understand me when I say that to bring a criminal prosecution it is not enough to bring a vague criminal charge, or support it by vague evidence. It must be a specific charge, and it must be supported by specific evidence relative to particular sums with regard to which the abuse is said to have arisen. By the middle of February, when these investigations were complete, it became perfectly clear that with regard to the first of the two sums in question any idea of prosecution must be abandoned. The reason was that it was not possible to obtain evidence by which you could define particular entries in the accounts as being ungenuine, false or inaccurate. Let me explain this. The suggestion by those who made the charge was that there were included in the wages sheets certain entries of wages paid which, in fact, were not paid, but, on the contrary, had been misappropriated by those who made up the wages sheet. The first problem was to identify those alleged false entries.

With regard to the first of the two sums in question, the evidence necessary for that purpose was wholly wanting. With regard to the second of the two sums in question, the evidence was exceedingly thin, although there was some evidence, the difficulties in regard to identification were very great, but there was just some evidence. I therefore had the inquiries exhausted. I think I ought to explain at this stage one feature which the affairs of this contract presented. Its accounts and its bookkeeping were in a state of confusion; they did not look as if they had been kept by experienced persons, and they certainly bore no sign of having been inspected, supervised, or checked by experienced persons. The result was that a great deal of the material for which one ordinarily looks for the purpose of checking the statement and showing it to be correct was in this case unavailable.

I have said that at the outset the difficulty was one purely of obtaining evidence to make the charge specific. That was fatal to the charge in regard to the smaller sum and very nearly fatal with regard to the other sum. With regard to this charge the evidence which was obtainable and was obtained by us completely disposed of the idea that the money in question had been pocketed by any one or more of the four persons charged, and accordingly the whole basis of the information, which was that these two sums had been pilfered by those in control of that part of the cash and business side of the contract, disappeared. That, of course, did not absolutely conclude the question of whether there had been some fraudulent practice in relation to the contract or not, but the Committee will realise how even that hope, if one ought to hope for a prosecution or conviction at any time, was dashed to the ground when I say that even those who were able to say that they understand there were entries in the wages sheet that were not reliable, coupled with the explanation that the entries were made and open to criticism, and represented money actually paid, although not in all cases to the men whose names appeared opposite the sums.

I will explain how that arose. There is a practice, I think, in contracts on both sides of the Border where work has to be done sometimes under very dirty and disagreeable conditions, by which the men obtain what they call dirty money, and it is very often paid. In this work dirty money was asked for when there was dirty work to do, and it was paid. In order to get the dirty money which was paid to the gang which actually performed the dirty work through the wages sheet it had to be entered up in the wages sheet of the week succeeding the week in which the payments were actually made. It was so entered, but care was not taken to enter the money opposite the name or names of the men who actually got the dirty money pay. There were a very large number of men employed on this work. I do not think it was a businesslike method, and it should have been different in order to make these entries accurate, but they were not accurately made. We were told that there were instances in which names were put in and names selected at random in order to cover the money paid as dirty money to somebody the week before.

That was a very reprehensible practice, and nobody would commend it; but the only question I had to consider, and by which I must be judged, is, What was left of the criminal charge? I came to the conclusion that nothing was left of the criminal charge, and accordingly, in the beginning of the month of March, after having carefully personally gone into the whole of the papers in this case, because I knew the Air Ministry were exceedingly anxious that a prosecution should be raised, and having made up my mind—and I see no reason whatever to alter it—that there was no ground whatever for my raising criminal proceedings which I regarded as hopeless, and there was no evidence that would have enabled me to identify the sums with regard to which my charge would have to be made, I made up my mind to communicate to the Air Ministry the fact that I did not see my way to raise any proceedings which I could hope would have any useful result.

I must explain one thing more before I come to my letter of March 6. There were three reasons which guided me in coming to my conclusion. The first of them was that I had not available evidence which would enable me to present a case to the jury; the second was that I had no evidence whatever, but quite the contrary, that the persons implicated had pocketed any of the money; and thirdly, even if there had been a glimmer of hope of presenting a prosecution, I had learned from the evidence obtained that the representatives of the Air Ministry on the spot, if they did not know, certainly ought to have known of the whole matter with regard to the practice of paying the dirty money and the way in which it was entered up. If experience has taught me any lesson it is that if you are asking a jury to convict somebody of fraud, and you have to disclose to your jury that the persons whose business it was to check and control did not exercise supervision and control, but that, on the contrary, by their own neglect they had facilitated looseness and laxity, you are certain to fail. Those three things were all in my mind, and each of them confirmed the other, and when I wrote my letter of March 6 to Sir John Hunter I told him each of the three. I will ask the House to listen for a moment to what I actually said:—

"With reference to your telegram of December 9 last to the Crown agent, and confirmation thereof regarding fraudulent practices in connection with contracts for the Renfrew aerodrome, I am directed by the Lord Advocate to inform you that, after full inquiry and consideration he does not see his way to order a prosecution. The evidence available is insufficient to afford any strong probability of obtaining a conviction."

In my letter I proceeded :—

"There is no evidence at all that any of the accused applied to their own uses any of the money said to have been improperly obtained from the Ministry. This circumstance, though it does not in itself provide an answer to a charge of fraud, makes the insufficiency of the evidence more formidable than would otherwise be the case. Further, a prosecution would reveal what appears to be inefficiency and absence of control on the part of the representatives of the Ministry on the spot. In view of these considerations, his Lordship regrets that he cannot come to any other decision than that intimated above."

I have nothing to add to or withdraw from those three reasons. I have no reason to think that any one of them is other than good. I was well aware, however, that the Air Ministry was exceedingly anxious for proceedings, and within a few days of the writing of my letter of March 6 I had communicated to me, from the Air Ministry, on March 19, a communication to that Ministry by Sir John Hunter, which occupies the bulk of page 3 of the Report of the Committee. I saw from it, and knew, that Sir John Hunter was grievously disappointed. He was, to my knowledge, exceedingly vexed by the state of things which, after 18 months of work, he had discovered to exist in connection with the Renfrew contract, and, although I think his communication in some respects a little unguarded, I quite appreciated the vexation of mind and annoyance in which he found himself at that time. I accordingly thought it proper to see Sir John Hunter, and we had a meeting accordingly. I did not deal with the detailed criticism in his note. I dealt particularly with that part of it in which he said that he thought a refusal to prosecute created an awkward position for his Ministry and increased their difficulties.

What I pointed out to him was this : I said, "You are grumbling in connection with this contract that £50,000 or £60,000 of public money has disappeared without work to show for it. Even if I raise a prosecution about this £286 worth, and that prosecution ended in success, which it would not, it will carry you no distance at all to the recovery of the public money which you think is lost—the £50,000 or £60,000. Moreover, if you want to show the public what mismanagement there was by the contractor at the Renfrew aerodrome, your best plan is to raise civil proceedings for the recovery of that £60,000." I told him that I thought it could be done, and I said, "If you want to get at the real thing, the £50,000 or £60,000, do not waste your time and waste public money in a futile attempt to prosecute these underlings for a paltry £286, in which I think you will fail, but expose the whole affair in Court in civil proceedings for the recovery of the £50,000 or £60,000." I said more than that. I said, "I cannot see my way to go on with this prosecution, which you want. It will not do, but if you take civil proceedings and the result of inquiry in the civil proceedings is to reveal evidence which I have not got into touch with now or to put a different complexion on the reports of this £286 which are before me at the present moment, I will reconsider the question of criminal prosecution when the civil proceedings are over."

I cannot help regretting that the only indication in this report that I had any meeting with the administrator at all is at the very end of paragraph 6 on page 3, where the matter is dismissed with the statement, "Later, the witness saw the Lord Advocate personally, but he refused to alter his decision." I think it is to be regretted that the actual position in which this matter was left in the month of March was not distinctly stated, for I think if that had been stated a very different complexion would, for outsiders, who knew nothing of the circumstances, have been put upon the events which have occurred. I ought to add this, that I saw the administrator personally more than once. I confess that I thought he was perfectly satisfied with the advice I had given him. I had not the remotest idea that when his own administration of the Air Force affairs was inquired into, he was going to flourish in the faces of the Committee my refusal to prosecute these poor underlings for £286 for alleged peculation, and his somewhat violent letter of protest as a kind of smoke screen behind which to avoid any further discussion of the matter.

I must deal with his letter paragraph by paragraph. The first paragraph in the letter has the sting in the tail of it. It is on the top of page 3 :—

"Any question, therefore, of the possible effects of the prosecution in revealing inefficiency and lack of control on the part of representatives of this Department on the site should be ignored altogether. As the person most affected I cannot concur in the view that such a question should be allowed to affect the legal question in the case."

If by that is meant that no regard must be had to persons in respect of criminal prosecution, I should agree with him, and unless he had misread my letter he knew from its terms that one of the reasons which led me to the opinion that even if there had been a charge, on putting some kind of a case to the jury I should have hopelessly prejudiced the case by revealing to the jury that any amount of opportunity was open to anybody on that contract through the negligence, irregularity, looseness, and failure of duty on the part of subordinates of the Air Ministry. The next paragraph says :—

"I find it very difficult to understand how a criminal charge cannot be formulated and a conviction obtained, having regard to the admissions made, and in some cases signed by persons charged."

Here there has been either a lapse of memory or some complete misunderstanding. There was no admission or signed confession by any one of the persons charged. They have all emitted a declaration, but there was nothing whatever in the declaration. If they had made a confession or signed a declaration there would be a plea of guilty. In the next paragraph he says :

"It is admitted that the books and time sheets were falsified by entering thereon the names of men said to be employed on the job, but who did not, in fact, exist. Wages were drawn regularly and charged as having been paid to these men. Where did that money go ? The Lord Advocate says there is no evidence that any of the accused applied to their own uses any of the money said to have been improperly obtained from the Air Ministry. But would not any jury on the facts above stated draw the obvious inference that the persons responsible for putting these 'dead men' on the books and drawing wages regularly for them from Government funds, had, in fact, put the money in their own pockets."

I daresay they would, but no case could have been brought which left the facts in that position. On the contrary, the facts brought out by the prosecution would inevitably have shown how that money was disposed of, and the inference which Sir John Hunter thinks might easily have been drawn would when the facts were known have been blown out of the water. In the next paragraph the letter says :—

"But I wish to carry the matter further and to point out that the position, if no prosecution is attempted, is, in my opinion, more serious for the Air Ministry than if a prosecution should be started and fail."

That was the matter with which I dealt when I saw him, and suggested the advisability of not wasting his time and public money by a criminal prosecution of the underlings, but that he should deal with the matter by raising civil proceedings. The next three paragraphs do not require any notice, but the fourth paragraph contains at the end this sentence, which deals with the same matter :—

"Even if the prosecution should fail on whatever charge was formulated, the evidence must be such as to strengthen the position of the Government against the contractors and save money to the country."

In my opinion it would have done nothing of the sort. Then there comes at the end of his communication the singularly bald statement,

"Later the witness saw the Lord Advocate personally, but he refused to alter his decision."

The comments which have been made not in this House but outside this House with regard to this matter have been full of the suggestion that my purpose, or at all events the effect of what I did, was to shield somebody in the Air Ministry from exposure. How baseless that suggestion is appears the moment it is known that my advice to the administrator when I saw that a prosecution must fail was to expose the whole matter in open Court in a civil action. I think I need say nothing more about that except perhaps this, that I was aware that the administrator would much have preferred criminal proceedings if those could have been raised, but for the reasons which I indicated I thought, and think, that that was out of the question. Lastly, I ought to say that the civil proceedings which I advised as early as March have been under instructions recently obtained and taken in hand and their commencement is now imminent.

Sir F. Banbury : The Sub-Committee of which I have the honour to be chairman has sat two days a week ever since it was appointed last March, and in addition there are the meetings of the main Committee and other work the members have to do. It is very easy to say, "Why do not you make specific charges ?" Anyone who has sat on one of these committees and who desires to do his duty to his country and the House of Commons, knows it is not possible to make specific charges unless evidence is brought before you to that effect, and it is not always easy to get evidence on these specific points. I do ask the House to recognise that all we wanted to do was to put facts before it, and if we have erred at all it has been on the side of not making known everything we have found out. My right hon. friend alluded to the scrapping of aeroplanes. We made a recommendation to which my right hon. friend referred this afternoon. I understood him to say that we suggested it might be more economical to burn the aeroplanes, but we did not make a recommendation that they should be burned. The recommendation which we did make, and which we made with the approval and concurrence of officers on the spot, was that instead of having a number of women occupied in taking to pieces the various aeroplanes and making hugh piles of wood, some other course should be adopted. We wanted to know what was the use of doing what they were doing. We saw a huge pile of wood, consisting of parts of aeroplanes, and we asked what was happening to it. They told us that they had been able to sell it at a very small price per ton, but the contractor who took away one ton then declared that he would take no more, but would prefer to break his contract, because he had made a loss on that ton. It was not known what to do with the wood ; they could not get rid of it. The Committee suggested that certain parts might be set aside, and the remainder, which was unsaleable, divided up and got rid of. What we wanted was to save the large amount of money which was expended by employing women on this work.

With regard to the cars, let me come back to that question for one moment. Is it necessary that certain officials in one particular Ministry should have cars to take them to and from their houses ? We thought not. I go further. My Committee recommended in its Report that we should make a start with the very highest official, with the Minister himself. We believe we shall never get economy unless the very highest people give a lead. Why should the country be put to the expense of keeping a Rolls-Royce or some other big motor car to be driven by a lady, or, it may be, a man, to take a high official to and from his house ? It is absolutely absurd ; such a thing never took place before the War. Never in this country were conveyances found for Ministers. Let them find their own cars, or else travel by tube, or even walk, as I do on many occasions. Nobody in this House works harder than I do.

Let me next say a few words, and it shall be a few only, on what the Lord Advocate has said. I saw my right hon. friend myself. I had a long conversation with him about the matter. I wrote him a letter in which I said we should have to allude in our Report to his letter. I gave him every opportunity of coming before the Committee to make any explanation he might think proper. My right hon. friend did not come. As the House knows, a Committee has power to compel attendance, but that is never exercised, as I understand, in respect of those occupying the position which my right hon. friend occupied. I understand it is the practice for the Chairman of Committees in such cases to suggest that if the right hon. gentleman cares to attend he can do so, but at any rate we did not have the privilege of hearing my right hon. friend. Sir John Hunter, on the other hand, did attend at very great inconvenience, and laid evidence before us. I do not know whether he was right or wrong in the conclusions at which he arrived. But I think there is one conclusion which the House will draw, and that is that the affairs of the Air Ministry at Renfrew were so inefficiently conducted that a very capable lawyer like my right hon. friend could not find sufficient proof on which to found a prosecution. That there was a very large loss of money is evident, because there is a civil action pending for something like £60,000. My right hon. friend said that the amount which these four people were supposed to have taken was only £286. What on earth does the amount matter ? The point was this. Here was a specific charge, and supposing even it had failed, would it not have had an effect upon Government offices generally by making it known that whenever cases of fraud were found prosecution would follow, and if inefficiency and want of control were shown on the part of the representatives of the Department on the spot, then those representatives would either be dismissed or prosecuted. There was a fifth gentleman connected with this matter. He was at the War Office. He held a commission. He is a Canadian. He went to Canada, and I want to know what is going to happen in his case ?

How does my right hon. and learned friend know that if he had instituted proceedings someone would not have come forward to give evidence in order to save his own skin ? Once you begin proceedings you cannot tell what sort of evidence will come out as a result. Therefore I repeat first of all that the Committee were justified in putting before the public the evidence which was placed before them, and I repeat the regret which I believe all the members of the Committee share, that the Lord Advocate took the view which he did under these circumstances.

The particular contract was a time and line contract. The Committee of which I was chairman last Session or the Session before investigated the Office of Works. Every single man at the Office of Works protested against a time and line contract, and we in our Report said, Do not go on with the time and line contract. The Ministry of Munitions and the War Office were, I believe, the only people who insisted on going on with this time and line contracts. The result of it is that it is the interest of the contractor to pay as high wages as he can, and to get as little work done as he can, and then he sends in a big bill on which he gets 5 per cent. or 10 per cent., or whatever it is.

Mr. Lambert : The right hon. gentleman (Maj.-Gen. Seely) brought in the question of railway tickets and one thing and another. The real point I want to put to him is this. He told us these Air Estimates of £66,000,000 are not peace Estimates. Will he be good enough to tell us—and we ought to have known that already—what does he expect will be the peace Estimates of his Department. After all, the Armistice was signed in November. The House of Commons has a right to know from the Air Ministry or the Secretary of State for War what are the peace Estimates to be. Sixty-six million pounds is a preposterous figure. I should cut it down, without the smallest hesitation, to a tenth of that figure. But, in reality, the trail of extravagance is over it all. Sir John Hunter's Report says that of 70,000 men who were employed not one was earning his wages. That is not a legal point. That is the point of a practical engineer skilled in dealing with labour. I have a case here. The Air Ministry employs unskilled labour in the eastern counties attracting all the men away from the agriculturists, paying double wages. I want the men to get good wages, but how can you expect the farmers to produce food when officials of the Air Ministry persist in paying actually double the wages which are fixed by the Agricultural Wages Board? There is another point I want to put. The Air Ministry had large contracts for aeroplanes on November 11. How many of these are being delivered now? I was actually told of a case, a few days ago—and I put it here plainly to the House—that aeroplanes are being manufactured to-day, the Air Ministry is taking delivery, material is being used, labour is being used, and the taxpayers' money will be spent in making aeroplanes which could be of no possible use whatever to anyone. Is that so? If it is so, eight months after the Armistice was signed, there is a serious ground of complaint on behalf of the House and the country against someone at the Air Ministry.

Mr. N. Chamberlain: Sir D. Maclean put his finger on the spot when he said that there was no central control.

It seems to me that the only way to get that is to have what does not exist now—that is someone in an independent position in every great spending Department whose business it is to review and check expenditure, to question it, to say whether it is necessary, to make representations to the head of the Department, if he considers that it is not necessary, and if he does not get satisfaction from him to make representations to some outside authority, and that outside authority it seems to me should be the Treasury. I noticed that the Select Committee in their Third Report spoke favourably about the financial part of the Air Force, but they said that the Assistant Financial Secretary had not got sufficient powers. He had not sufficient powers, and he never will have sufficient powers so long as he is subject to the Secretary of State for that Department. There is already in the Air Force an Assistant Financial Secretary. All I propose is that his salary should be paid by the Treasury instead of by the Air Ministry. He would then be a Treasury servant and would be responsible to them. He would be doing his duty by them and by the House of Commons too, when he made representations, and if they were not listened to he could say, "I shall have to report this to the Treasury or the Select Committee on National Expenditure when they come to review the affairs of the Department."

The Secretary of State for War (Mr. Churchill): The very important and helpful speech which has just been delivered by Mr. Chamberlain will, I think, make the House feel that much is to be said for both sides, which have, I think, so far been represented in this discussion. I think that the Government is entitled to some sympathy from the House, and I think that the House is also entitled to a sympathetic comprehension of its difficulties and its position on the part of the Government. Sir D. Maclean, and the hon. gentleman who has just spoken, both said in effect, "We have had very good answers, very effective answers, but however good the answers are, the Government will acknowledge, with its preparations, its officials, and its organised apparatus of public information in marshalling the facts, that the expenditure goes on. We are still being drawn steadily along the path which no one can doubt must ultimately, unless our progress is arrested or deflected, result in very grave public and administrative disaster." That has been, I am sure, the feeling in the House during the whole of this debate. Let us be quite fair with one another. I agree that Government answers on points of detail are no answer to the grave feelings of anxiety, and the undoubted mass of substantial facts which support the view, that our expenditure at the present time is a grave public danger. On the other hand, I think that we are entitled, when definite specific points of policy are attacked, when allegations of a very injurious kind are made, to make precise and definite answers.

Various questions have been raised in the Report of my right hon. friend the member for the City of London, and these points have figured in the speeches of various members who have taken part in this debate. There has been the clothing contract which was referred to, I think, by my right hon. friend opposite, and which acquires a special interest because of its association with the activities of Miss Douglas-Pennant. On that the House will remember that from the very beginning of the year I have been engaged in a correspondence with Miss Douglas-Pennant, inviting her to make any charge of corruption or immorality which could be brought to the test of judicial investigation, and I have published to the House reams of correspondence which have taken place with that lady, in which I have been endeavouring to induce her to state a case for inquiry into a definite matter of a criminal or highly culpable character. Any hon. gentleman who likes to read that correspondence will see that no suggestion of any kind has been put forward which constitutes a fulfilment of that requirement.

I am in possession of the House, and members can read the correspondence for themselves, and form their own opinion. However late in the day charges have been made by a Miss O'Sullivan in regard to a particular contract, and the moment those charges were made, the very same day, I think, that they assumed a definite form, an official inquiry was ordered, and that inquiry is now taking place, and until that inquiry has taken place I do not feel that it would be an advantage, and certainly it would be improper for me, to take any part in the discussion. But this I do say, that the results and process of the inquiry shall be made public and laid before the House, so that everyone may judge for himself.

Then there are the allegations connected with the Renfrew Aerodrome. I am entitled, speaking at this stage in the Debate, to say that after the statement of my right hon. friend (the Lord Advocate) no further reference to the question of prosecution is required from me. There was only one by-product which arose out of this, of which I must say one word. One of the allegations was that a military officer who was involved in these proceedings was not tried by court-martial on the demand of Sir John Hunter. The officer was a Canadian lieutenant. He was not employed under the War Office. He was employed under the Air Ministry in Sir John Hunter's Department. Sir John Hunter wrote to the Adjutant-General to demand that the officer should be placed under arrest, but the reason he gave was this: "I am unable to formulate any definite charge against him under civil or criminal proceedings, but I demand that he shall be placed under arrest." The Adjutant-General, not unnaturally, refused to take such a step against a Canadian officer, who is to a very large extent, except in case of emergency, outside the War Office jurisdiction, unless there is the prosaic formality of a definite charge in the first instance.

But this officer was detained by the Canadian authorities at our request for upwards of three months in this country until the Crown Counsel in Scotland and the Lord Advocate's Office had definitely reported that there was no material charge against him which could be made the subject of a criminal investigation. As I say, for my own part there is nothing which would give me greater pleasure than to order a criminal prosecution against a person guilty of fraud at the present time. There is nothing which would be easier for a Minister at the head of a Department to do, if the facts warranted it. He has nothing to lose by it; he has everything to gain.

I read the Report of the Select Committee with the greatest interest and I must say that I know how very hard their task has been and how much we owe to them for their devotion to their work and for the long hours they have spent in laborious investigation. At the same time, in regard to this question of the aerodrome contracts, it does seem to me that they have very largely missed the main issues. Let me take the House back to the autumn of 1917 and the early spring of 1918. What was the position? Aeroplanes were being made in great numbers; they were coming forward; pilots were being trained; but aerodrome construction was lagging heavily behind. Everything was being concentrated on a supreme effort for the years 1918-1919, and I think it is only fair to those who were then responsible for the Air Ministry to say that had the war not come to an end when it did, the exertions that they made—exertions conducted under the conditions of war, which led to great financial improvidence—it is only fair to remember that those exertions would, in all human probability, have placed us in a position towards the end of the present year to be absolutely supreme in the air, and possibly to terminate the struggle from the air alone. We must not forget that. In those days, when only the dregs of adult manhood remained for ordinary outdoor labour and construction, when our labour market was completely disorganised by continued war-time grants of wages, when there was the most supreme urgency to get on with the work, Sir John Hunter was appointed—I think by Lord Rothermere, or else by Lord Weir—to look after the aerodrome construction of the Air Ministry, and to bring that great element in our air policy abreast of the aeroplane and the pilot. Sir John Hunter addressed himself to this task with the very greatest energy and with immense personal force, and I do not think it was possible to have chosen a better man to have got the work done. At the same time, he is a man who is accustomed, like many of these big business men in their private affairs and businesses, to act on his own responsibility with a very free hand in giving orders of all descriptions, and not always to bother about the formalities of Treasury finance and accounting.

When in January of the present year I became responsible for the Air Ministry, I confess to the House that I had a good many misgivings about the state of the aerodrome works finance and contracts of the Air Ministry. My attention was drawn at the end of February by Sir James Stevenson, who belongs both to the Air Ministry and to the War Office, and who is advising me on business matters, of which he has great experience—my attention was drawn to the state of the finances and accounting for the whole of this great area of work. After much consideration I saw clearly that matters could not be left where they were, and I was advised to appoint Messrs. Price, Waterhouse and Company, probably the best firm of chartered accountants in the country—one of the best firms, a firm with a reputation second to none—to make a special expert investigation into the whole of this subject of aerodrome contracts and finance. They have been engaged on that task for five months, and several of their reports have already come to hand. The Comptroller and Auditor-General shortly after this began to move, and he drew attention to the unsatisfactory state of affairs in this branch of the Air Ministry's finance. I should like the House to realise that the constitution in these matters may not work as quickly as hon. members may desire and as the times may demand, but the constitution and machinery of Government work steadily and faithfully. The Comptroller moved the Treasury, and the Treasury wrote to the Air Ministry, and we then told them what we had already done. They approved the setting up of this expert inquiry, but, in addition, they had an inquiry of their own, under Sir Maurice Fitzmaurice, and they asked that Sir Gilbert Garnsey, who is a partner in the firm of Price, Waterhouse, and Company, and whose admirable work I had become acquainted with during my tenure of the Ministry of Munitions, should be co-opted on the Treasury Committee as well as continue expert investigation on behalf of this firm.

There were the long delays in making peace with Germany, delays in demobilisation of the Army of the Rhine. That demobilisation has now begun. We have arranged with France that by October 31 our forces on the Rhine may be reduced to the dimensions of a strong brigade.

We had, practically speaking, no Air Force before the war, and at the end of the war we had the finest Air Force in the world. This year the demobilisation of the Air Force follows and keeps pace with the demobilisation of the Army; as a matter of fact, it has gone on somewhat in advance of it. The Army has been reduced to about a quarter, and the Air Force has been reduced to about a fifth, of its Armistice figures, and that process is going to continue. What of next year? I see statements in the papers and from various high authorities that we are planning the permanent structure of the Air Force on the basis of it costing twice as much as the whole of the Army before the war. Twenty-nine millions multiplied by two would be £58,000,000, and if you were to allow for prices it would be £116,000,000 at least, but that, I presume, is not intended. We will say, therefore, £58,000,000. Who has ever suggested this? Who in a responsible position at the Air Ministry or in the Government has ever suggested such a scale for our air defences in the future? Personally, as a provisional decision for us to work by until the whole question of our defences can be considered in relation to our financial situation, I have pursued the following policy. I have instructed Sir Hugh Trenchard that he must provisionally frame his scheme within the limits of £25,000,000 a year, which is equal to something less than £12,000,000 a year on the pre-war basis, and I have offered him all possible support in the measures which he has recommended. Here let me say that this is a matter of policy which Parliament and the Cabinet may review. I am telling the House quite frankly the course which I am now pursuing, so that it can be criticised and argued on both sides. I observe that the Committee presided over by my right hon. friend the Member for the City of London, in its third Report, after taking two pages to deal with the Renfrew episode, and two more pages to deal with the clothing contracts, and two more pages out of the seven to deal with the cases of the motor-car garages and the complexities of Kennington and Belvedere Road, include this small but very significant paragraph, No. 28:—

"The Sub-committee examined Major-Gen. Sir H. Trenchard (Chief of the Air Staff), and are of opinion that he is doing all that is possible to cut down expenditure while having due regard to the efficiency of his Department."

I think I am entitled to take my stand on that. I hold most strongly that an earnest and resolute effort must be made to reduce the cost of national Government, even if it involves the abandonment of cherished schemes and of many projects which are desirable and useful in themselves. I am of the opinion that the risks of the financial situation are such that risks in other directions must be faced. I believe that it will be found, in these four or five years after the war, that the best course for the armed forces of the Crown is to aim at scientific progress and quality rather than mere numbers or instant readiness for action. Reduction of expense, as I have said, can only be obtained by discharging officers and men from the Army and Air Force as quickly as the situation allows. Every effort will be made to obtain the decisions of world policy, which in some cases are necessary before we can proceed upon our path. I go all the way with the House and with those out of doors in feeling that this question of the reduction of our expenditure upon armaments, after making due allowance for the absolute change in nominal values and the decline in purchasing power which has occurred, is the first need which we have to face in this House and on this Bench, but I shall not myself become responsible, whatever the pressure may be, for the maltreatment of the Army during the years which follow immediately after the war, nor for any policy which denies to the Royal Air Force a permanent and an effective and an independent means of existence.

Aeroplanes for Indian Frontier

CAPT. R. TERRELL, in the House of Commons, on August 11, asked the Secretary of State for India whether the supply of aeroplanes on the North-West Frontier has been adequate; and whether there has been any adverse criticisms of the types of machines employed?

The Under-Secretary of State for Air (Major-Gen. Seely): Owing to transport difficulties, there has been delay in supplying the forces of India with the required number of machines of suitable types. These deficiencies will have been remedied at a very early date.

Mr. Billing: Was the officer responsible for selecting these types of machine an officer experienced in aviation in India, and is the right hon. gentleman aware that machines which will fly in this country will not fly in India?

Major-Gen. Seely: The officers concerned had full knowledge of that fact. It is a fact that suitable machines could not be got to India in time owing to extraordinary difficulties of transport, but that is being remedied.

Capt. Terrell: Will the right hon. gentleman answer the last part of the question, and say whether there has been any adverse criticisms on the types of machines employed?

Major-Gen. Seely: Yes, from here and from there. We did not get the right type of machine for the purpose, but that is being remedied. We could not get them there owing to the shortage of ships.

The W.R.A.F.

LIEUT.-COMMANDER KENWORTHY asked the Under-Secretary of State to the Air Ministry what was the numerical strength of the Women's Royal Air Force, officers and other ranks, respectively, on the 1st January, 1st July, and 1st August, 1919; what steps are being taken to demobilise the remainder of the officers and other ranks; and what is to be the future of this force?

Major-Gen. Seely: The numerical strength of the Women's Royal Air Force at the dates mentioned by my hon. and gallant friend was as follows:—

	Officers.	Other Ranks.
1st January, 1919	545	24,911
1st July, 1919	434	18,282
1st August, 1919	407	15,700

The force is being demobilised as quickly as circumstances will permit, with the object of reducing the numbers to about 3,200, at which figure it is intended the post-War strength of the force shall be fixed. It has already been stated to the House, in answer to a question put by the hon. and gallant member for the Fylde Division of Lancashire on the 3rd July, that it is not intended to disband this force.

Air Ministry Contracts

Mr. DAWES asked the Under-Secretary of State to the Air Ministry (1) whether he is aware that the Select Committee on National Expenditure have recently reported that replies given to them by Major Cockhurn, Royal Air Force, in connection with certain clothing contracts, were contradictory and unsatisfactory; what is this officer's war record; whether he is still on the active list; and whether it is proposed to take any and, if so, what action in connection with the matter;

(2) Whether he is aware that the Select Committee on National Expenditure have recently reported that they were unable to attach any credence to the statements made to them by Col. Latimer, Royal Air Force, in connection with certain clothing contracts; what is the war record of this officer; whether he is still on the active list; and whether it is proposed to take any and, if so, what action in connection with the matter; and

(3) Whether he is aware that the Select Committee on National Expenditure have recently reported that replies given to them by Col. Bersey, Royal Air Force, in connection with certain clothing contracts were very unsatisfactory; that this officer ignored the request of the Committee to come before them for further examination; what is this officer's war record; whether he is still on the active list; and whether it is proposed to take any, and if so, what action in connection with the matter?

Major-Gen. SEELY: The answer to the first part of the first two questions is in the affirmative, and to the first part of the third that the complaint of the Committee is that Colonel Bersey did not attend at all, and not that his replies were "very unsatisfactory."

The facts asked for about the three officers mentioned are as follows:—

Major Cockhurn was transferred from the Army to the Royal Air Force as from April 1, 1918, and was employed at Headquarters up to October 24, 1918, first with the Directorate of Manning and then in the Directorate of Air Quartermaster Services. He was then transferred to Headquarters Midland Area, where he remained until he was demobilised on February 21, 1919.

Col. Latimer was employed in an administrative position first at South Farnborough, and then at the Air Ministry, from October 12, 1916, until May 3, 1919, when he relinquished his commission.

Col. Bersey joined the Service on October 29, 1917, and was employed in an administrative capacity under the Air Board and Air Ministry until September 30, 1918, when he was transferred to No. 7 Royal Air Force Reception Depot, where he remained until his transfer to the unemployment list on April 25, 1919.

As regards the statement that Col. Bersey ignored the Committee's request for his attendance, the only information I have is that contained in the Committee's Report and a letter which appeared in the Press from Col. Bersey's solicitors, explaining his non-appearance; but in fairness to this officer I must state that there has been nothing in his conduct, so far as the Air Ministry are aware, to show that he wishes to avoid examination, and that in point of fact he is attending in London to give evidence before the O'Sullivan Court of Inquiry.

As regards any action which it may be desired to take in regard to these officers, I cannot, I am afraid, make any statement until the findings of the Court of Inquiry just referred to have been received. My right hon. friend the Secretary of State for War gave an undertaking yesterday that the results of proceedings of this inquiry should be laid before the House.

Mr. Briant asked the Under-Secretary of State to the Air Ministry if the attention of the Air Ministry was drawn to the statements of Sir John Hunter that there had been fraudulent conspiracy in connection with the carrying out of contracts; and if no action was taken because a prosecution would reveal what appears to be inefficiency and absence of control on the part of the representatives of the Ministry on the spot?

Major-Gen. Seely: I have nothing to add to the reply I gave to the hon. member when he put a similar question to me on August 11.

R.A.F. Establishment

Mr. BETTERTON, on August 14, asked the Chancellor of the Exchequer whether he has made any estimate of the saving which could be effected in expenditure by a revision of the Royal Air Force establishment, in view of the termination of the war?

The Under-Secretary of State for Air (Major-Gen. Seely): This question has been under constant consideration and a provisional establishment has been drawn up which shows very substantial reductions. That establishment is now undergoing further revision with a view to reducing expenditure. The results will be embodied in the detailed Air Estimates, to the presentation of which, during the autumn, my hon. friend the Secretary of the Treasury referred in his answer to the right hon. Baronet the Member for the City of London, on the 11th inst.

Mr. Grant: Has the right hon. gentleman considered the desirability of demobilising the women of his Department?

Major-Gen. Seely: Yes, sir. As I announced in my remarks the day before yesterday the women will be reduced very shortly from the large number they were to 3,000, comprising only those employed on domestic service.

Commercial Aircraft Competition

Lieut.-Col. MALONE asked the Under-Secretary of State to the Air Ministry whether it was proposed to hold a competition for commercial types of aircraft; and, if so, when particulars would be published?

Major-Gen. Seely: Yes, Sir. During the war the paramount necessity in aircraft design was military efficiency, but for the successful development of aviation the first essential is safety. The Government have accordingy decided to institute a competition with a view to obtaining a type giving greater safety. Any machine which succeeds in qualifying will represent a great advance in respect of safety and comfort over any machine at present in use. The Treasury have agreed to the competition, and I am sure that, even at this juncture, the House will not grudge the funds for the prizes. Prizes will be offered for three types of aircraft—a smaller aeroplane, a larger aeroplane, and a seaplane, respectively. In addition to the advantage to civil aviation the lessons learnt will be of the greatest value to the Royal Air Force. The precise terms of the competition will be announced in a few days. If all the competitions are won, the amount required for prizes would be about £64,000.

AIR MINISTRY CONTRACTS

Sir JOHN HUNTER has sent the following reply to the Press:—

"The Lord Advocate, in his speech in the House of Commons, on Tuesday last, upon the Report of the Select Committee on National Expenditure on Air Ministry affairs, thought it necessary to make a somewhat violent attack on me, which I feel cannot be allowed to pass unchallenged.

"In *The Times* of Wednesday, August 13, he is reported as having referred to me in the following terms:—'I had not the remotest idea that, when his own administration of the Air Force was inquired into, he was going to flourish in the faces of the Committee my refusal to prosecute those poor underlings for £286 for alleged peculation and his own somewhat violent letter of protest, as a kind of smoke screen behind which to hide further discussion of the matter.'

"In any controversy with the Lord Advocate I am at a disadvantage, as I am not capable of dealing in debate with a skilled Advocate, but I am quite capable of stating actual facts fairly and truthfully, whereas the Lord Advocate has not done so.

"Let me state shortly the true position which must have been known to the Lord Advocate at the time he made his speech. As Administrator of Works and Buildings at the Air Ministry I was summoned to give evidence before Sir Frederick Banbury's Committee. I obeyed the summons. During my evidence I was asked if any cases of fraud had to my knowledge arisen on any of my contracts. I mentioned the Renfrew contract as the worst case known to me.

"The Committee asked me what action I had taken in the matter, and I told them that the papers had been put before the Crown Authorities in Edinburgh with a view to criminal prosecution against certain persons. The Committee then called for the papers on this subject, and, of course, I again obeyed, and produced the letter from the Lord Advocate to the Air Ministry, and my letter to the Air Ministry commenting on the Lord Advocate's decision.

"I had nothing to do with the decision of the Committee to comment upon this correspondence in their report, but when the Chairman of the Committee informed me that it might be necessary, in their opinion, to do so, I expressly stated that, in my opinion, having regard to the fact that civil proceedings were pending, it might be inadvisable to do so. I asked the Chairman for permission to communicate with the Lord Advocate, and to inform him that the correspondence had been given to the Committee, but was informed by the Chairman that he had already seen the Lord Advocate, and had informed him that the Committee had the correspondence, and that the Committee regarded the matter as very serious.

"Thereafter I called twice on the Lord Advocate personally, but was not fortunate enough to find him in his office, but I informed his secretary of what had occurred before the Committee. It now appears that the Committee invited the Lord Advocate to appear before them, but he was content to write to the Chairman the letter which appears in the Committee's Report, in which he states that 'his Department's letter speaks for itself.'

"It is curious that this letter which is to speak for itself, is spoken of thus by the Lord Advocate in his speech in the House of Commons:—"Possibly it may have been inevitable that my letter in particular may have raised some misconception either in the minds of the Committee or still more in the minds of those outside this House who make it their business to comment on public affairs, but a true appreciation of what took place and a true understanding of the position could only be arrived at when the true facts connected with these documents are placed before the House.'

"The documents already published will give ample proof that it was not I who was asking to avoid discussion on the affairs of my Department.

"I cordially agree with the Lord Advocate that he received me when I called upon him with the utmost kindness, courtesy, and sympathy, and the same also applies to the Solicitor-General for Scotland, whom I saw on several occasions. I have always recognised that the Lord Advocate's opinion on matters of law must be final, and have never criticised that, even though I did not agree with it, but I regret that he should have diverted the attention of the House from the real point at issue by making it appear that I was anxious to prosecute some 'poor underlings' charged with peculation of 'two paltry sums,' and to take no action against the contractor to recover the very large sums which could not be accounted for.

"This suggestion was both unproved and unfair. The Lord Advocate knows that the fact that civil proceedings can be taken against the contractor to recover these sums is due entirely to my action in this matter when I first heard of the state of affairs at Renfrew, and he knew that I never intended the criminal proceedings against members of the staff to be an alternative of the civil proceedings against the contractor.

"My thought was that both proceedings could be taken concurrently, Those who are described by the Lord Advocate as 'poor underlings' were in fact not 'underlings' at all, but were the persons holding the most responsible positions on the job, and the fact that the charge involved 'two paltry sums' is due to the request of the Crown Authorities that the evidence should be directed to proof of specific sums having been wrongfully dealt with."

GENERAL SYKES'S VISIT TO THE AMSTERDAM EXHIBITION

Major-General Sir Frederick Sykes, Controller-General of Civil Aviation, and a number of the officers who accompanied him on his recent visit by flying boat to the Amsterdam Aircraft Exhibition, have furnished some impressions of their stay in Holland and, incidentally, of the effect of the arrival of the British flying boats at Amsterdam.

The cordial reception accorded to the visitors and the kindness of General Snyders, President of the Exhibition General Committee, late Minister for War and the Navy, equally with the courteous attention and hospitality of all with whom General Sykes and his staff came in contact, engendered a very favourable sense in regard to the possibilities of civil aerial traffic between the two countries and of the mutual good feeling which exists between Britain and the Netherlands, the significance of which cannot be overrated.

This spirit was clearly evidenced in the speech made by General Snyders at a dinner given to General Sykes at the exhibition grounds on the first evening of his visit, when General Snyders expressed the gratitude of Holland for British support in the past, and explained, with regard to the organisation of the exhibition, that they had received more assistance from Great Britain than from any other country, and looked upon our help as having given life-blood to the project. In his reply, General Sykes drew attention to the important fact that in the development of the world's great air routes Great Britain and the Netherlands have many interests in common. On the Australian route for example, many of the points of vantage are in the Dutch East Indies, and therefore we ought to get together and work in unison.

The handling of the flying boats on arrival at Amsterdam was regarded by the Dutch people as an extraordinary example of the advance achieved in airmanship during the War. The five machines, flying in formation, circled over the exhibition building and aerodrome before landing in Amsterdam Harbour. Formation flying was an entirely novel spectacle, and in conjunction with the landing on the water, when each machine descended on the same spot at regular intervals of two minutes each, it produced a remarkable demonstration of enthusiasm. It is, of course, understood in Holland that the flying boat and seaplane are types of aircraft particularly suited to the requirements of the Netherlands, which, as is well known, are intersected with broad waterways.

General Sykes chose the air as his means of conveyance simply because it offered the most expeditious and comfortable travelling; it is noteworthy that the five flying boats accomplished the outward journey from Felixstowe in less than two hours and returned against a head wind in under three hours. As the flight was conducted as a routine duty and passed without mishap to any of the machines from start to finish, it emphasises once again the practicability of utilising these craft for regular North Sea services and for over-water communication under similar conditions.

On departure from Amsterdam the British flying boats were given a send-off by two Dutch seaplanes and a number of the Allied aeroplanes participating in the exhibition.

◆ ◆ ◆ ◆

Finns Honour Flying Boat Pilot

To celebrate the recent flight from this country to Helsingfors, the Finnish Minister, Monsieur Ossian Donner, gave an informal dinner, on the night of August 13, at Claridge's Hotel, to Major Sitwell, D.S.O., and Capt. Bailey, navigator and pilot of the F. 5 flying boat in question. The following also were present:—Senator T. Wegelius, of the Finnish Legation; Major-General Swinton, of the Civil Aviation Department; Air Commander R. M. Groves, and Major Field, of the R.A.F., and Mr. Temple.

The R 34's Stowaway

Air Mechanic William Ballantine, who made the trip across the Atlantic as a stowaway on the R 34, and was left behind there, has now reported to East Fortune. It is understood that no disciplinary action has yet been taken in the matter.

The Drzewiecki System of Propeller Design

We are asked to correct a date quoted in Lord Weir's paper entitled "Some Developments in Aircraft Design and Application during the War," given before the North East Coast Institution of Engineers and Shipbuilders on July 10, 1919, and which was recently published in Flight.

The date of 1882 given for M. Drzewiecki's original treatment of propeller design should read 1892. In that year M. Drzewiecki presented two papers, one entitled "Memoire sur une methode pour la determination des element mecanique helicoidaux" on April 4, to the French Academie des Sciences, and another entitled "Une methode pour la determination des elements mecaniques des propulseurs helicoidaux" on December 15, to the French Association Technique Maritime

A New Passenger Height Record Claim

Record-breaking is well under way again in France, and on August 13 Lieut. Weiss, accompanied by his mechanic Bégué, claims to have climbed to a height of 9,000 metres (29,700 ft.) in 52 mins. Altogether the machine was in the air for 1 hr. 40 mins., starting from and returning to Villacoublay. The barograph is now being examined and tested by the Aero Club of France.

The 300-h.p. Renault motor on the Breguet was fitted with the Rateau turbine compressor, to compensate for the difference in atmospheric pressure at the great height. At the top of the climb the temperature was 30 degrees below zero.

The previous record in France was that of Walbaum, 7,800 metres, as recorded in last week's Flight.

From Paris to Africa

At five minutes past midnight on August 10-11 the Farman "Goliath" set out from Toussus-le-Noble and arrived at Casablanca on the N.W. coast of Africa at 5.30 p.m. on August 11, having covered the distance of 2,050 kiloms. (1273½ miles) in 17 hrs. 25 mins. The route traversed was *via* Bordeaux, Biarritz, Madrid, Cadiz and Tangier. This is claimed as a record for a non-stop flight with a machine carrying eight persons on board. The pilot was Bossoutrot, and the other passengers were Coupet, assistant pilot; mechanics Mulot, Jousse and Coupet; Capt. Bezard, representing the Director of Military Aviation; Lieut. Boussot, representing the civil aviation authorities and Lieut. Guillemot, wireless operator.

On arrival at Casablanca it was found that there were still 400 litres of petrol left out of the 1,700 litres which were put into the tanks at Paris.

At 11 a.m. on August 14 the machine set out to go across the Sahara to Dakar, but for that portion of the journey rifles and ammunition were carried as a precaution against hostile Arabs should a forced landing be necessary. It landed at Mogador from whence it started the following day. It was seen at Port Etienne, 750 kiloms. from Dakar, but nothing has been heard of it since.

Paris to Copenhagen

Another Farman "Goliath" on August 12, set out from Paris to fly to Copenhagen but had to land at Utrecht, the journey to the Danish capital being completed the next day. The machine was piloted by D'or, and the persons on board were M. Paulin Krauss, a journalist; M. Deseaux, of the Danish Embassy, with French and Danish diplomatic dispatches, and mechanic Leclerc.

Arc de Triomphe to be Closed

Following on the exploit of Sergt. Godefroi, the military authorities in Paris have issued orders that the chains enclosing the Arc de Triomphe are to be replaced. No more troops are to be allowed to pass through the arch.

Washington-New York Record

Last week Col. S. B. Claggett, on a De H machine, succeeded in beating the record set up by the aerial mail planes between Washington and New York. He covered the 210 miles in 1 hr. 15 mins.

U.S. Aviators Seized by Bandits

A new turn in aerial warfare was recorded in a message from Washington, which stated that two U.S. flying officers, Lieut. Paul Davis and Harold Peterson, who were reported missing on August 10, were captured by Mexican bandits, who were holding them to ransom for $15,000 in gold. They were threatened with death if the money was not paid by August 18. The cash was collected and handed over on August 19; the two officers were then released, and arrived safely at Marfa, Texas. Afterwards they accompanied the cavalrymen who were sent out in pursuit of the bandits.

The Spad-Herbemont Height Record

In the inscription to the illustration of the Spad-Herbemont biplane appearing on page 1092 of our last week's issue the altitude attained by this machine was, through a slip of the pen, given as 89,200 ft. Some record! This should, of course, read 29,200 ft.

CORRESPONDENCE

LORD WEIR'S PAPER AND THE NAPIER "LION"

[1979] We have read with interest the article by the Right Hon. Lord Weir of Eastwood in your issue of the 7th dealing with the progress in engine design.

We would point out, however, one or two serious errors which have arisen in connection with the Napier "Lion" engine, especially as weights are shown in comparison with others.

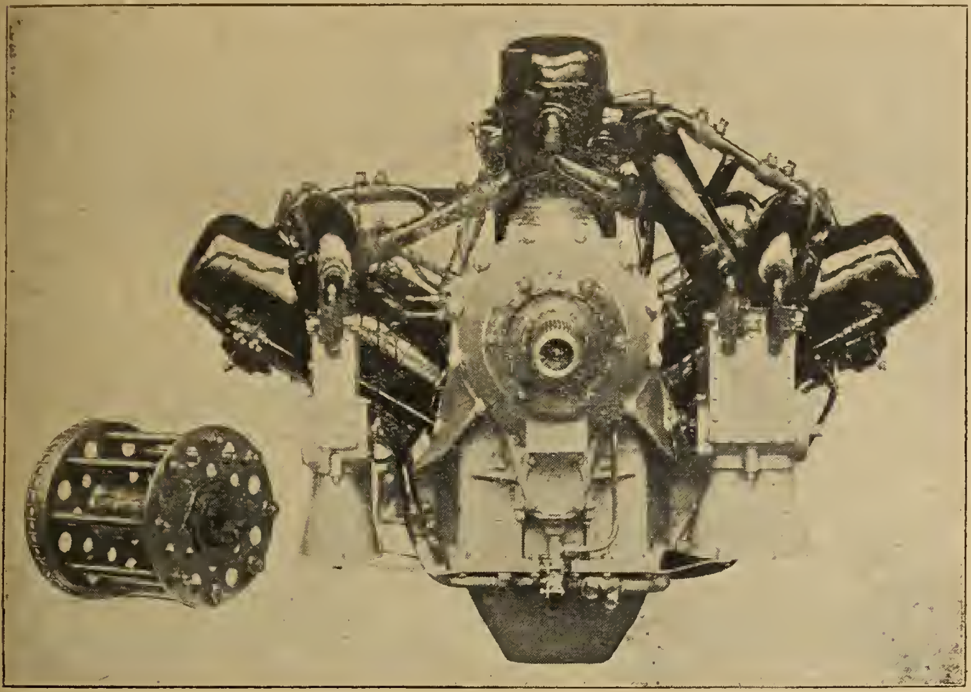
On page 1,051, the tabulated comparisons, giving the leading particulars of representative British aero engines, give the normal propeller speed of the Napier "Lion" engine as 840 and the dry weight in pounds as 1,318. These figures should be reversed, as the dry weight in pounds of the engine is 840 and the normal propeller speed 1,318.

The engine is described under the heading of type as three rows of four "V." It would, however, be more correctly described as three rows of four "broad arrow," 60 deg. between vertically and inclined cylinders.

The maximum brake horse-power is also given as 468, whereas a fair average of engines on test is 500, and in many instances even higher horse-power has been obtained.

On page 1,050 an illustration is given, described as the Napier "Lion," but this illustration is of the first experimental engine of this type which was manufactured. We enclose an up-to-date photograph taken from approximately the same position, from which the principal exterior difference in regard to the very much neater arrangement of carburettors will clearly be seen. The engine illustrated was manufactured as long ago as 1916, and is therefore considerably out of date.

D. Napier and Son, Limited,
A. F. Sidgreaves, *Assistant Manager.*
14, New Burlington Street, W., August 11.



The Napier "Lion" engine, reference to which is made by the Napier Co.

◆ ◆ ◆ ◆

THE "SEABIRD'S" LONDON–MADRID NON-STOP FLIGHT.

The pilot's report of the recent non-stop record flight from London to Madrid made by the Alliance biplane shows that the flight was remarkable in many ways. This machine, which was fitted with a 450 h.p. Napier "Lion" engine, was originally designed for the Transatlantic flight. The pilot and navigator, Lieut. W. R. Curtis, R.A.F., was lent by the Air Ministry to the Alliance Co. for the purpose of making this flight. He had with him Mr. J. A. Peters, the designer, as assistant pilot.

The following notes are taken from the pilot's report:—

"We left Acton Aerodrome at 7.30 a.m., steering a course for Havre. A heavy ground mist made visibility poor, and at times completely obscured the ground from view.

"7.55 a.m. passed over Brighton at 10,000 ft., where visibility improved, until half-way across the Channel, when thick clouds again obscured the water from view.

"8.50 a.m. passed over Havre, which we just sighted through a break in the clouds. Course was altered here for San Sebastian, and we gradually decreased our height to 6,000 ft., flying just below the clouds, which were very broken.

"At 11.10 we passed over Rochelle; just after leaving this place we ran into very bad weather, the clouds being very thick and ranging from 2,000 to 10,000 ft. in depth. After having a very bad time in thick clouds we eventually found ourselves at 2,000 ft., flying just below them in most terrific bumps, which almost made the machine uncontrollable. After experiencing this for some time, we decided to go out to sea and get clear of the land.

"Here we found much better conditions, the sky being almost clear.

"We climbed to 13,000 ft., and passed over San Sebastian at 1.10 p.m.

"Course was altered for Madrid, and the land again became obscured from view owing to very heavy clouds.

"Nothing was seen of the Pyrénées, and the first land sighted at 2.20 p.m. when the clouds began to break up, Madrid being sighted at 3.10 p.m. and we landed at Cuetro Vientos Aerodrome at 3.28 p.m., having completed the journey in 7$\frac{3}{4}$ hrs."

◆ ◆ ◆ ◆

The "Felixstowe Fury" Crash

At the inquest, on August 12, on Lieut. S. E. S. MacLeod, who was killed in the crash of the "Felixstowe Fury," as recorded in our last issue, no further light was thrown upon the cause of the accident. A verdict of "Accidental Death" was recorded.

Fatal Accident at Maidenhead

At the inquest at Maidenhead on Lieut. Herbert Stanley Morris, R.A.F., who was killed in an aeroplane crash at Hurley on August 14, it was stated that he was looking forward to a flight to Fiji next month with a brother officer.

Capt. R. S. Aitken, of Netheravon, Wilts, said he instructed Lieut. Morris to go up for landing practice and told him he was only to go round and round the aerodrome. It was no part of his duty to go to Maidenhead. The inquest was adjourned.

SIDE-WINDS

IN connection with the recent non-stop flight of the Alliance Aeroplane Co.'s "Seabird" from London to Madrid the aviators concerned (Capt. W. R. Curtis, the pilot, and Mr. J. A. Peters, the designer of the machine, who was also the observer on the journey) have written to Messrs. S. Smith and Sons (M.A.), Ltd., congratulating the firm on the successful performance of their instruments and accessories. They say that they relied entirely upon the Smith compasses for navigation, owing to the land and sea being at most times completely obscured by heavy clouds. During their flight over France, at an average height of 10,000 ft., when they had only occasional glimpses of the country, and again in their flight over Spain at a height of over 13,000 ft., owing to the dense clouds below they had no opportunity of checking their course, and it was due to the accuracy and dependability of the instruments that they were able to reach Madrid in record time. The instruments fitted to the machine supplied by Messrs. Smith were:—Smith revolution indicator; Smith air speed indicator; Smith altimeter; Smith time-of-trip clock; Smith lateral clinometer; Smith binoculars; Hughes long-distance compass, pattern No. 253; Hughes navigation charts.

- - -

In addition to the successful performance of the instruments the aviators expressed their appreciation of the excellent performance of the "K.L.G." sparking plugs, for which Messrs. Smith and Sons (M.A.), Ltd., are the world's sole distributors. They say that the engine ran perfectly and never missed fire once on the entire journey. This is a record of which Messrs. S. Smith and Sons must feel very proud.

- - -

MESSRS. GENT AND CO., LTD., inform us Mr. A. E. Eats has resigned his position as London Director and Manager, and is no longer connected with the Company.

- - -

SOME changes fall to be recorded in connection with the British Anzani Engine Co., Ltd. We are informed that Mr. A. M. Ramsay, who was formerly General Manager, has resigned all connection with the company, which is now under the joint direction of Mr. Hubert Hagens and Mr. Richard H. Simpkin.

- - -

INCIDENTALLY we learn that all types of Anzani engines have been officially approved by the Civil Aviation Department of the Air Ministry, and as this is believed to be the first official intimation of the kind, the firm are naturally proud of the distinction. It is the just reward of the progress and development which has gone on in connection with these engines since the time when a 25 h.p. three-cylinder Anzani engine enabled M. Louis Blériot to make the first flight across the English Channel.

- - -

FROM an announcement which appears elsewhere it will be seen that the private owner who wishes to have a small machine for his own purposes has an opportunity of securing a bargain. The London and Provincial Aviation Co., Ltd., have three 50-h.p. Gnome two-seater *fuselage* biplanes for disposal on very reasonable terms. They are very well built and give a very good performance considering their low power. The firm will be pleased to answer any enquiries addressed to them at the Stag Lane Aerodrome, Edgware.

- - -

ONE D.H. 9A, with "Liberty" engine, piloted by Mr. Banting, M.O.B.M., and one "Bristol" fighter, with B.R. engine, pilot, Capt. Leacroft (M.C. Bar), both used Castrol "R" in the flight in which the telephone messages were exchanged with the Houses of Parliament.

- - -

ON Saturday last H.M. the Queen of Spain was graciously pleased to accept a gold cup as a small souvenir of the arrival of the first commercial aeroplane to fly a direct non-stop run between London and the Spanish capital. The cup was presented by the pilots, Capt. W. R. Curtis, R.F.A., and Mr J. A. Peters, the latter of whom is also the designer of the "Seabird." At the same time her majesty was handed a letter from her mother, H.R.H. Princess Beatrice, which was also taken over by the "Seabird."

- - -

MESSRS. WARING AND GILLOW, LTD., who control the Alliance Aeroplane Co., purpose opening up aerial communication between their various houses upon the Continent and elsewhere—the London-Madrid flight being the initial trip.

⁂ ⁂ ⁂ ⁂

PUBLICATION RECEIVED

The Future of Aerial Transport. Reconstruction Problems No. 34. London: H.M. Stationery Office. Price *2d.*

Aeronautical Specifications Published

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published August 21, 1919

18,845. G. H. THOMAS and B. C. HUCKS. Starting engines of aeroplanes. (130,019.)
19,016. F. W. LANCHESTER. Attachment of propellers. (130,025.)
19,138. VICKERS, LTD., and H. A. SAVAGE. Control of aircraft engines. (130,030.)
19,300. A. A. STARRING. Bomb dropping apparatus. (130,034.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published August 21, 1919.

107. C. T. G. BAKER and A. S. FLETCHER. Machine gun synchronising-means for firing between propeller-blades, etc. (130,037.)
123. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Tail surfaces of hydro-aeroplanes. (130,041.)
194. SOPWITH AVIATION CO. and A. J. MILLS. Turn-buckles. (130,043.)
440. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Indicators of speed of revolution of aero engines. (130,054.)
441. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Tail planes. (130,055.)
592. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Altimeter. (130,057.)
593. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Air-speed indicators. (130,058.)
705. F. W. LANCESTER. Launching apparatus for aeroplanes. (130,070.)
721. F. M. A. PINEL. Dirigible balloons. (130,071.)
789. W. F. W. DAVIES. Control of aeroplanes. (130,072.)
796 and 768. H. O. SHORT. Floats or boats for aircraft. (130,073 and 130,075.)
707. H. O. SHORT. Indicators of rate of ascent or descent of aircraft. (130,074.)
810. BRITISH THOMSON-HOUSTON CO. and A. P. YOUNG. Level indicator. (130,076.)
871. SOC. ANON. L'HELICE INTEGRALE (ANC. ETAB. L. CHAUVIERE). Supporting surfaces of aeroplanes. (130,080.)
873. F. J. J. GIBBONS. Apparatus for releasing bodies from aircraft. (130,081.)
918. W. TAYLOR. Clinometers, etc. (130,082.)
930 and 999. E. LETORD. Radiator screens for aircraft. (130,083 and 130,085.)
1,462. W. BEARDMORE AND CO. and G. T. RICHARDS. Gun mountings. (130,097.)
12,003. NAAMLOOZE VENNOOTSCHAP BERENDONCK'S SECTION TYRE SYND. Tyres. (120,374.)
12,017 and 12,018. W. T. REID. Controls for aeroplanes. (130,141 and 130,142.)
12,028. G. A. HIRST. Inclination indicator for aircraft. (130,143.)
15,417. J. O. CLAXTON. Instrument for calculations in air navigation. (130,206.)
15,726. W. WALLACE. Joint manual and power control for aeroplanes. (130,213.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlix, l, li and lii)

NOTICE TO ADVERTISERS.

IN order that "FLIGHT" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates*:—

UNITED KINGDOM.	s.	d.	ABROAD.	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 " " ..	14	1	6 " " ..	16	6
12 " " ..	28	2	12 " " ..	33	0

These rates are subject to any alteration found necessary under war conditions.

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 557 (No. 35, Vol. XI.)	AUGUST 28, 1919	[Weekly. Price 6d. Post Free, 7d.

Flight
The Aircraft Engineer and Airships
Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.*
These rates are subject to any alteration found necessary under war conditions

CONTENTS

Editorial Comment: PAGE
The Rules of the Government Tests.. 1139
"Anti-Aircraft" Defences 1140
"Titular Anomalies" in the R.A.F. 1142
Air Policy 1142
What it would Mean 1144
Flight—and the Men: Mr. H. P. Martin and Mr G. H. Handasyde .. 1141
A Sitter 1143
The Westland Limousine 1145
Royal Aero Club Notes 1148
London to Paris Aerial Service 1149
British Aircraft Competitions 1150
Civilian Flying 1153
The Sopwith Schneider Cup Machine 1154
The E.L.T.A. Show 1155
Airisms from the Four Winds 1164
London Flying Club 1166
R.A.F. Sports 1167
In Parliament 1169
British Air Services 1171
Side-Winds 1173

EDITORIAL COMMENT

The Rules of the Government Tests

IN another part of this issue of FLIGHT we print the full rules and conditions for the conduct of the competition for the prizes announced to be given by the Government for improved commercial aircraft types, including both land and marine heavier-than-air machines. We do not propose to enter into much detailed criticism of these rules, inasmuch as they speak for themselves, and those who intend to participate in the contest are fully capable of appreciating the rules and what they mean. They are undoubtedly severe in their requirements. Indeed, they seem to err on the side of undue severity if they err at all, and we doubt not there will be adverse criticism directed against them on account of that severity. On the whole, we are not inclined to the view that they are unfair in their requirements. It is clearly laid down that in giving the prizes the Government have had before them the fact that if commercial aviation is to develop as we hope and believe it will in the future it must be made as reasonably safe as any other mode of transport. In order that it shall be safe, the factors of safety must be made as high as possible without being impossible of attainment. During the War, the one and only goal set to the designer and constructor was military efficiency. Nothing else mattered, and it is well known that some of the most militarily efficient types were not by any means as "safe" as the commercial type needs must be. Now the whole trend of things has been reversed, and the first essential is safety even at the expense of some degree of efficiency. Of course, if it is possible to combine safety with high efficiency so much the better, but where any part of a quality may have to be sacrificed to obtain a high factor of the other, it is safety that must be the first consideration.

Certain of the conditions we have heard described as impossible of fulfilment. We take leave to doubt if this criticism is intended to be taken too literally. We have all within our recollection a number of things which were quite impossible of achievement at some anterior period, but which are the commonplaces of today. Flying itself was 15 years ago an utter impossibility. Later, when the initial problems of dynamic flight had been surmounted, all sorts of subsidiary prophecies were made as to its limitations. One by one these prophecies were falsified, and we have seen the impossible of yesterday translated into the actual fact of today, until we have quite justifiably come to regard nothing as being impossible.

Reverting to the rules under discussion, as we have said, generally speaking there is really very little to find fault with. The rules are undoubtedly in some cases severe, very severe, while some others appear to be unnecessarily lenient. Thus, to take one example, the maximum speed asked for, for small vehicles, is, only 100 m.p.h. For a machine carrying only one occupant, in addition to the pilot, this seems somewhat low. It should be remembered that the whole *raison d'être* of the aeroplane as a commercial vehicle is its superiority in speed over other means of locomotion. With a maximum speed of 100 m.p.h. an aeroplane making a cross-country flight will often, if it is to be run on a *regular* mail or passenger service, have to fight a head wind of 30 to 40 m.p.h., which will mean that its ground speed is reduced to 60 or 70 m.p.h. This is quite low enough, and it should be remembered that these figures apply to a machine flying "all out," while in most cases the greater part of the journey will be made at cruising speed. The cruising speed asked for for small machines is 80 m.p.h. for 3½ hours, which, against such head winds as must be expected, would still further reduce the actual ground speed. However, those responsible for the framing of the regulations evidently realise this, and marks will be given to machines exceeding the minimum top speed of 100 m.p.h. asked for, the marks allotted being ½ for each m.p.h. above the 100 m.p.h.

If rule 5 may appear to be on the lenient side, at any rate as regards the smaller machines, the same cannot be said of rule 6, which requires the small machine to land in a circle of 175 yds. diameter, and the large machine in a circle of 275 yds., both types first to clear an obstacle 50 ft. in height. The small machine could scarcely touch the ground less than 50 yds. inside the obstacle, which would only leave a straight run of 125 yds. before pulling up. And this, it should be pointed out, is to be done in "still" air. We should not like to say that this cannot be done, for the low landing speeds demanded will mean either light wing loading or the employment of high-lift wing sections, but it will not be easy to fulfil this rule. Possibly something may be done in the way of setting the wings at a greater angle of incidence than is usually done, especially as the maximum speed asked for is not very high. Some tests carried out at the Royal Aircraft Establishment tended to show that the length of run was reduced very materially by increasing the angle of incidence of the planes.

The question of inherent stability, which was a feature rather disliked by pilots for War machines—in which manœuvrability was the chief consideration—is to be one of the qualities demanded in the commercial machine. Rule 11 requires competing machines to be able to fly for five minutes at cruising speed without the use of controls. If desired, this test may be carried out with the standard controls locked in any desired position.

Under "General Features," Rule 17, there appears to be little to find fault with. Sub. para. (*h*) refers to freedom of entry and exit for occupants. On looking up the marks allocated for this feature it is found that this is only 2. We confess that we should have liked to see somewhat greater importance attached to this feature. Not only is the question of entry and exit of great importance as regards the comfort of the passengers, but in the case of an enclosed aeroplane it may become a matter of life and death in case of a crash. A machine which after a bad landing can discharge its occupants quickly is evidently safer than one in which considerable time is taken to extricate the passengers. Furthermore, the mere knowledge that in case of a bad landing it will be easy to get out of a machine will in itself add very materially to the comfort and peace of mind of the passengers. We have no desire to emphasise this side of passenger flying unduly, but it is a contingency which has to be reckoned with.

The rules for seaplanes—and apparently this term covers both float machines and flying boats—are very similar to those relating to land machines, and are, generally speaking, quite fair. Seaplane rule 6, which demands that the machine shall clear an obstacle of 25 ft. in height, after a run of only 300 yds., is perhaps somewhat severe; Sub. para. (*d*) states that this taking-off test is to take place in still air. Presumably this also includes a calm sea, as the latter might easily be of more importance than the former. The machines, it will be noticed, are required to start from the sea, alight on land, and start from land again. This is apparently a resurrection of the Mortimer Singer prize won by a Sopwith bat boat before the War. Although it may at first sight appear that there can be little object in requiring a machine primarily intended to operate over water to be capable of alighting on land, it should be remembered that a seaplane may easily during a long journey find itself some distance inland, and that in such a case to be able to land safely will be a great advantage. Old R.N.A.S. pilots who have found themselves some 30 miles inland on 225's will readily appreciate this point. That the seaplane should also be able to take-off from the land again is really a natural corollary, since it is of little use for a machine to be able to land safely on, for instance, a desert, if it cannot get off again. Again, in the seaplane-conditions it is laid down that machines must be capable of being moored out in waters with "not more than a four-and-a-half feet lop." As a matter of fact, that represents quite a respectable run of seaway—more than is likely to be encountered in any enclosed harbour likely to be used for seaplane work. We take it that the idea is that a seaplane may be compelled by force of circumstances to alight away from a harbour and in a considerable sea and it is to test the sea-keeping qualities of machines that this condition has been included. But it is questionable if any seaplane or flying boat can live in such a sea for more than an hour or two. It is not only that 4½ ft. is quite a good sea, but that to raise it a considerable wind must be blowing and between the two—well, the business man had rather be ashore or in the air. However, as we have said, it is better to err on the side of severity than on that of undue leniency. It is desirable to avoid giving the public anything in the shape of misplaced confidence in aircraft and for that reason alone we are not disposed to fall foul of the regulations.

◆ ◆ ◆

"Anti-Aircraft" Defences

We do not count ourselves among the lesser critics of waste and extravagance in Government Departments, but we must say we are not inclined to join in the outcry that is being made because there still remain on service some couple of thousand officers and men of the anti-aircraft defences. While we agree that this *personnel* should be demobilised at the earliest possible moment, it must be recognised that there has been a large amount of clearing-up work to be done in connection with the disbandment of this part of our forces and that, even if the officers and men had been dispensed with, this work would have had to be carried out by civilian labour. It took, literally, years to bring our defences against hostile aircraft to a proper degree of efficiency. We began the war and received our first visit from German air-raiders when anti-aircraft defences were virtually non-existent. In the later months of the war the defences had grown to such importance and efficiency that the Hun had been driven to realise that the game of raiding these islands was one that did not pay for the candle. We do not know the

Flight—And the Men

"Flight" Copyright

MR. H. P. MARTIN (left), Chairman and Managing Director, and MR. G. H. HANDASYDE (right), Director and Technical Manager of Messrs. Martinsyde, Ltd.

exact number of guns and searchlights employed on this service, but we do know that they were to be numbered in thousands and that it would, therefore, be absurd to expect that they could be all packed up and the stations cleared as though the *personnel* had been engaged in a cricket match. It cannot be done and the authorities are entitled to at least a reasonable amount of consideration in the matter of demobilisation. Still, no harm has been done by the direction of attention to what, at first sight, might appear to be one of the minor scandals of the post-War period. We have no doubt the anti-aircraft service is not singular in its *personnel* or that it includes in its ranks some who are disposed to hang on to comfortable jobs for as long as possible. Now that the subject has been ventilated the authorities may be impelled to make sure that the clearing-up process shall not be unduly prolonged and that the limpets shall be removed as early as is consistent with the public service.

◆ ◆ ◆

"Titular Anomalies" in the R.A.F.

A disgruntled correspondent of *The Times*, who signs himself "A Country Squire," complains of the use of the title of Marshal in the R.A.F. He says that for some centuries the rank of Marshal has, in Continental Armies, been a mark of rare distinction and very grudgingly bestowed. In our own Army, quite properly, the distinction is only awarded in exceptional cases, and a general officer of great merit may close his career without ever having reached this high rank. He asks:

"Does a spirit of complete levity pervade the Air Council? Has it nothing else to do except to constantly change its titles and its uniforms?

"Would it not be better employed in stopping the maintenance of anti-aircraft guns nine months after the signing of the Armistice; in putting an end to the misuse of its official cars; in demobilising the many thousands of W.R.A.F.'s who are idling about the country; in stopping the training of many of these girls as lady drivers, which is still going on, etc.?

"When several South American States were recently endeavouring to purchase large numbers of surplus aeroplanes at big prices from the Air Ministry, is it not a fact they were told that these aeroplanes might still be wanted, although at the time large numbers of aeroplanes were, by official orders, being destroyed in various parts of the country?"

Really, we do not see where the grievance lies. It was necessary in order to properly differentiate between the three Services that new titles should be coined for the senior officers of the R.A.F. and, no doubt, after the fullest consideration of alternatives, the present titles were decided upon. Is the title of "Marshal" so sacrosanct that it is not to be employed at all, even with the distinctive additions which go to make up the title of a senior officer of the R.A.F.? And is there any reason why we should consider the manner in which Continental Army practice happens to differ from our own? If we are to be bound by every case which might figure as a precedent, both here and abroad, there would be an end at once of all progress.

The point that in the British Army the title of Marshal is only given to officers of exceptional merit it quite beside the question. Moreover, the title is qualified in the very same way that the R.A.F. titles are made self-explanatory. As a matter of fact, there is no title of "Marshal' in the British Army. The highest rank in our Army is that of "Field-marshal," as it is in the German Army. In France an officer of this rank is a "Marshal of France." We submit that these qualifications make all the difference in the world. If "A Country Squire" had wanted to complete his case he might have reminded us that in America a country chief constable is a "United States Marshal!" That, he would doubtless aver, is simply a sacreligious misuse of the title!

◆ ◆ ◆

Air Policy

The Times continues its criticism of the aerial policy of the Government, particularly regarding the real or supposed intention to close down the Civil Aviation Department of the Air Ministry. We have been unable to obtain any direct confirmation of this intention. As a matter of fact, we do not think *The Times* has any absolutely direct information on the subject, but there are nevertheless significant indications about which serve to show which way the wind is blowing. Undoubtedly, the Government has become seriously alarmed at the condition into which the nation's finances have fallen as a result of the unexampled expenditure on the war and after indulging in a wild orgy of extravagance, the swing of the pendulum is taking it all the other way. A wave of economy is sweeping over the Cabinet, and the intent now is to cut down Estimates at every turn.

As an abstract policy this is absolutely right, but economy quite as much as expenditure requires to be exercised with due discrimination. Misplaced economy may, in the long run, be quite as harmful as wilful waste and extravagance. To close down the Civil Aviation Department is one of those measures of economy which would be far more expensive to the nation in the end than to keep it going and to expend far more money on it than the miserable pittance of half-a-million which was supposedly placed at the disposal of Gen. Sykes out of this year's Estimates of £66,000,000. We say supposedly placed at the disposal of the head of the Department, because that was the sum alleged to have been allocated for the encouragement of civil aviation, though it would be interesting to know exactly how much has actually been expended on such "encouragement." The recent announcement of prizes to the value of £64,000 is the first direct expenditure on encouragement of which the general public has any knowledge. Let it be said that we do not attach the smallest blame to the Department itself. The faults lie higher up and at the root is the desire to economise in all directions but the right one. Unless we are very greatly out in our reckoning, the next few days will afford a striking index to the manner in which the Government is approaching this question of economy in matters affecting aviation. We believe it will be shown that the Government is prepared to suffer any loss on past contracts and arrangements and virtually to make a present of material which has cost the nation enormous sums to anyone who will undertake to use it commercially and will not ask for financial help or backing from the State to assist in the development of civilian aviation. We cannot, for reasons which are quite sufficient to ourselves, indicate more precisely at the moment what we know to be going on, but we have said enough to show that matters are moving in a direction which makes *The Times* theory that the intention is to scrap the Department of Civilian Aviation seem to have a solid foundation on fact. What the Government

A Sitter. (*Drawing published by the Air Technical Services for use at the R.A.F. Schools.*)

suggests in effect is : "We will make you a present of all this material and write off all our losses on past Estimates, but for Heaven's sake, don't ask us to add a penny to any future Estimates, because it can't be done."

If, as we believe to be the case, that is the present attitude of the Government, it certainly points to an intention to allow civil aviation to fend for itself in the future.

◆ ◆ ◆

What it Would Mean Assuming the theories to be right—and for the sake of argument no harm can result from the assumption—the wiping out of the Department would throw the development of civil aviation over to private enterprise. Now, if that should result, it would follow that the control exercised by the Government would be merely analogous to that exercised over motoring. It would be confined to simply making sure that the factors of safety of aircraft conformed to a reasonable standard and that a system was in being whereby transgressors of the law could be brought to book with a minimum of trouble. There the functions of the State would almost of necessity end because there are lengths of control to which the State cannot proceed without being a partner. Such a measure of control would be all that is needed if flying were not international and if British commercial aviation were simply to be developed within the confines of the British Isles. But it is not. It is essentially an international affair and can never be anything else. That being so, it is clear that a greater measure of Government control is essential and that cannot be exercised except by a strong Department of Civil Aviation with power to encourage development and even to assist in financing the movement until such time as commercial aviation is able to stand on its own feet.

Now, it being clear that control is necessary, how is it to be exercised in default of the existence of a Civil Department ? In that case, it can only be administered by the military side of the Air Ministry. That is perfectly clear. Equally clear is it that commercial flying cannot possibly develop under military control, if only for the reason that no European Power would allow quasi-military machines to have the constant and unquestioned right of aerial access to their territories, and this country would be a mere "dead-end." Another point is that, although we do not look forward to another great war in our time, there is no certainty that within the next 10 or 15 years we may not be engaged in another struggle for existence. At least, common prudence dictates that we should take elementary precautions against being caught unprepared. In the event of another war it is unquestionably true that air power will play a great, even a decisive part in the struggle. Now, it is obvious that we cannot establish military air bases sufficient to give us the requisite aerial supremacy to ensure victory or to maintain great non-remunerative stations all over the world. Nor need we do so if the development of civil aviation is approached in a proper way. We can have those stations and establishments on all the great arterial air routes, but they will be civilian stations, under civilian control and management, and instead of being a dead charge on the Estimates—as purely military establishments would be—they would pay their own way after the first year or two. They would then be available in case of war, and in the meantime we should be building up a huge reserve of machines and pilots ready against the day they would be needed for Empire defence. Again, the war 'plane is not suitable to the traffic of peace, but the machine designed for commercial flight can be readily adapted for war if the need arises. On every count, therefore, the case is good for the encouragement of the commercial side of aviation, even if that encouragement should entail some reduction in the sums available for the purely military development of flying. The principal point to keep in mind in this connection is that military material and *personnel*, constructed and trained purely as such, are next door to useless for civilian purposes. Further, they do not and cannot pay their way, but are a dead expense to the country. On the other hand, civilian *personnel* can be so trained and machines so constructed as to be available for either peace or war and can be made to pay their way. To conclude, therefore, the arguments are all in favour of economy in the fighting branch of the Air Service and for spending on the civil side—so long as neither economy nor spending are carried to a dangerous excess.

◆ ◆ ◆ ◆

The Gordon Shephard Memorial Prizes

Sir H. H. Shephard, father of the late Brig.-Gen. G. S. Shephard, D.S.O., M.C., of the R.A.F., has, in memory of his son, placed a sum of money in trust, the income of which is to be applied to the provision of annual prizes for essays by officers, N.C.Os. and men of the R.A.F.

The subjects for the essays will concern the airman's work in the air, and this year separate prizes will be given for essays on : (1) Sea and Fleet Reconnaissance and (2) Aerial Navigation and Pilotage. The administration of the yearly competition will be carried out by the Air Council.

Permits to Visit R.A.F. Aerodromes

In future, visitors to R.A.F. aerodromes must first obtain permits from the Air Ministry.

Requests for permits should be addressed to the Secretary, Air Ministry, and should state clearly the purpose for which a permit is required. The permits, if granted, will be issued subject to such restrictions as the Air Ministry may direct.

R.A.F. Aircraft Using Civil Aerodromes

It is notified by the Air Ministry that in the event of R.A.F. officers *on duty* landing at aerodromes not owned by the Government, the aerodrome authorities, having charges to be paid, should render a bill to the Officer Commanding the Unit to which the officers belong. Officers have been instructed to sign a receipt for services obtained in these circumstances.

R.A.F. Aerodromes Relinquished

The Air Ministry announce that the aerodrome at Guston Road (Dover) and the landing ground at New Holland (Yorks) are being relinquished by the R.A.F.

Warning to Aircraft

Pilots of aircraft are warned by the Air Ministry that kite-balloons will be flown from time to time for purposes of meteorological observation at the following places ; Merifield (Tor Point) ; Larkhill (Salisbury) ; Caldale (Orkneys) ; North Queensferry (near Edinburgh).

The cables of these balloons when flying will be marked by streamers at intervals of not more than 500 ft.

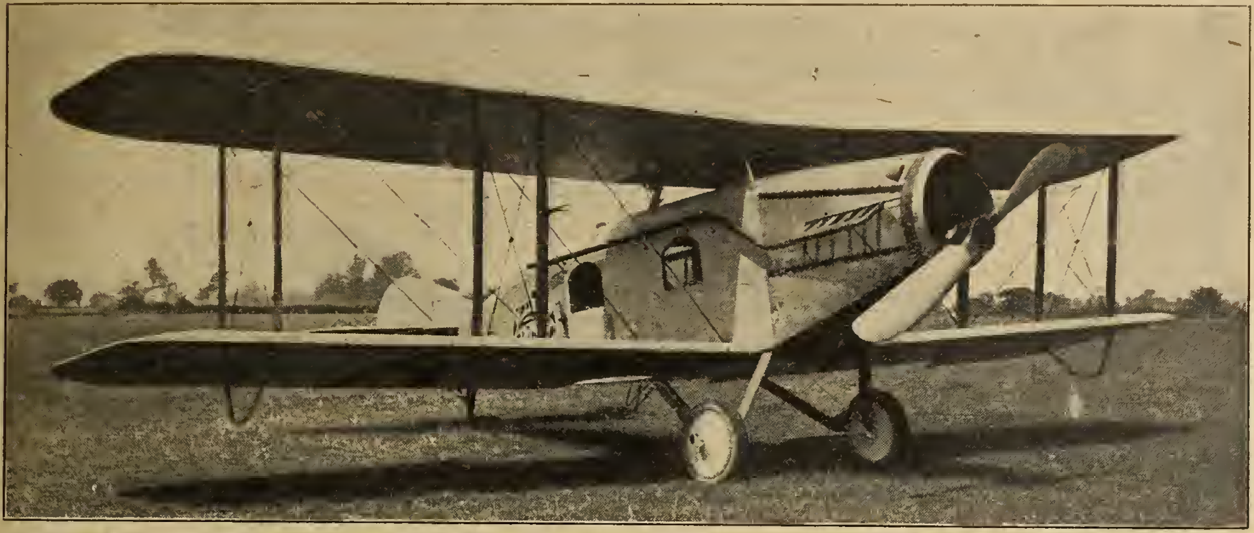
The New Aliens Order

In the new Aliens Order, which comes into force on September 1, there are one or two interesting changes. For instance, the list of "approved" ports at which aliens may land now includes the air stations at Lympne, Felixstowe and Hounslow. Also the Air Council is given the same power as the Admiralty and the Army Council to recommend the Home Secretary to declare any area to be a "protected area" from entering or remaining in which aliens may be prohibited, or if allowed to remain to be subjected to special restrictions.

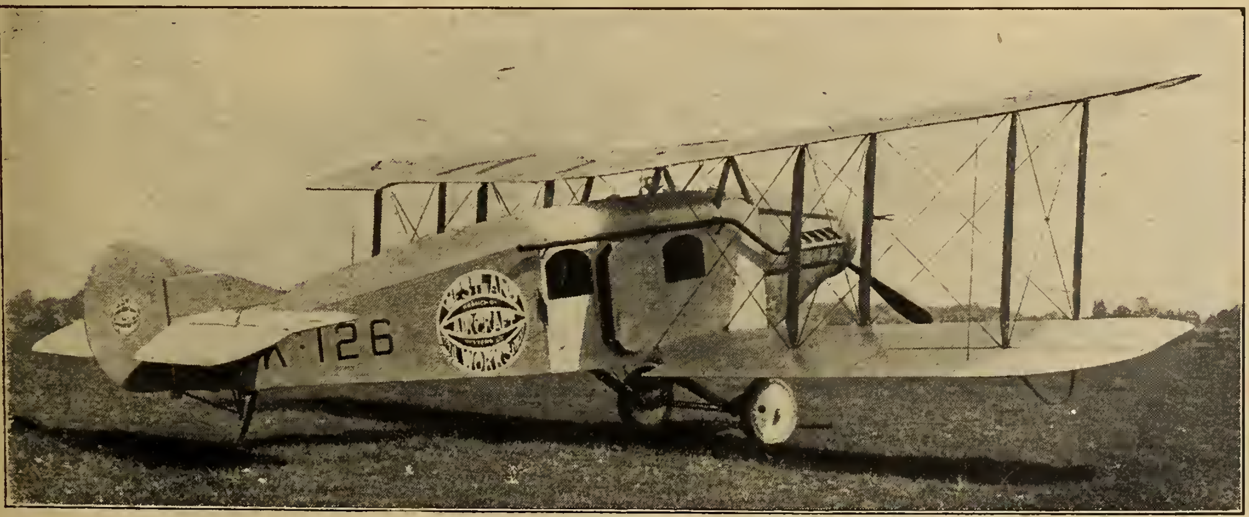
THE WESTLAND LIMOUSINE

An account of a trip to Yeovil to inspect the Westland Aircraft Works was published in our issue of August 7, 1919. This referred briefly to the new passenger or mail carrier produced by this firm. At the time it was not possible, from considerations of space, to include a lengthy description of the Westland limousine, and we are therefore now giving a more detailed description of it in the present issue. In one respect the first article requires modification, in that the impression was conveyed that the machine was designed by Mr. Davenport. Actually the designer of the limousine, as of all the Westland aircraft, is Mr. R. A. Bruce, who is the head of the Westland Aircraft Works, and with Mr. P. W. Petter, joint managing-director of Messrs. Petters, Ltd. Mr. Bruce is, however, ably assisted by Mr. A. Davenport, chief draughtsman of the Westland Aircraft Works.

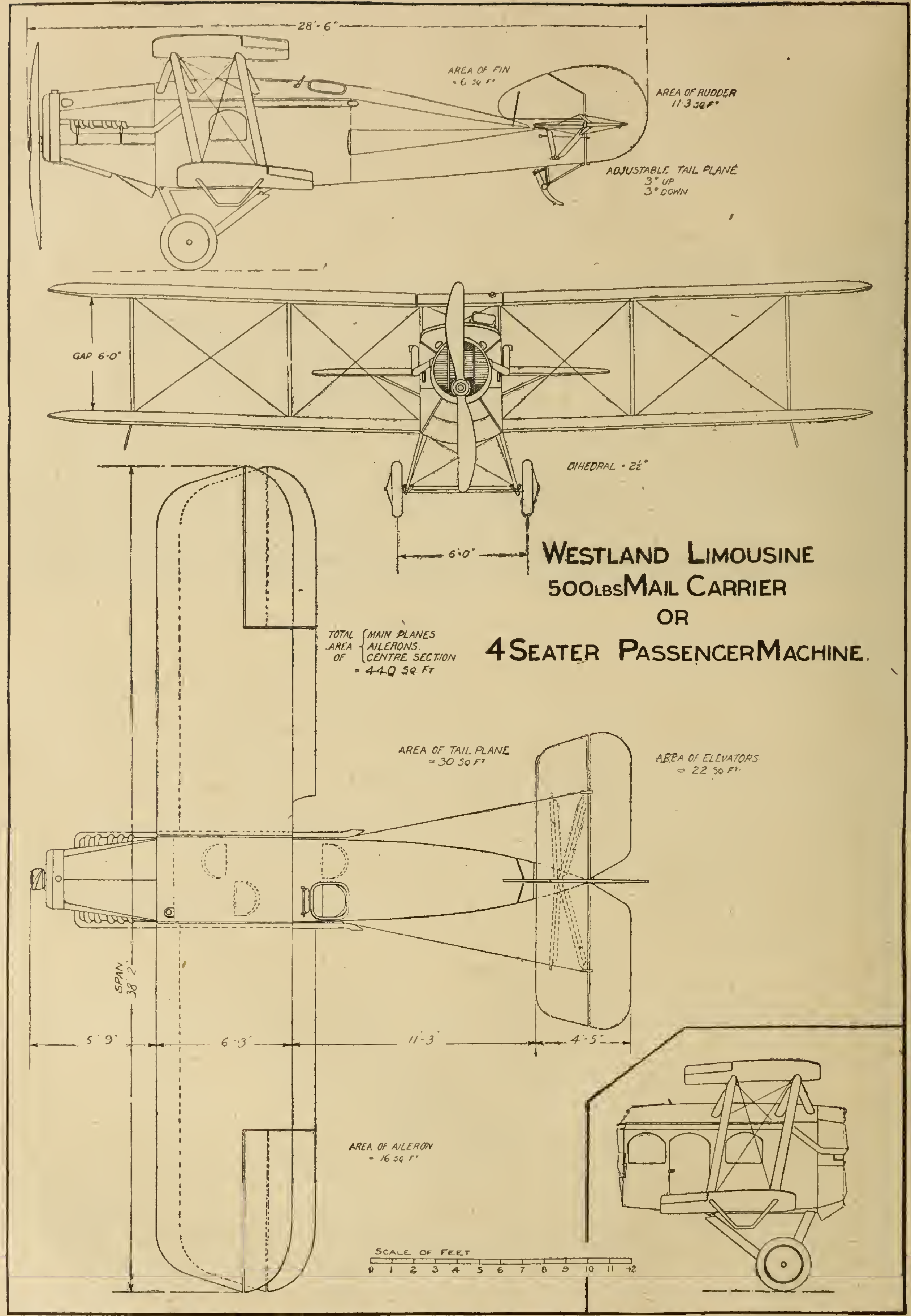
The Westland limousine, which has been designed and built since the Armistice, is intended to provide for the man of means, to whom time is of great value, a fast and at the same time comfortable means of locomotion. The object kept in mind by the designers was to combine in a modern aeroplane the best points of a high-class motor car and at the same time possessing the initial advantage of the aeroplane—speed. That this object has been attained cannot be denied. The Westland limousine is extremely comfortable to fly in, sheltered as the passengers are from the rush of wind which makes for discomfort in an open machine. It approximates very closely to the motor car, in that it is designed to carry three passengers in addition to the pilot; and while its engine—a 275 h.p. Rolls-Royce "Falcon"—is not of so high a power as to raise running expenses to an exorbitant point, it is nevertheless of sufficient power to give the machine a very good performance, both as regards speed, climb and endurance. That running expenses will be higher than those of a four-seated motor car must be admitted, but then it should be realised that the aeroplane will do cross-



THE WESTLAND LIMOUSINE: Three-quarter front view



THE WESTLAND LIMOUSINE: Three-quarter rear view


28'-6"
AREA OF FIN = 6 SQ FT
AREA OF RUDDER 11·3 SQ FT
ADJUSTABLE TAIL PLANE 3° UP 3° DOWN
GAP 6'-0"
DIHEDRAL = 2½°
6'-0"
WESTLAND LIMOUSINE
500LBS MAIL CARRIER
OR
4 SEATER PASSENGER MACHINE.
TOTAL AREA OF {MAIN PLANES AILERONS. CENTRE SECTION = 440 SQ FT
AREA OF TAIL PLANE = 30 SQ FT
AREA OF ELEVATORS = 22 SQ FT
SPAN 38'2"
5'9"
6'3"
11'3"
4'5"
AREA OF AILERON = 16 SQ FT
SCALE OF FEET
0 1 2 3 4 5 6 7 8 9 10 11 12

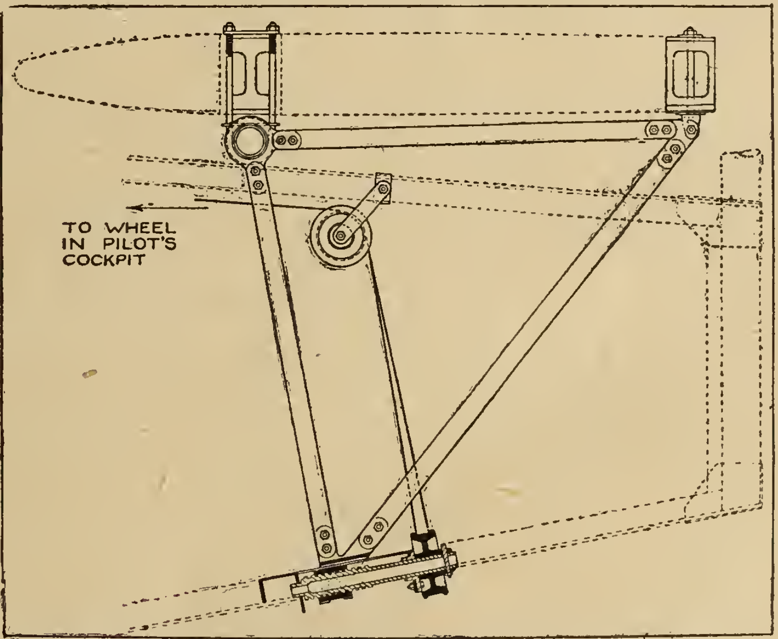
THE WESTLAND LIMOUSINE: Plan, side and front elevations to scale country journeys very much faster than any motor. Also it is actually a fact that there is less vibration and jolting than in a motor going over any but the smoothest of roads, and consequently it is possible for the owner of such a machine to carry on work *en route* which he could not do with any comfort in a motor car. Thus it is quite easy and comfortable to write or read while the machine is in the air, and Mr. Norton, Commercial Manager of the Westland Aircraft Works, demonstrated on our recent visit to Yeovil that it is quite possible to take up a shorthand typist and to dictate and have typed out letters while the machine is in flight. The time spent on a journey, in addition to being very much shortened by travelling by air, instead of being wasted can be employed for getting through urgent correspondence or other work, and to have such correspondence ready for posting the instant the machine reaches its destination.

Fundamentally the Westland limousine is an ordinary single-engine tractor biplane, with its body made slightly deeper and wider than that of the usual open type of machine. As will be seen from the illustrations, this has been accomplished without spoiling the lines of the machine, which, as a matter of fact, are very pleasing to the eye.

As regards structural design, the Westland limousine is interesting in several respects. For instance, the unit type of design, which has several marked advantages, has been followed to a considerable extent. Thus the *fuselage* comprises three separate units. The first is the engine mounting and housing, which forms a unit separate from the next one—the cabin. The structure which carries the engine is of the overhung type, and is constructed mainly of steel tubing. This unit is bolted to the cabin unit and is readily removable, should it be desired to change the engine. This system of construction has several advantages. For instance, if it is desired to overhaul the engine it is a simple matter to remove the entire power plant to the engineers' shop, where the work can be most efficiently done. Or, in case of a firm running a passenger or mail service with these machines, if an engine needs overhaul the whole front unit of a machine may be taken out and a new one substituted in a short time, thereby avoiding a long delay before that particular machine can be put into service again. Also, the substitution of one type of engine for another is greatly simplified by the unit system.

Perhaps the most interesting feature of the Westland limousine is the arrangement of the cabin. In order to provide a clearer space inside, the central unit of the *fuselage* has been constructed on a different principle, which does away with any internal bracing. Without going into minute details of the actual construction, it may be said that in principle it consists in covering the sides of the body with ply-wood, stiffened with a framework of diagonal members. Where door and windows occur, bent frames are provided which more than make up for the weakening that might otherwise attend the cutting of the side covering. Thus the door giving entrance to the cabin is placed on the starboard side, and to make up for the absence of side bracing of the *fuselage* at this point there are curved frames above and below the door which take the place of the ordinary bracing. The added comfort of having the door in the side will be apparent, as the cabin is entered as easily as is the ordinary motor car.

As indicated in the plan view of the general arrangement drawings, the seats of the Westland limousine are arranged in a somewhat unusual fashion. Against the front wall of the cabin, on the starboard side, is one seat facing aft, while the corresponding seat on the port side is placed slightly farther aft and faces forward. In front of the latter seat is a neat little folding table, which may be used for writing, accommodating if desired a typewriter. Of the remaining two seats, both of which face forward, the pilot occupies that on the port side, the starboard one being available for a third passenger. The pilot's seat is raised about a foot off the floor of the cabin so as to bring him into a position with his head projecting through an opening in the roof of the cabin. From here the pilot obtains a very good view, certainly no worse than that obtained in the ordinary tractor biplane, and better than some we have seen. As already mentioned, the entrance door is on the starboard side, and is so arranged that when in flight it is locked by a bar that precludes any possibility of the accidental opening of the door. On the starboard side there are two windows, one for each of the passengers sitting on this side, while the third passenger looks out through a window to port. In the roof of the cabin is a ventilator, adjustable from the inside, which admits air to the cabin and prevents any tendency to stuffiness. The noise of the engine is very effectively silenced, partly by the long exhaust pipes, and partly by the fact that the machine is enclosed. What adds considerably to the silence is the provision of an asbestos bulkhead at the front of the cabin. The ordinary three-ply partition would probably act as a very efficient sounding-box and tend to increase rather than decrease the noise.



THE WESTLAND LIMOUSINE: Diagram of the tail plane trimming gear.

The seats are upholstered in grey, and the whole cabin is most comfortable and pleasing in appearance, while the occupants are so well protected from oil and dirt of any kind that no special flying rig is required. Lady passengers may travel in this machine in the most delicate frocks without fear of getting them spoiled by oil.

The rear portion of the fuselage is of the usual wood girder wire braced type, and does not call for any special comment. In order to compensate for the difference in weight or number of passengers carried, the Westland Limousine is provided with a tail plane trimming gear. This in itself is not, of course, a novel feature, but the design of the trimming gear itself is somewhat unusual and is, we understand, protected by a patent. As will be seen from the accompanying diagram, the tail plane hinges about its front spar and has its incidence changed by shifting the lower angles of two triangles, formed by steel tubes. The diagram is, we think, self-explanatory. When the worm is rotated in one direction, *via* cables and pulleys, the lower point of the triangle moves forward, dropping the rear spar of the tail plane and thus increasing the angle of incidence. When the pilot rotates the wheel in his cockpit in the opposite direction, the incidence is decreased.

From the specification printed below, it will be seen that the Westland Limousine has a very good performance, and from a careful watching of the pilot's movements during a recent flight we are convinced that the machine needs very little control during a straightforward flight, while at the same time, when it is desired to manœuvre her quickly she answers very readily and appears quite light on the controls. The following specification gives all the more important data relating to the machine:—

Length overall, 28 ft. 6 ins.; span, 38 ft. 2 ins.; height, 11 ft.; total wing area, 440 sq. ft.; weight empty, 2,183 lbs.; weight fully loaded, 3,383 lbs.; fuel capacity, 3 hours; range, 290 miles; commercial load, 540 lbs.; passenger or cargo space, 95 cubic ft.; Speed, ground level, 100 m.p.h.; at 10,000 ft. 91 m.p.h.; at 15,000 ft. 85 m.p.h. Climb, to 5,000 ft. in 8·35 mins.; to 10,000 ft. in 19·6 mins.; to 15,000 ft. in 37·5 mins; ceiling, 17,000 ft. Landing speed, 50 m.p.h.; load/sq. ft., 7·8 lbs.; load/h.p., 15·1 lbs. Engine, 275 h.p., Rolls-Royce Falcon. Cruising speed, 85 m.p.h. at 1,750 r.p.m.

◆ ◆ ◆ ◆

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Jacques Schneider International Seaplane Race

THIS Race will be held at Bournemouth on Wednesday, September 10, 1919, and machines representing France, Italy and Great Britain will compete. The course is 200 nautical miles, over a circuit of 20 miles (10 times round) in Bournemouth Bay. The start of the Race will take place about 2.30 p.m.

The Royal Aero Club has obtained the loan of the T.S.Y. *Ombra* (350 tons) to accommodate the Members on the day of the Race. This Yacht will be anchored off Bournemouth Pier and will be the official starting and finishing point, the Competitors passing 10 times during the Race. Tickets, £2 each, which include luncheon and tea on board.

Members are requested to make early application to the Club for tickets.

Motor Launches will convey Members from the Pier to the Yacht between 12 noon and 2 p.m. on the day of the Race.

International Seaplane Race

The following are the Competitors for the International Seaplane Race to be held at Bournemouth on Wednesday, September 10 next:—

Great Britain.	Motor.	Pilot.
Sopwith	450 h.p. Cosmos "Jupiter"	H. G. Hawker.
Supermarine	450 h.p. Napier "Lion"	Squad.-Com. B.D. Hobbs, D.S.O., D.F.C.
Avro	Siddeley-Deasy "Puma"	Capt. Hammersley.
Fairey	450 h.p. Napier "Lion"	Lieut.-Col. Vincent Nicholl, D.S.O.

(Three Competitors from the above will be selected by the Royal Aero Club to represent Great Britain.)

France.	Motor.	Pilot.
Nieuport	300 h.p. Hispano-Suiza	Malard.
Nieuport	300 h.p. Hispano-Suiza	Casale.
Spad		Sadi Lecointe.

Italy.	Motor.	Pilot.
Savoia S. 13.	250 h.p. Isotta Fraschini	Janello.

The start will be made from Bournemouth Pier, at about 2.30 p.m., and the circuit of 20 nautical miles embraces Bournemouth, Swanage and Christchurch. The full length of the course is 200 nautical miles, and Competitors will make ten laps of the course.

Arrangements have been made for a Members' Enclosure at the head of the Pier, Bournemouth, and tickets, admitting to the Pier and enclosure, may be obtained from the Club.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

Lost Royal Air Force Records

IT has been brought to light during the compilation of the official aerial history of the War, that several R.F.C. Squadron Record Books, which are of great value for historical purposes, are missing. The Air Ministry requests that any such books as may be in the possession of demobilised officers or others should be returned, at once, to the Officer in Charge, Air History Branch, Offices of the War Cabinet, 2, Whitehall Gardens, S.W.

Cross-Channel Flights

IN conformity with the information previously issued to the aircraft industry the Air Ministry made the following announcement on Monday:—"Pending the final signature of the International Convention a provisional agreement to allow of flying between France and Great Britain from Monday, August 25, has been arrived at between the respective Governments."

Air Ministry Staff

A WHITE PAPER issued on August 22 shows that on July 1 the staff of the Air Ministry totalled 3,254. Of this number 282 men and 7 women were permanent staff, and 1,399 men and 1,566 women were temporary staff.

Miss O'Sullivan Demobilised

The Times understands that Miss O'Sullivan, late Clothing Controller of the W.R.A.F., has been demobilised by the Air Ministry, although she accepted the invitation to sign on for a further term and signed the necessary form. An inquiry is now proceeding regarding some irregularities alleged by Miss O'Sullivan.

THE LONDON-PARIS AIR SERVICE

MONDAY last saw the inauguration of the daily air service between London and Paris organised by Messrs. Aircraft Transport and Travel, Ltd. Two Airco machines set out from this side and one machine from Paris.

An Airco 4 machine, fitted with Rolls-Royce engine, left Hounslow at 9.10 a.m.; it was piloted by Lieut. E. H. Lawford, and carried Mr. G. M. Stevenson-Reece, of the *Evening Standard*, as well as a full load, including a number of daily newspapers, a consignment of leather from a London firm to a firm in Paris, several brace of grouse, and a considerable number of jars of Devonshire cream. It arrived at Le Bourget, the Paris terminus, at 11.40.

At 12.30 p.m. an Airco 16, fitted with Rolls-Royce engine, left Hounslow for the regular journey to Paris, the landing being made at 2.45 p.m. Major Cyril Patteson was the pilot, and four passengers were carried.

One machine—an Airco 4A—left Paris at 12.40 p.m., and, piloted by Lieut. J. McMullin, with Lieut. Lawford and Mr. V. M. Console of the *Daily Mail* as passengers, it arrived at Hounslow at 2.45 p.m.

Although the Handley Page service does not start its regular running until Monday next, a preliminary trip was made last Monday. The machine used was of the twin-engined type and the pilot was Maj. Foot, while the 14 passengers included Mr. L. A. Northend, of *The Times*; Maj, C. C. Turner, *Daily Telegraph*; Mr. E. A. Perris, of the *Daily Chronicle*; Mr. Harold Begbie, *Daily Chronicle*; Mr. Tourtell, *Daily Express*; Mr. Bartholomew, *Daily Mirror*; and Mr. Crosfield, *Daily News*.

The machine started from Cricklewood at 8.20 a.m., called at Hounslow for Customs formalities, was away at 9.20 a.m., and landed at Le Bourget at 1.15 p.m. Owing to difficulty in obtaining petrol the return journey was postponed to the following day.

THE LONDON-PARIS AIR SERVICE: Start of the service for Paris from Hounslow Aerodrome on August 25. The Airco machine embarking its passengers, and on the right the first Airco machine just leaving for the journey. Below Gen. F H. Sykes and Gen. Festing, who were present at the inauguration of the service.

London Air Raid Workers' Memorial

To commemorate the work done during the War by the Metropolitan Observation Service under Commander Paget, which was formed to give information of the presence and position of hostile aircraft, the members of this service have subscribed £276 3s. 6d., which has been sent to the Charing Cross Hospital for the part endowment of a cot in the new Children's Ward. If there are any members who have not yet contributed, they may like to know that the fund is still open. Donations may be sent to the hospital.

No Aerial Shoots?

IN the report of the Departmental Committee which has been considering the subject of the protection of wild birds it is pointed out that a new danger to bird life has been introduced by the shooting or bombing of birds from aircraft. It is also recommended that the use of aircraft for the purpose of killing or taking wild birds should be prohibited.

Vickers-Vimy Flies to Amsterdam

A "VICKERS-VIMY-COMMERCIAL" aeroplane, piloted by Capt. S. Cockerell, carrying numerous copies of the morning editions of various London newspapers, left London for Amsterdam at noon on the 21st instant, arriving at its destination at 3 p.m., having accomplished the journey in three hours. There were eight passengers, in addition to two pilots on board, during this journey. The papers found a eady sale, and the proceeds benefited local charities.

The Transatlantic Vimy for the Nation

MESSRS. VICKERS, LTD., have expressed their willingness to present to the nation the Vickers-Vimy on which Capt. Sir John Alcock and Lieut. Sir A. W. Brown crossed the Atlantic, but the authorities do not seen to be able to make up their mind as to where they can put it. Messrs. Vickers have suggested that it would be appropriate if the machine could be exhibited at South Kensington, alongside Stephenson's "Rocket."

The Paris Aero Show

THE arrangements are now well forward for the sixth Paris Aero Show, which is to be held from December 19, 1919, to January 4, 1920, in the Grand Palais. It will be held under the auspices of the Chambre Syndicale des Industries Aeronautiques, and applications for space should be addressed to M. le Commissaire général, 9 Rue Anatole de la Forge, Paris (17e).

Commander Read to Fly the Pacific

IT appears from a message from Washington that the United States Naval authorities are proposing to send Commander Read, who piloted the N. 3 across the Atlantic, on a voyage across the Pacific. It has not been decided which route will be followed, but Commander Read may try the southern route, in which case he would be obliged to alight at sea to pick up fuel, because the nearest land station—Honolulu—is 2,100 miles from San Francisco.

BRITISH AIRCRAFT COMPETITION

The Air Ministry makes the following announcement:—

A Committee composed of members of the Air Ministry and of the Aviation Industry has been sitting for the past two months under the chairmanship of the Under-Secretary of State for Air to consider the question of encouraging the future development of aviation on the lines of increased safety. A large number of witnesses has been called, including constructors and designers and representatives of the public who are interested in aviation. It has been decided, as stated in Parliament, to institute a competition open to the British Empire. Prizes to the value of £64,000 will be awarded by the Government under the conditions which are set out below.

RULES FOR A COMPETITION FOR AIRCRAFT TO FURTHER THE ATTAINMENT OF SAFETY OF AIR TRAVEL

Notes on the Competition

(*a*) The aim of these competitions is to obtain a real advance in the efficiency and design of aeroplanes and seaplanes, more especially with the view of increasing the safety of air travel. The rules drawn up are intended to secure this object.

(*b*) As regards the rules for aeroplanes it is recognised that the conditions are, generally speaking, easier for the small machine than for the large. The object in this is to attract a large number of competitors from amongst designers of small machines.

(*c*) The present competitions are not directly aimed at engine reliability nor at economy in fuel and oil consumption, although these are of the first importance, but chiefly at the attainment of efficiency in the machine itself. A much longer time is required to produce radical improvements in engines than in machines, and since it is intended that the present competitions should be held early next year, it has been decided to concentrate attention on the machine on this occasion.

RULES

Aeroplanes

1. A competition will be held commencing on March 1, 1920, with the object of ascertaining the best types of aeroplanes which will be safe to travel in, and in particular be capable of alighting in and rising from a small space.

2. Two types of aeroplanes will be entered for the competition.

(*a*) Small type with a total carrying capacity of two persons (including pilot).

(*b*) Large type with seating accommodation for 15 persons (exclusive of crew).

3. Machines and engines must have been designed and constructed within the British Empire. This rule will not, however, apply in the case of such secondary equipment as ignition system, carburettors and instruments.

4. Machines are to fulfil all conditions required for a certificate of airworthiness, and are to carry parachutes for all persons for whom accommodation is provided, including crew.

5. Each machine must be capable of flying level at or above the following speeds with full load at ground level:

Small type.	Large type.
100 m.p.h.	90 m.p.h.

and must also be capable of flying level at or below the following speeds with full load at ground level:

Small type.	Large type.
40 m.p.h.	45 m.p.h.

Each machine must also be capable of climbing not less than:

Small type.	Large type.
500 ft. in the first minute, starting from ground level.	350 ft. in the first minute, starting from ground level.

6. *Landing and Getting-Off Test.*

(*a*) A circle will be marked out on open ground to represent a field surrounded by obstacles. This circle will be of the following diameter:—

Small machines	175 yds.
Large machines	275 yds.

The obstacles will be represented by a continuous string or tape with streamers attached, 50 ft. from the ground, of such a nature as to be easily broken by an aeroplane.

(*b*) The landing to be made in still air. Still air includes any wind not exceeding five miles per hour at ground level.

(*c*) During landing the machine is not to side-slip nor to turn, after reaching the obstacles, until it is on the ground. Once it has touched the ground the machine may turn in any direction.

(*d*) The machine to come to a standstill before reaching the marks representing the boundary of the field.

(*e*) After landing, the machine to get out of the same field over the 50 ft. obstacle in still air (as defined in sub-para. (*b*), no turn to be allowed until clear of the obstacle on the far side.

(*f*) No breaking device operated by the engine may be used during landing.

(*g*) Any landing or taking-off gear used, must be integral with the machine.

(*h*) No landing apparatus may be used that in the opinion of the judges would be liable to cause undue damages to an aerodrome—*e.g.*, a claw attached to the machine as used on certain types of German machines would not be allowed, but the ordinary knife edge on a tail skid would be allowed.

(*j*) Both landing and taking-off to be with full load.

(*k*) Each machine will be allowed two trial attempts (which are definitely not to be counted as tests), and thereafter will be allowed four attempts, of which two must be successful.

7. *Reliability Tests*

(*a*) In the case of the small type, each machine must carry out a series of two flights of 3½ hours each at a speed, through the air, of not less than 80 m.p.h., starting with full load. Between flights machines will be left untouched, and under seal if necessary, a period of not more than 30 minutes being allowed before the second flight, for the purpose of filling up and normal examination.

No parts of the machine to be adjusted or changed without permission from the judges.

(*b*) In the case of the large type, each machine must carry out one flight of 7 hours' duration at a speed through the air of not less than 75 m.p.h., starting with full load. Pilots may be changed during these flights.

8. Machines must be capable of landing from a height of 500 ft., with their engines switched off or completely throttled down.

9. In a machine having two or more engines, the stoppage or retardation of any one engine must not prevent the machine from flying level nor cause it to get out of control.

10. Machines must be capable of being started from the cockpit or cabin without undue muscular exertion on the part of the pilot.

11. Machines to be capable of flying at cruising speed for 5 minutes without the use of any controls or stabilising devices. Controls may be locked during this test.

12. Machines to be capable of standing unattended and not fastened down in a wind of 10 m.p.h., blowing in any direction with reference to the machine.

13. The design of the machines to be such that the risk of the machines turning over on a rough ground is reduced to a minimum.

14. Each machine to be provided with a complete outfit for pegging it out in the open. This outfit will not be carried as part of the load during tests.

15. In order to be eligible for prizes, machines must fulfil the conditions and tests laid down in Rules 3 to 14 inclusive. Marks will be awarded for soundness and quality of construction, for general features and for exceeding the specified requirements in Rules 5 and 6.

16. "Soundness and quality of construction" will include:—

(*a*) Fire protection, including use of self-sealing tanks, position of tanks (from the point of view of safety from fire in event of a crash); fire-fighting appliances and accessibility of same.

(*b*) Reliability of petrol, oil, and water systems, and facilities for seeing if all tanks are full.

(*c*) Durability of machine including propeller (any advantages due to metal construction may be taken into account).

(*d*) Simplicity of design and accessibility of parts.

(*e*) Absence of vibration in the machine.

17. "General features" will include:—

(*a*) Efficiency and ease of control.

(*b*) Unrestricted field of view to the front for the pilot.

(*c*) Silence, as effecting occupants of the machine including crew.

(*d*) Comfort generally, including warmth.

(*e*) Self-starting devices.

(*f*) Method of wind screening adopted.

(*g*) Convenience for use of instruments.

(*h*) Freedom of entry and exit for occupants.

1. With reference to Rule 6, marks will be allotted for the capabilities of machines to land in an area more restricted than that used for the tests.

In judging this, the point vertically below the point where the centre line of the machine crosses the tape will be marked on the ground, and the maximum distance reached by the wheels of the undercarriage will be measured in a straight line from this point.

19. Marks will be allotted for exceeding the minimum high speed and for flying less than the maximum low speed.

20. The judges will have regard to the method of fitting parachutes, and especially to the means of exit by parachute afforded to the occupants of the large machine, and will allot marks for the same.

21. Marks will be allotted for the convenience of pegging out the machine in the open, and for the lightness of the apparatus necessary for pegging down.

22. Marks will not be given on account of the number of engines installed.

23. The following will be the allotment of marks:—

Soundness and quality of construction (Rule 16)—

Sub-para.	
(*a*)	maximum 8.
(*b*)	,, 8.
(*c*)	,, 6.
(*d*)	,, 6.
(*e*)	,, 4.

Maximum total, 32.

General features (Rule 17).

Sub-para.	
(*a*)	maximum 6.
(*b*)	,, 6.
(*c*)	,, 6.
(*d*)	,, 5.
(*e*)	,, 5.
(*f*)	,, 3.
(*g*)	,, 3.
(*h*)	,, 2.

Maximum total, 36.

		Maximum marks.
High speed. For each mile per hour in excess of required minimum (Rule 5) ..	½	No maximum.
Low speed. For each mile per hour below required maximum (Rule 5) ..	1	Do.
Landing. For every complete 3 yds. less than the distance allowed in 175 yds. for small and 275 yds. for large machine (Rules 6 and 18)	1	Do.
Method of fitting parachutes (Rule 20)		5
Convenience of pegging out (Rule 21) ..		3

Forfeiture of Marks

	Maximum marks.
Adjusting or changing parts in reliability test. See Rule 7 (*a*)	8
For every 2 minutes or portion of 2 minutes in excess of the maximum time allowed for filling, 1 mark. See Rule 7 (*a*)	8

24. With reference to Rule 6, when carrying out the landing, and getting-off test, machines will start with the full load of petrol and oil, and will be allowed to fly for 20 minutes. If they have not carried out their tests by the end of that period, they must land and fill up again.

25. The type of propeller used on any machine must be the same for all the tests.

26. Full load is to include:—

Instruments as under—

- Revolution counter.
- Aneroid.
- Air speed indicator.
- Turn indicator.
- Compass.
- Watch.
- Oil pressure gauge (when necessary).
- Air pressure indicator (when necessary).
- Radiator thermometer (when necessary).

Small type.	Large type.
Petrol and oil sufficient to fly 450 miles at 3,000 ft. In addition, a load of 440 lbs., to include weight of pilot and passenger, if carried, and parachutes.	Petrol and oil sufficient to fly 600 miles at 3,000 ft. In addition, a load of 3,000 lbs., to include weight of passengers if carried, and also to include parachutes but not to include the weight of crew.

27. Petrol and oil for the tests and as far as possible accommodation (at owners' risk) for the machines will be supplied free by the Government.

28. The judges shall have the right to disqualify any machine that is very seriously defective in any respect.

29. The judge shall have the right to put up a service pilot to fly any of the machines, should they consider it desirable to do so at Government risk.

All tests will, however, be carried out by the entrant's pilot.

30. During or on completion of any flying test if it is necessary to effect any repairs to the machine after landing, it will be considered to have failed in that particular test.

This does not apply to cases where the machine is by the judges' instructions being flown by a pilot, other than the entrant's pilot.

31. Any entrant may enter more than one type of machine.

32. If a machine is wrecked during the competition, it may, at the discretion of the judges, be replaced by another, but the replacement machine must carry out the whole programme of tests.

33. The decision of the judges, shall be final in all matters affecting the competition.

34. The Government do not accept any liability in respect of accidents during the competition, whether resulting in injury to personnel or damage to the machine, except as specified in Rule 29.

35. The Government reserve the right to adjourn the competition.

36. The Government reserve the right to withold any or all of the prizes if in the opinion of the judges no real advance on existing designs is shown.

37. The Government will, if the entrant agrees, buy the machine of each type winning the first prize, the designs to remain the property of the manufacturers. The maximum prices payable under this head will be:—

Small type.	Large type.
£4,000.	£10,000.

38. The following prizes are offered:—

	Small type.	Large type.
1st prize,	£10,000.	£20,000.
2nd prize,	£4,000.	£8,000.
3rd prize,	£2,000.	£4,000.

39. Entries to close December 31.

RULES.

Seaplanes.

1. A competition will be held on March 1, 1920, with the object of ascertaining the best types of float seaplanes or boat seaplanes in which it will be safe to travel, and in particular to be capable of alighting on and rising from land as well as water.

2. Each machine entered for the competition will be provided with seating accommodation for four persons exclusive of the crew.

3. Machines and engines must have been designed and constructed within the British Empire. This rule will not apply in the case of such secondary equipment as ignition system, carburettors and instruments.

4. Machines to fulfil all conditions required for a certificate of airworthiness, and to carry parachutes and lifebelts for all persons for whom accommodation is provided, including the crew. The boat or floats must be so sub-divided that if perforated in any one part each float still remains positive buoyancy.

5. Each machine must be capable of flying level at or above a speed of 80 knots with full load at sea level, and must also be capable of flying level at or below a speed of 40 knots with full load at sea level.

Machines must be capable of climbing not less than 350 ft. per minute in the first minute.

6. *Alighting and Getting-Off Tests*

(*a*) Getting-off test (sea).

Machines will be required to take off with full load, and clear an obstacle 25 ft. above sea level in a distance not exceeding 300 yds. from a position of rest.

(*b*) Alighting test (land).

Machines will be required to land on a smooth aerodrome over an obstacle 25 ft. in height and to come to rest in a distance not exceeding 400 yds., measured in a straight line from the point where the obstacle is crossed. For this test machines will be required to carry full load less 50 per cent. total and oil.

(*c*) Getting off test (land).

Machines will be required to take off a smooth aerodrome with full load and clear an obstacle 25 ft. in height in a distance not exceeding 400 yds. from a position of rest.

(*d*) The above tests are to be made in still air, which for the purposes of this competition will be regarded as any wind velocity not exceeding 5 statute miles per hour.

(*e*) During landing the machine is not to side-slip nor to turn after reaching the obstacle until it is on the ground. Once it has touched the ground the machine may turn in any direction.

(*f*) No braking device operated by the engine may be used during landing.

(*g*) Any landing or taking off gear used must be integral with the machine.

(*h*) No landing apparatus may be used that in the opinion of the judges would be liable to cause undue damage to an aerodrome.

(*i*) In test (*a*), (*b*) and (*c*) above, machines will be allowed four attempts, of which two must be successful.

7. *Test of Reliability in Flight*

(*a*) Each machine must carry out a flight of five hours at a speed through the air of not less than 70 knots, starting with full load.

Pilots may be changed during this flight.

8. *Mooring out Tests*

(*a*) Fair weather. Each machine will be moored to a buoy by its own crew, and using its own mooring tackle (other than the buoy and its moorings) for a period of 24 hours, during the first 23 hours of which time it will be left unattended. The crew will not be allowed on board to pump out the bilges at any time during this test except with the permission of the judges in case of emergency.

At the conclusion of the 24 hours period the crew will be allowed on board; the machine will be got under way by its own crew and under its own power, and will be required to carry out a short flying test within a period of one hour from the conclusion of the 24 hours period.

The test will be carried out under fair weather conditions. Marks will be allotted for rapidity in getting under way.

Moderate weather. Each machine will be moored to a buoy for a period of not less than 12 hours, unattended, under the following conditions:—

Locality—Roadstead sheltered from the open sea.
Wind—From 4 to 6 on the Beaufort Scale.

Marks will be allotted for the general condition of the machine at the conclusion of this test, and its behaviour during the test.

In both the above tests the ordinary average tidal currents existing round the coast of the British Isles may be experienced.

9. Rough water getting off and alighting test.

Each machine will be required to carry out a test of getting off and alighting on disturbed water, which in the opinion of the judges constitutes a moderate sea. The condition in any case will not exceed state 4 in the sea disturbance scale. (Waves under 4 ft. in height.)

10. Machines will be required to carry out a test of being towed in a moderate sea as defined in para. (9) in a circle of approximately ½ mile radius.

11. Each machine must make a figure of eight course round two buoys 100 yrds. apart, and within a rectangle measuring 200 yds. by 100 yds. in a wind not exceeding 15 m.p.h., the sea to be smooth and the tide at slackwater.

12. Each machine must be capable of moving on the water, under its own power for a period of at least 30 minutes and at a speed of not less than 10 knots and not greater than 20 knots.

13. Each machine will be required to carry an anchor and sea anchor, as well as its own mooring tackle, and to anchor on good holding ground with its own gear and remain fast in a wind of 10 m.p.h. and with tidal current not exceeding 3 knots.

14. In a machine having two or more engines, the stoppage or retardation of one engine must not cause the machine to get out of control.

15. Machines must be capable of flying at cruising speeds for 3 minutes without the use of any control or stabilising devices. Controls may be locked during the test.

16. Machines, in the round flying position, must take up and maintain a gliding angle, when the engine or engines are cut off without the use of any controls or stabilising devices.

17. After stalling (1) machines must be capable of recovering flying speed and complete control without a loss of more than 500 ft. of height.

18. Machines must be capable of being started from the cockpit or cabin, without undue muscular exertion.

19. (1) In order to be eligible for prizes machines must fulfil the conditions and carry out the tests laid down in paras. 2 to 18 inclusive. Marks will be awarded for soundness and quality of construction, for general features, for general behaviour afloat, and for exceeding the specified requirements in Rules 5 and 8 (*a*).

20. (2) Soundness and quality of construction will include:—

(*a*) Fire protection, including use of self-sealing tanks, position of tanks (from the point of view of safety from fire in event of a crash); fire-fighting appliances and accessibility of same.

(*b*) Reliability of petrol, oil and water systems, and facilities for seeing if all tanks are full.

(*c*) Durability of petrol, oil and

(*c*) Durability of machine, including propeller (any advantages due to metal construction may be taken into account).

(*d*) Simplicity of design and accessibility of parts.

(*e*) Absence of vibration in the machine.

(*f*) Ease of repair, especially in regard to the hull or floats.

21. (3) General features will include:—

(*a*) Efficiency and ease of control.

(*b*) Unrestricted field of view to the point for the pilot.

(*c*) Silence as affecting occupants of the machine.

(*d*) Comfort generally, including warmth.

(*e*) Self-starting devices.

(*f*) Convenience of mooring and anchoring arrangements.

(*g*) Method of wind screening adopted.

(*h*) Convenience for use of instruments.

(*i*) Freedom of entering and exit for occupants.

(*j*) Bilge pumping arrangements.

22. Behaviour afloat will include:—

(*a*) Stability at rest.

(*b*) Water stability at all speeds.

(*c*) Minimum spray at all speeds.

23. Marks will be allotted for exceeding the minimum high speed and flying less than the maximum low speed.

24. The judges will have regard to the method of fitting parachutes, and especially to the means of exit by parachute afforded to the occupants, and will allot marks for the same.

25. Marks will not be given on account of the number of engines installed.

26. The following will be the allotment of marks:—

Soundness and quality of construction (Rule 20)—
Sub-para. (*a*) 8.
(*b*) 8.
(*c*) 6.
(*d*) 6.
(*e*) 4.
(*f*) 4.
Maximum total, 36.

General features (Rule 21)—
Sub-para. (*a*) 6.
(*b*) 6.
(*c*) 6.
(*d*) 5.
(*e*) 5.
(*f*) 5.
(*g*) 3.
(*h*) 3.
(*i*) 3.
(*j*) 3.
Maximum total, 45.

Dehaviour afloat (Rule 22)—
Sub-para. (*a*) 6.
(*b*) 6.
(*c*) 6.
Maximum total, 18.

High speed (Rule 5)— For each knot in excess of required minimum	½	No maximum.
Low speed (Rule 5)— For each knot below the required maximum	1	
Mooring out test (fair weather) (Rule 8 (*a*)). For each complete 5 minutes less than the hour allowed from the completion of the 24-hour period, to the moment when the machine leaves the water	1 mark.	
Mooring test in moderate weather (Rule 8 (*b*)). For behaviour of machine during test ..	Maximum marks, 5	
For condition of machine at end of test	Maximum marks, 5	
Method of fitting parachute (Rule 24)	Maximum marks, 5	

27. With reference to Rule 6 when carrying out alighting and getting off tests, machines will start with the load of petrol and oil specified, and will be allowed to fly for 20

minutes. If they have not carried out their tests by the end of that period they must alight and fill up again.

28. The type of propeller used on any machine must be the same for all the tests.

29. Full load will include :—

Instruments as under :—

- Revolution counter.
- Aneroid.
- Air speed indicator.
- Compass.
- Watch.
- Turn indicator.
- Bearing plate.
- Sextant.
- Oil pressure gauge (when necessary).
- Air pressure gauge (when necessary).
- Radiator thermometer (when necessary).

Petrol and oil sufficient to fly 450 nautical miles at 1,000 ft.

In addition a load of 1,000 lbs., to include passengers if carried and lifebelts and parachutes, but not including crew or any gear specified in Rules 8 (*a*) and 13.

30. Petrol and oil for the tests and as far as possible accommodation (at owner's risk) for the machines will be supplied free by the Government.

31. The judges shall have the right to disqualify any machine which is very seriously defective in any respect.

32. The judges shall have the right to put up a service pilot to fly any of the machines, should they consider it desirable to do so, at Government risk.

All tests will, however, be carried out by the entrant's pilot.

33. During or on completion of any flying test, if it is necessary to effect any repairs to the machine after alighting, it will be considered to have failed in that particular test.

This does not apply to cases where the machine is by the judges' instructions being flown by a pilot other than the entrant's pilot.

34. An entrant may enter more than one type of machine.

35. If a machine is wrecked during the competition it may, at the discretion of the judges, be replaced by another, but the replacement machine must carry out the whole programme of tests.

36. The decision of the judges shall be final in all matters affecting the competition.

37. The Government do not accept any liability in respect of accidents during the competition, whether resulting in injury to personnel or damage to the machine (except as specified in Rule 32).

38. The Government reserve the right to adjourn the competition.

39. The Government reserve the right to withold any or all of the prizes if, in the opinion of the judges, no real advance on existing designs is shown.

40. The Government will, if the entrant agrees, buy the machine winning the first prize, the design to remain the property of the manufacturer. The maximum price payable under this head will be £8,000.

41. The following prizes are offered :—

1st prize, £10,000.
2nd prize, £4,000.
3rd prize, £2,000.

42. Entries to close December 31.

◆ ◆ ◆ ◆

CIVILIAN FLYING

BLACKPOOL

Flying has been as busy as ever, for the Lancashire Wakes are in full swing. The climax takes place this week when the Oldham holidays are on. The five-seater Avros as usual did the bulk of the work.

One of the five-seaters, flown by Capt. Tully, A.F.C., has been temporarily equipped as a repair plane. An engine was urgently wanted at Southport. It would have taken the best part of a day to send it by road, and probably by goods train it would have taken a week. So the engine and stand were fixed up in the five-seater and flown across the Ribble in ten minutes. The cost of transport was in the neighbourhood of £2, as against £5 for the hire of a lorry.

SOUTHPORT

At Southport itself, where the Sopwith Aviation and Engineering Co., have the sole concession for making flights, their team of one "Dove" and three "Gnu" machines have been kept busy. With these machines Mr. King and Mr. Clapham have taken about 1,000 passengers during the past seven weeks.

The Avro machines at Birkdale have also been well employed. One little job of work last week was to run across to Blackpool and bring up a passenger who wished to catch a certain train from Southport. A taxi would have taken four hours, but the Avro went there and back in 15 minutes, and that in spite of pouring rain and thick mist.

In the Air Ministry list of aerodromes Southport is shown as unsuitable for landing at high tide. We understand, however, that the expanse of sand is so wide that there is plenty of room to land even when the tide is up.

MORECAMBE AND FLEETWOOD

Lieut. Macrae, M.C., flies an Avro twice a week at Fleetwood, spending the rest of his time at Morecambe, where he has been kept busy. Every day he flies backwards and forwards from Scale Hall, Lancaster, where he reigns in solitary glory over the Government Bessoneaux and landing grounds.

MANCHESTER—SOUTHPORT AND BLACKPOOL DAILY SERVICE

The Avro service between these towns has run daily since the middle of May. The service is each way, and it is claimed (notwithstanding certain recent statements to the contrary), to be the first regular flying service run on civilian lines in the country. The time-table, which is published in the Manchester railway guides, is as follows :—

Leave Blackpool	12 noon	Leave Manchester	2 p.m.
Arrive Southport	12.15 p.m.	Arrive Southport	2.30 „
Arrive Manchester	12.45 „	Arrive Blackpool	2.45 „

NOTTINGHAM

The Air Ministry, having refused, probably wisely, to license the ground in the centre of the town for the proposed flying week, arrangements are being made by the Avro people for an alternative scheme in the middle of September. It is possible that a combined Nottingham and Derby passenger service may be run as a missionary effort, as neither of these great industrial centres have seen much flying, and neither of them have started suitable civilian aerodromes.

ISLE OF MAN

Lieut. Moxon, flying on probably the most difficult aerodrome in the North, continues to do good business. His machines are stationed on the grassy portion of the promenade, opposite Little Switzerland. He has started another Avro aerodrome at Ramsay where the flying conditions are very much better. This has been licensed and should produce good results.

BRIGHTON

During the week, in spite of very indifferent weather—no flying was possible on the 19th and 20th inst.—38 flights were made aggregating 11 hours 20 mins. In all 88 passengers were taken up. On the 17th Mr. T. W. Best, of Boston, U.S.A., with his niece, flew across to Swanage, and returned after tea.

CAMBRIDGE

Several exhibition flights have been made recently by the Cambridge School of Flying at their aerodrome at Hardwick, and they have proved very popular. Capt. R. Birkbeck, D.F.C., is the pilot, and he has put up some very good shows on his Avro.

◆ ◆ ◆ ◆

Utilising Aircraft in Canada

The latest use suggested for seaplanes in Canada is in connection with the whaling industry, although precise details of the proposal are not to hand. In the meantime, it is understood to be the view of officers of the Forestry Service in the Province of Quebec, that aeroplanes are most effective in guarding forests against fire.

Dunkirk's Ordeal

At the ceremonial conferring of the Legion of Honour on Dunkirk on the afternoon of Sunday last, President Poincaré mentioned that Germans had bombed Dunkirk 172 times from the air, not to mention four shellings from the sea and 34 attacks by the long-range gun concealed in the dunes.

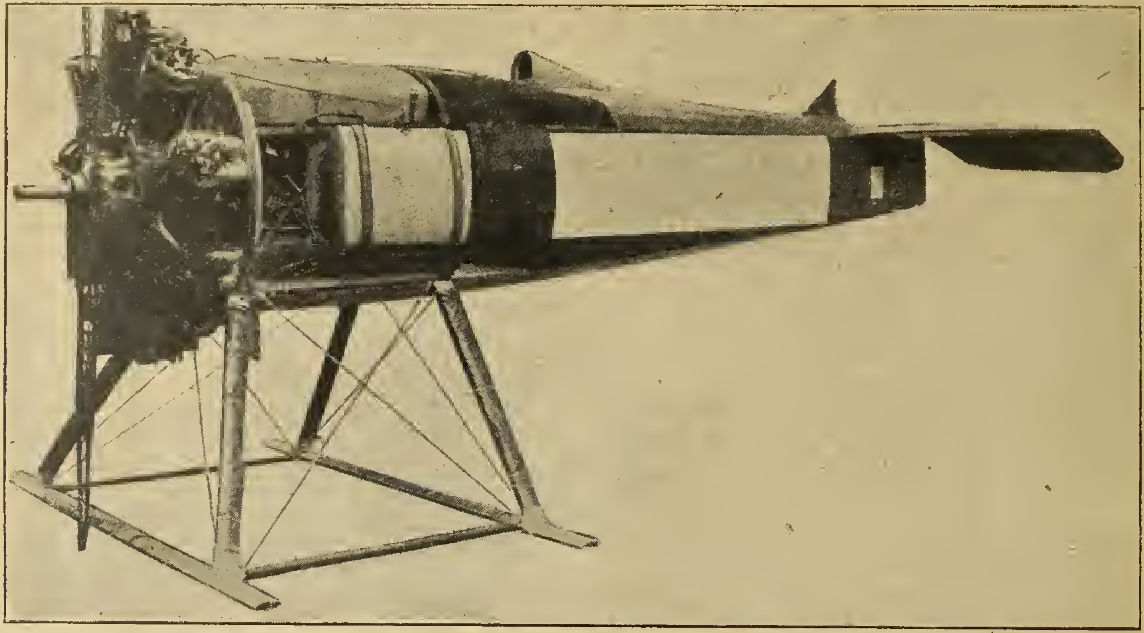
THE SOPWITH "SCHNEIDER CUP" MACHINE

As the firm who won the Jacques Schneider Cup at Monaco in 1914, special interest attaches to the machine entered by the Sopwith firm for this year's Schneider race, which is to be held at Bournemouth on September 10. It will be remembered that the race of 1914 was won by Mr. Howard Pixton, who was flying a small Sopwith tractor seaplane of the twin-float type. The machine, in a general way, was not unlike the little land tractor "Tabloid," except that, of course, she was fitted with floats in place of the wheels. Later on the "Sopwith Schneiders" were called upon for work of a much more serious character, and during the earlier part of the War these machines did a tremendous amount of good work in the R.N.A.S. The race of 1914 was over a distance of about 150 miles, and was covered by Mr. Pixton on the Sopwith in 2 hours $13\frac{2}{5}$ secs. The next best time was made by Burri on an F.B.A. flying boat, which completed the course in 3 hours 24 mins. 12 secs. As already announced, this year's race will be held over a distance of about 200 miles, the course being from Bournemouth to Swanage, thence to Christchurch, and from there back to Bournemouth. The length of the course is approximately 20 miles, so that competitors will be called upon to cover the course ten times. This should give the spectators a very good view of the machines, not only as they pass the turning points, but from the cliffs at Bournemouth the machines should be well in view the whole time. There can be little doubt that as regards speed the machines entered this year will be greatly superior to those of 1914, and, although the distance is longer, the times should be considerably shorter than the two hours taken by Pixton in 1914.

The machine entered by the Sopwith firm for this year's Schneider race is a small tractor biplane of the twin-float type. It is fitted with a Cosmos "Jupiter" radial engine of about 450 h.p. Judging from estimated figures of performance, and from data of wing loading and load/h.p., which figures we are not, unfortunately, permitted to publish this week, the Sopwith should show an astonishing turn of speed. The machine, as already mentioned, is a small single-seater, with only one pair of struts on each side. The planes are given a slight backward stagger, although this is so slight as to be almost unnoticeable.

As regards its construction, the Sopwith machine follows usual Sopwith practice. Its *fuselage* is the usual wood girder, wire-braced structure, but a superstructure of light stringers has been added so as to give the *fuselage* a good streamline form. The machine, it will be seen from the accompanying photograph, has very clean lines, and everything has been done to reduce head resistance. Thus as regards the tail planes, the vertical fin grows out of the body, so to speak, although it does not form an integral part of the *fuselage*, and the rudder continues the streamline of the body, being very thick as regards its lower portion. No external crank levers are fitted to the rudder, and the elevator crank lever is placed centrally, where it is covered by the detachable vertical fin. A notable feature of the machine is that no tail float is fitted. This in spite of the fact that the two main floats are not extraordinarily long.

The accompanying photograph, taken while the machine was being erected at the Sopwith works at Kingston, does not show the floats in place, but it gives a very good idea of the simplicity of the undercarriage structure, which consists of four streamline steel tube struts, cross-braced with Rafwire. The two floats are simply bolted to the transverse struts joining the chassis struts.



THE SCHNEIDER RACE: The *fuselage* and undercarriage struts of the Sopwith machine, which is now nearing completion at the Sopwith works at Kingston. The engine is a 450 h.p. Cosmos "Jupiter."

With regard to the floats themselves, these are of the plain non-stepped type. That is to say, there is no actual step, in the ordinary sense of the word, but from a point slightly aft of the centre of the floats the bottom is perfectly flat and slopes upward towards the heel. The nose of the floats is cut off at a slight angle to the transverse axis of the machine. In general it may be said that the Sopwith Schneider 'bus has a very strong family resemblance to previous Sopwith machines, and it is certainly not a "freak" machine in any way. This is not meant to indicate that she will not be fast, however, for being quite a small light machine, and having a light engine of 450 h.p., she cannot very well help being fast, but that as regards her general design and construction she is quite an orthodox seaplane of the small type. Sopwiths were the first to show the world that a biplane can be made fast, and their present machine may be expected to uphold the reputation, especially as it will be piloted by Mr. Hawker.

◆ ◆ ◆ ◆

City Church Restored after Air-Raid Damage

The historic church of St. Edmund the King and Martyr in Lombard Street, which was a good deal damaged in one of the air raids, is to be reopened on Wednesday, October 1. The Lord Mayor and Sheriffs will attend in state and the Bishop of London will preach.

Disposal Board's Exhibition to be Moved

As the Agricultural Hall, Islington, will shortly have to be vacated, the exhibition of tools and other miscellaneous stores arranged by the Disposal Board of the Ministry of Munitions has had to seek a new home. Earl's Court has been selected and the opening date will be announced later.

The E.L.T.A. SHOW

(*Concluded from page* 1118)

The Dutch Exhibits

Apart from the machines exhibited by the Dutch Military and Naval air services, Holland is represented at the E.L.T.A. by three firms: The Nederlandsche Vliegtuigen Fabriek (Fokker), the Nederlandsche Automobiel and Vliegtuig Fabriek "Trompenburg" (Spyker) and Van Berkels Patent.

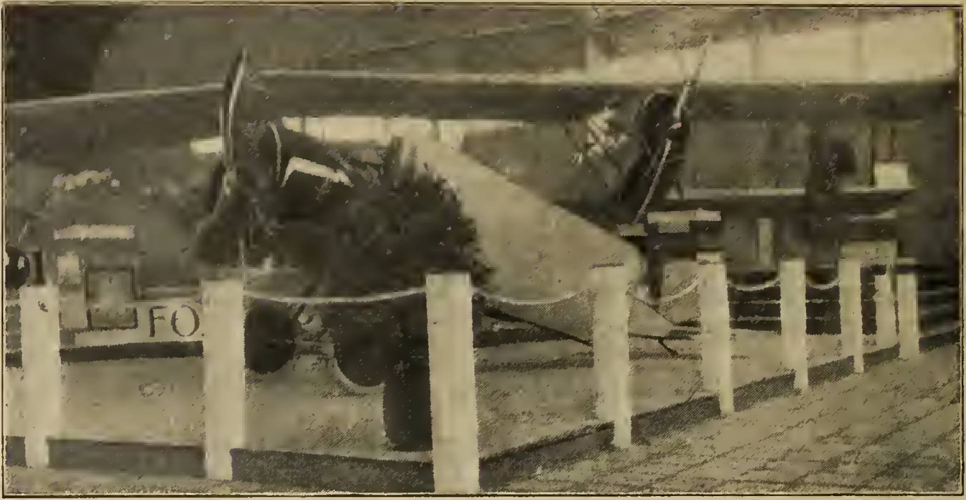
The Fokker Stand

Herr Fokker, having relinquished his German naturalisation, obtained, one presumes, for business purposes during the War, and become a Dutchman once more, was handicapped by not yet having had time to build works of his own in Holland since the armistice while German built machines, of any design, were not permitted. The three machines exhibited on his stand, while not built by Herr Fokker, although to his designs, were not, we learn, made in Germany, as has been hinted in certain quarters, but were, we are informed by the gentleman in charge of the Spyker stand, made for Herr Fokker by the Spyker works at Trompenburg. Three machines are exhibited, none of which show any striking departures from their prototypes built in Germany during the War, and which have been fully dealt with in Flight. One of the machines is a little parasol monoplane, with 110 h.p. Clerget (Dutch) engine. It has the usual type Fokker cantilever wings, supported by four struts on each side. It is a single seater, and judging it by a similar machine flown with great skill by Lieut. Versteegh, has a very good performance.

The second machine on the Fokker stand is a little single-seater biplane with 80-90 h.p. Thulin (Swedish version of the Le Rhone) engine. It is designed as a sporting biplane, and has its wings placed on the *fuselage* top and bottom respectively, the pilot sitting in an opening in the top plane. In order to facilitate housing and transport the wing bracing is arranged so as to be quickly dismantled, when the wings, by means of suitable hooks, can be placed alongside, and supported by brackets on the *fuselage*. In a general way this machine is very similar to some of the earlier War machines produced by Fokker in Germany, but with, probably, a smaller engine in view of the purpose for which this machine is intended.

Finally there is on the Fokker stand, a two-seater biplane which has more than a family, resemblance to the German Fokker type D VII. It has the same general shape and construction of *fuselage*, the same thick tapering wing section, and the same N form of interplane struts, without external wing bracing. One difference one notices, however, in the attachment of the lower wing to the *fuselage*. Whereas in the D VII the bottom plane was in one piece, resting in a recess in the bottom of the *fuselage*, in the show machine the bottom plane is made in two halves, bolted to the sides of the *fuselage*. The pilot occupies the front seat, while the seat usually occupied by the gunner is now reserved for the passenger, who is protected from the wind by a glass wind screen, while above his head is a collapsible hood made of fabric. A front radiator of elliptical shape suggests that the

A Bird's-Eye View of the E.L.T.A.: The two large sheds in the centre of the picture contain the exhibits, while in front and behind them are office buildings, etc., and the Fair grounds.



The Fokker Stand: On the left may be seen the port wing of a parasol monoplane, while in the centre is a sporting two-seater, shown with the port wings folded for transport. In the background, on the right, is a Fokker two-seater biplane, similar to the German Fokker type D.VII.

"Flight" Copyright.

engine is a water-cooled one, but as to make we were unable to obtain any information from the gentleman in charge of the stand. The front of the body was hermetically sealed so as to make it impossible to discover the contents—if any—of the engine housing, and the young man in charge naïvely informed us that he did not know with what engine the machine was fitted! This may be taken to mean that either no engine was fitted, or that, if there was one fitted, it was a German one.

THE SPYKER MACHINES.

Of the aeroplanes of Dutch design and construction the two Spyker biplanes exhibited are perhaps the neatest. There is about both types a certain cleanliness of outline which is very pleasing to the eye. Yet as regards their design and construction everything is simple and along common-sense lines.

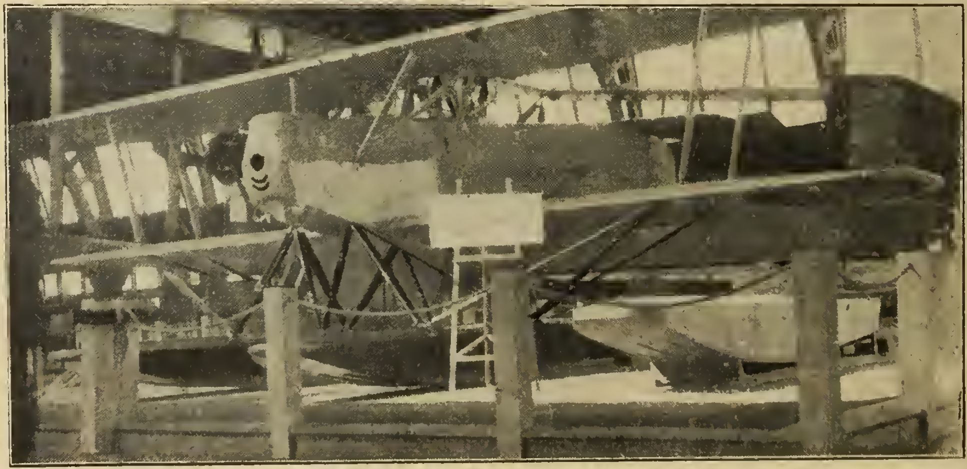
One of the Spyker machines is a little single-seater sporting biplane, fitted with a 130 h.p. Spyker-Clerget engine. It follows standard practice as regards its general lay-out, having a single pair of inter-plane struts on each side. The wing bracing is in the form of flat steel bands, not of the alleged stream-line section now used so extensively on our own machines, but truly plain flat steel bands, fitted in duplicate side by side and in surface contact with one another. The terminals for these flat steel strips are extremely neat, and would appear to be a good deal less expensive to make than are our own neat but super-refined trunnion terminals for R.A.F. wires. The plane struts are of wood, stream-line section. Upper and lower planes are of equal span, and both are fitted with *ailerons*.

The *fuselage* is of the monocoque form of construction, and would appear to be of very good shape as regards air resistance. The controls are of standard type, the stick terminating at the top in a very convenient handle. A very complete set of instruments is carried on a neat instrument board in front of the controls. The top plane centre section is provided with windows so as to improve the pilot's view in an upward direction. A simple type of Vee undercarriage, having wood struts, is fitted, the axle being divided in the centre. In its show paint—the planes are yellow and the *fuselage* blue—the little Spyker scout looks extremely well, and has, we believe, a very good performance.

The second machine exhibited on the Spyker stand is a two-seater tractor, designed for school work. It is fitted with an 80-90 h.p. Thulin (Swedish) engine of the Le Rhone type. This machine, being intended for instruction work and carrying two, is somewhat larger than the single-seater, but is also a fairly small, and very pleasing, aeroplane. It has two pairs of struts aside, and the same common-sense design is noticeable in all its details. This machine has not, however, a monocoque *fuselage*, but one of the usual wood girder type, with struts and cross members of T section, and wire bracing. As shown, the rear part of the *fuselage* was uncovered so as to show the internal construction and workmanship, both of which were very good. In this machine the lift bracing is in the form of standard cables, and the manner of attaching the lower plane to the *fuselage* is very neat, being effected by a form of union, not unlike that employed on some of the earlier German Albatros biplanes.

The undercarriage is of the Vee type, with very wide track, and the lower apices of the two Vees are arranged in a manner not unlike that of some of the Sopwith undercarriages. That is to say, there is a cross piece some little distance up, and a plate with guides for the axle. Needless to say, as the machine is intended for instruction it is fitted with dual control. In view of the comparatively low power the machine has a good performance, and we are informed that she has been looped, which is not bad for a two-seater with only 80 h.p.

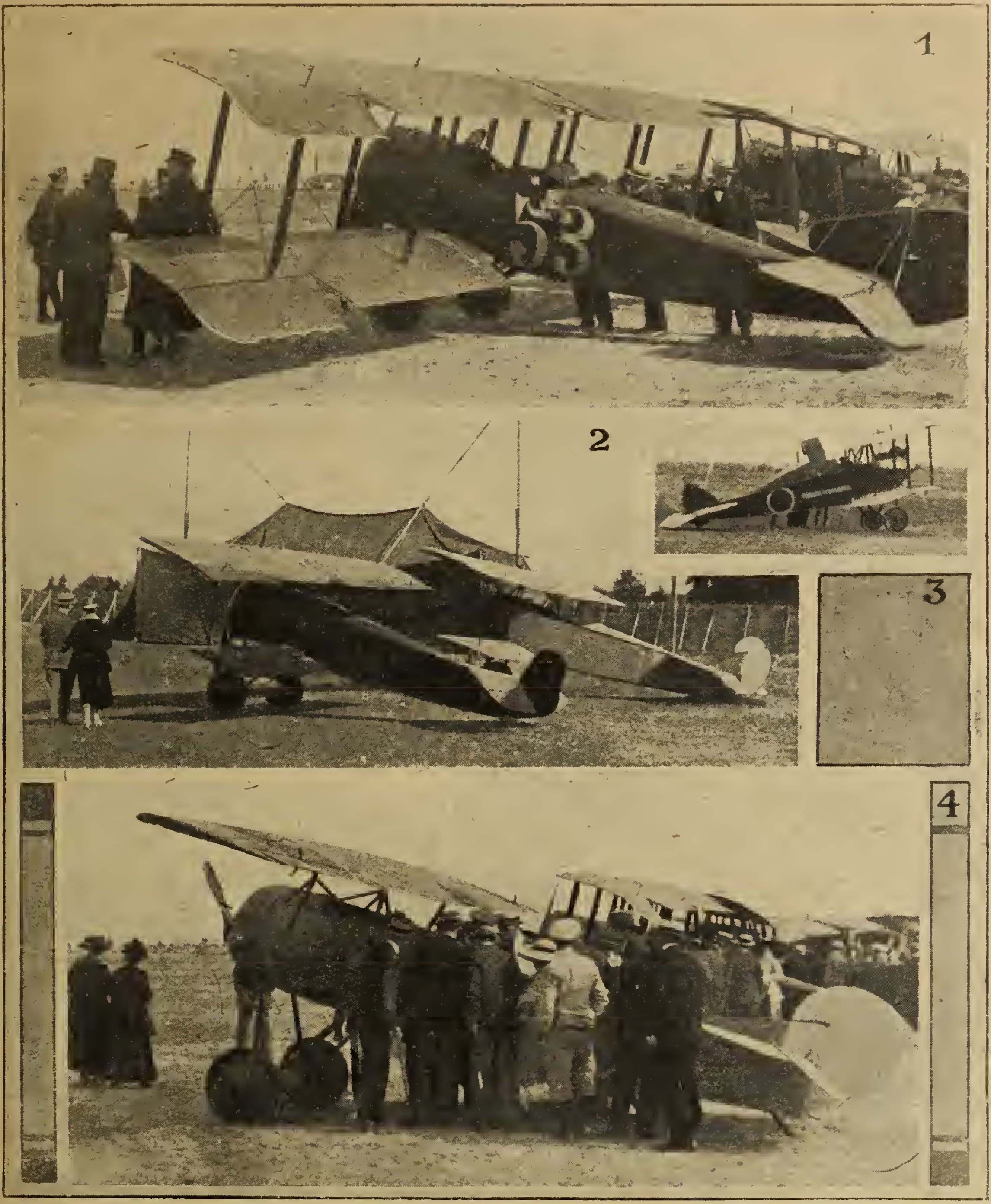
The Spyker firm also shows, in addition to one of their cars, a rotary engine of the Clerget type, but built by Spykers, which is rated at 130 h.p. Judging from an external examination it is a very fine job, the engine being well finished and



Van Berkels Patent: On this stand is shown a twin-float seaplane without inter-plane wing bracing, the lift being taken by tubes from the floats. This machine was shown minus engine.

"Flight" Copyright.

the workmanship, as far as it was possible to judge, being very good.



"Flight" Copyright

SOME DUTCH MACHINES AT THE E.L.T.A. AERODROME: 1. A Spyker school machine; 2. A couple of Fokker biplanes, one with rotary and one with stationary engine; 3. A cabin machine which was known as a Fokker, but which was recently an L.V.G.; 4. The Fokker monoplane on which Lieut. Versteegh does some very clever flying

THE HOLLANDSCHE MARINE LUCHTVAARTDIENST,

or Dutch Naval Air Service exhibits on its stand a twin-float seaplane, of the Friedrichshafen type, we believe. It is fitted with a Benz engine, and does not present anything of unusual interest. The amount of strutting to the two stepped floats appears excessive, as is so often the case with German seaplanes, and must, one would incline to think, offer an unnecessary amount of air resistance.

THE NEDERLANDSCHE REGEERING, L.A.

or Military Air Service, exhibits, a very neat twin engine machine, not unlike the later types of twin-engine Caudrons. It has two engines, placed on the wings in neat stream-line *nacelles*, developing, we were informed, 130 h.p. each. The machine is of the *fuselage* type, with the three occupants seated one behind the other. The middle seat is occupied by the pilot, while in the nose of the *fuselage* is seated a photographer, the rear seat being taken by the wireless operators. The machine is shown complete with its full equipment of guns and bombs, the latter being carried on bomb racks underneath the *fuselage*. The machine was, we understand, built to official designs at the military aerodrome at Soesterberg.

The only other Dutch machine exhibited is that built by

VAN BERKELS PATENT, HOLLAND.

This is a twin-float seaplane, shown at the exhibition without engine, but intended, we believe, for a Mercédès. The *fuselage*

At the E.L.T.A. Aerodrome : One of the Avros which are kept busy all day and every day carrying passengers. Note the registration letters on the *fuselage*

is built up of a light framework covered with three-ply wood. The ply-wood covering of the rear portion of the *fuselage* is continued outwards over the tail plane, which latter is built integral with the body. The *fuselage* is very deep at the rear, where as a matter of fact it perfoms the function of a fin, no other vertical fin being fitted. As the tail plane is at the top of the *fuselage* the whole tail looks somewhat unusual, especially as the rudder has its balanced portion projecting below the stern instead of, as in the majority of machines, above it.

The two floats, which are of the single step type, are flat-bottomed as regards their front portion, but to the rear of the step the bottom gradually changes from flat to Vee bottom, finally coming to a point at the heel of the float. The construction is very similar to that of the *fuselage*, brass screws and nails being used throughout. The floats are, of course, fitted with water-tight bulkheads, easily detachable inspection doors being provided in the deck for examining the interior.

The wing bracing of this seaplane is unusual, in that there is only one pair of struts on each side, in spite of the comparatively large span. The upper plane is of slightly greater span than the bottom one, and the inter-plane struts slope outwards to obtain the best load distribution on the respective spars. The lift and landing loads are taken by tubes sloping from the floats outward to the lower surface of the bottom plane at the points where occur the inter-plane struts. As the float strut formation is in the shape of a letter M, as seen from in front, and having a transverse horizontal strut between the floats, the outward component of the lift pull on the sloping struts is transmitted to this horizontal strut, which is therefore in tension when the machine is flying, and probably in slight compression when the machine is at rest. We understand that this machine has not yet flown, but a speed of 155 km. per hour is estimated for her.

Another exhibit on this stand which attracts attention is a small 8-cyl. rotary engine of the two-stroke type. It was, we learn, designed by Mr. Kerner, of the technical staff of Van Berkels. Its chief feature is that, in order to avoid the trouble experienced in all two-stroke engines at certain speeds—either a mixing of the fresh charge with residual gases, or a waste of fuel through blowing part of the fresh charge out through the exhaust ports—a small piston disc is interposed between the fresh charge and the exhaust gases, thus preventing them from mixing, while at the same time being limited in travel so as to prevent the escape of the fresh gas through the exhaust ports. This piston disc is mechanically operated, but we were unable to ascertain the details of the mechanism. The Kerner engine is provided with external inlet pipes, and very large inlet valves are fitted in the cylinder heads. We understand that the engine has passed through satisfactory test runs, and it is claimed to develop 120 h.p. for a weight of 95 kgs.

The French Section

At the time of writing, the aircraft industry of our gallant ally France is represented by two machines only, a very ancient type of Caudron, and a military type Breguet, of the type used so extensively during the War. It is somewhat of a disappointment that French aviation is not more fully represented, and we trust that before the exhibition closes this will be remedied.

The Messageries Aériennes

which is a combine of the French firms of Blériot, Breguet, Caudron and Morane, show two machines. One of these is a type G 3 Caudron, which will be well known to all our readers. It has a le Rhone engine of 80 h.p., and is characterised by the usual short *nacelle* and open tail booms associated with the Caudron machines. It might be pointed out that it was on a similar machine that Poulet established a duration record of 16 hrs. 28 mins. in May, 1914. It has also been used very extensively for training purposes, and many of the French "Aces" have got their ticket on machines of this type. Incidentally this type of machine was, we believe, the first biplane to loop the loop, which it first did piloted by Chanteloup on September 17, 1913. The type, although many may be inclined to smile at it in these days, has therefore a long and honourable career behind it, and for landing on or starting from difficult ground it is probably unexcelled by any other machine. For instance, it may be recollected that it was on a machine of this type that the late Jules Vedrines landed on the roof of the Galleries

A FRENCH REPRESENTATIVE : The Breguet biplane, which arrived at Amsterdam by air. The machine, which has a 450 h.p. Renault engine, was piloted by the well-known pilot Roget, who had with him as passengers Lieut. Labouchere and a mechanic

Lafayette. Another similar machine is busy carrying passengers from the E.L.T.A. aerodrome.

The Breguet machine is a two-seater fighter of the XVII C 2 type, and is shown as such, with a full complement of machine guns, a very full one, in fact, for it carries, we believe, no less than five machine guns. The engine fitted is a 450 h.p. 12-cylinder Renault water-cooled, with the radiator placed in the nose of the *fuselage*. Perhaps the most remarkable feature of the Breguet is the wing bracing, which is so arranged as to have no inter-plane lift wires in the inner bay, the place of these being taken by wires running from the bottom of the undercarriage to the foot of the inter-plane struts. The landing wires in this bay run from the top of the *fuselage* to the base of the first pair of inter-plane struts. The lift bracing consists of stranded cables, while the landing wires are of the Rafwire type. The Breguet is credited with the following performance :—

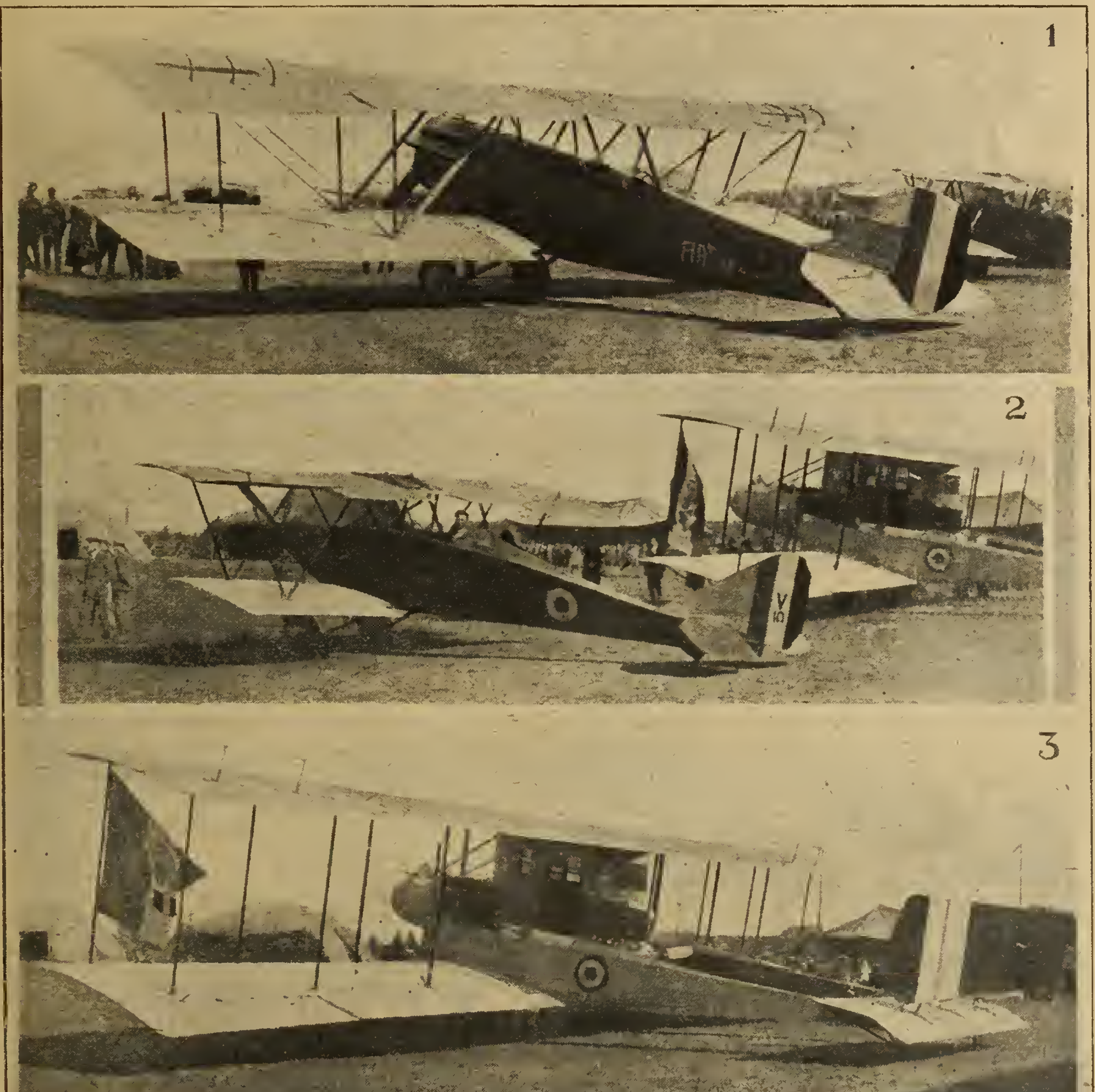
Climb	2,000 metres in 5 mins. 45 secs.
	4,000 metres in 14 mins.
	6,000 metres in 31 mins.
Ceiling	7,500 metres.
Speed—	
At ground level ..	221 kiloms. per hour.
At 2,000 metres ..	218 ,, ,,
At 4,000 ,, ...	207 ,, ,,
At 6,000 ,, ...	186 ,, ,,

Italy's Representative

At the actual exhibition Italy is represented by two machines only. One is the large Fiat biplane, on which recently Lieut. Brack-Papa flew from Italy to England, and which was *not* crashed in France on the return journey as stated in the daily press, and the other is a Caproni three-engined machine, turned into a commercial aeroplane by adding a cabin to the *fuselage*. A third Italian machine is, however, flying at the E.L.T.A. aerodrome—the little S.V.A. biplane with Warren girder wing bracing.

THE GREAT FIAT BIPLANE

Arriving from France by air, the Fiat biplane, on which Lieut. Brack-Papa flew from Turin to London recently, is now exhibited at the E.L.T.A. show. As the machine was described and illustrated in FLIGHT of July 24, 1919, no detailed reference to it is necessary here. It is a very large, single-engined two-seater, with a 700 h.p. Fiat engine of the 12-cylinder Vee type. The *fuselage* is of the ply-wood covered type, with the two seats arranged in tandem, the pilot in front. The control is of the wheel type for the *ailerons*. A very large petrol tank is placed between the engine and the pilot's seat. The radiator is placed in the nose of the *fuselage*, and under the bottom of the body, just behind the front chassis struts, is a small oil cooler of copper tubing. In order to reduce the air resistance of the 12 exhaust



"Flight" Copyright.

THE ITALIAN REPRESENTATIVES AT THE E.L.T.A.: 1. The large F.I.A.T. biplane with 700 h.p. engine; 2. the S.V.A. biplane ; 3. The Caproni three-engined biplane

pipes, each set of six is enclosed in a stream-line casing projecting outwards and downwards from the top of the cylinders.

The most interesting feature of the Fiat B.R. is, perhaps, the wing bracing, which is of a somewhat unusual type. The centre section struts are arranged as in the Sopwith 1½-strutter, *i.e.*, the form of a letter W as seen from in front. The inner bay of the wing bracing has no lift wires, diagonal struts sloping from the top of the outer centre section struts to the base of the first pair of inter-plane struts, being thus in compression under lift loads. The outer bay of the wing truss is wire braced, the lift wires being in duplicate and enclosed in a stream-line aluminium casing, while the landing wires are single Rafwires. It might be mentioned that all the terminal connections of the wing struts and wires are enclosed in stream-line aluminium casings so as to reduce air resistance. As mentioned in our issue of July 24, the machine has a maximum speed of about 160 m.p.h., and her appearance at the E.L.T.A. aerodrome was hailed with delight by the visitors, most of whom had probably never seen a machine flying at such high speed. The Fiat did not, however, remain long at the aerodrome, but was put into the exhibition the day after her arrival.

The Caproni Biplane

Another Italian machine which arrived at Amsterdam by air was the Caproni three-engined biplane, which made its first appearance above Amsterdam on August 7, when, after circling over the town for about an hour, it landed on the E.L.T.A. aerodrome, fortunately without coming to grief. The machine cannot by any stretch of imagination be termed a pretty one, the twin *fuselages* and straight, square-tipped wings giving it a somewhat ungraceful appearance. But it seems to fly very well, and does some fairly sharp banked turns, although at times it was observed to do flat turns which one usually associates with tendencies to spin. However, the Caproni does not appear to be troubled by flat turn, and at times they appeared to be chosen deliberately by the pilot when he wanted to turn quickly.

The three engines of the Caproni are Isotta-Frachinis, the two outer ones being placed in the nose of the twin *fuselages*, while the third is installed in the rear of the central *nacelle*, where it drives a pusher airscrew. The front portion of the *nacelle* projects far out in front, and here are arranged two cockpits in tandem. Slightly further aft a superstructure has been added which extends up to the top plane, and forms a cabin for the passengers. The machine carries 10 persons, and flies fairly fast with its three engines developing a total of a little over 700 h.p. The general arrangement of the Caproni will be clear from one of the accompanying photographs. Like the Fiat, the Caproni was also put into the exhibition building shortly after its arrival, and may now be examined on the Caproni stand.

A CLEVER DUTCH PILOT : Lieut. Versteegh is very popular at the E.L.T.A., and handles a Fokker parasol monoplane exceedingly well, doing vertical banks, loops, spins, &c.

The S.V.A. Biplane

Although not strictly speaking at the exhibition, the little S.V.A. biplane is included here, as it is flying daily at the E.L.T.A. aerodrome, piloted by the Italian pilot Guglielmotti. This little machine is chiefly remarkable for its wing bracing, in which no wire bracing is employed. The struts are arranged in the form of a Warren girder, and the only wires in the system are the incidence wires. The 200 h.p. engine is perched high up on the front of the *fuselage*, and is totally covered in, the radiator being in the nose. In front the *fuselage* is of rectangular section, which gradually runs into a triangular section aft of the pilot's seat. From this point to the tail the *fuselage* is triangular, which gives it a somewhat weak appearance, and the tail plane may be seen to warp appreciably during flight. However, this does not appear to worry Guglielmotti, who does all the usual stunts on the machine, including spins. One very peculiar thing one noticed about this machine. In taking off its tail never leaves the ground, the machine travelling along at the angle at which it is standing at rest until sufficient lift is obtained. Until one becomes accustomed to it the sight of a machine starting in this manner is rather terrifying, as one is inclined to expect to see her stall as soon as leaving the ground.

THE ETCETERAS

In addition to the firms showing complete machines, there is a vast number of firms, British and others, who exhibit accessories of all descriptions. It is patently impossible for us to mention every firm, and to attempt a complete catalogue of all the exhibits in the limited space at our disposal, and we are therefore perforce obliged to leave out many that deserve to be mentioned. Reference has already been made to a few aero engines, such as the Spyker-Clergets, the Thulin-le Rhones, and the Kerner two-stroke. At the time of writing, only one firm was represented in the aero engine section, the Gnome and Rhone, who were showing one 80 h.p. le Rhone and one 180 h.p. le Rhone, both 9-cylinder rotary engines. According to the official catalogue, several other engines were to be on view, but when we had a walk around to the stands in question, such as Anzani, Hispano-Suiza, Lorraine-Dietrich, etc., nothing was to be found on them except empty packing cases. However, by the time this appears in print it is to be hoped that the long-delayed engines will have turned up. Of British firms who are exhibiting at Amsterdam articles connected with the science and practice of aviation, apart from complete machines, mention may be made of the following :

The British Emaillite Co., Ltd.

The exhibits on this stand are partly by the above-mentioned firm, and partly by its affiliated Company, the General Aeronautical Co., Ltd. At the time these notes are written some of the exhibits have not yet arrived, but by the time this week's issue of FLIGHT reaches our readers the remaining exhibits will no doubt have reached the E.L.T.A., and be on view at the stand. As it was obviously impossible for the firm to exhibit full-size machines showing their doping schemes, a set of excellent models have been made, and are shown on the stand. These include three models of a B.E. 2 C, demonstrating the Emaillite Doping Scheme " X," one of which is finished with the " Nivo " green pigmented coverings, the upper plane with the glossy P.O.V. constituents of this colour, and the bottom plane with the matt nitro constituent. The second model is finished with glossy P.O.V. constituents, the upper plane with the standard khaki shade of the Air Ministry, and the bottom plane with the new " Nivo " green colour as now used on Government aircraft. The third model to which reference has been made is finished off with six varied colours, indicating a suitable series of shades for commercial aircraft. These colours are : Upper surface of top plane, rose pink ; under surface of top plane, white ; upper surface of lower plane, heliotrope ; under surface of lower plane, pale green ; fabric covering of *fuselage*, orange chrome ; woodwork, " Nivo " green. All these colours are in the P.V.O. type of protective covering, providing a glossy finish. A fourth model demonstrates the Emaillite Doping scheme " B." The upper surfaces of this model are doped solely with the pigmented dope constituents of the scheme,

THE E.L.T.A. FLYING GROUND : A view of the enclosures and some of the tent hangars

while the lower plane is, in addition, finished off with the final protective varnish.

It is, of course, well known that the British Emaillite Co. have been successful in producing some very excellent doping schemes for airships, in addition to the aeroplane doping schemes. The current schemes specially designed for the outer covers of rigid airships are : Emaillite Airship Doping schemes "P," "R" and "R.A." A 6-foot model of the R34 is shown on the stand, and demonstrates the scheme "R." As this firm is also manufacturers of enamels and varnishes for general purposes, a series of panels is shown, indicating a very wide range of enamels and varnishes.

Of the items exhibited by the General Aeronautical Co., Ltd., mention may be made of a series of airscrews, including a D.H. four-blader, fabric sheathed and with the tips enamelled in the different alternative colours provided by the Emaillite Propeller finishing scheme, a G.A.C. licence "Regy" screw fabric sheathed and enamelled in camouflage green, and a G.A.C. licence "Regy" screw enamelled in white. Also a D.H. 9 propeller completely varnished with blades enamelled in grey. Various G.A.C. instruments are also shown, among others a 5,000 meter altimeter with black dial and figures engraved in white so as to give easy reading.

The Farringdon Propeller and Engineering Co., Ltd.

This firm, with which is affiliated the Aircraft Improvements Co., shows a series of airscrews, including a large airscrew for airship work, 17 ft. 6 ins. diam., a Rolls-Royce Eagle airscrew, four-bladed, finished with Farringdon special lacquering process for resisting bad climatic conditions, and a 100 h.p. Mono-Gnome propeller, two-bladed. Small propellers, or more correctly speaking windmills, used for driving various signalling apparatus, are also exhibited, as well as a "Walker" propeller-boring jig which ensures that all the bolt holes in the propeller hub shall be true. At the time of writing, this stand was also awaiting the arrival of samples of fireproof petrol and oil tanks.

The Improved Liquid Glues Co., Ltd.

This firm is showing samples of glued joints made with the famous Croid glue, which is so well known in the aviation world that it would be difficult to say anything new about it. Croid is, of course, used cold, a great advantage in practice, and its damp-resisting qualities are known to all the aircraft industry.

The Marconi Wireless Telegraph Co., Ltd.

This stand is one of the most interesting in the exhibition, showing as it does a variety of wireless outfits, from the large field and aerodrome installations, to small compact transmission sets suitable for carrying on board aeroplanes. It is impossible for us to mention in detail all the exceedingly interesting wireless instruments on this stand, but reference may be made to a new set which had just arrived on the stand at the time of our visit. This little transmission set was extremely compact and light, yet had a range of about 30 miles. It was so designed that the "box of tricks" containing the coils, valves, etc., can be mounted anywhere in the aeroplane, only the transmitter and the ammeter requiring to be mounted in the operator's cockpit. The amperage, by the way, is 1.5, and the whole outfit, in addition to being very handy and compact, is quite light, weighing, we should judge, less than 40 lbs., including generator. Direction-finding sets were also shown, illustrating the use of two different types of directional wireless : one in which the operator on board the aircraft works out his position according to the angle of certain ground stations, and the other by which ground stations obtain the angle of the aircraft and, having found that, send a message to the operator on board, giving him his position. Of the two methods, perhaps, the latter may be expected to become the more popular in commercial aviation, requiring as it does less skill on the part of the operator on board.

It should also be mentioned that a wireless station has been established at the E.L.T.A. by the Marconi Co., which is in touch with a number of wireless stations in France, Belgium and England. Any aircraft which is approaching the E.L.T.A. aerodrome, and is provided with wireless, can therefore find out beforehand the weather conditions at the time, the condition of the aerodrome, etc., which should prove of great value to aerial visitors to Amsterdam. Altogether, it is scarcely possible to overestimate the value of wireless, and the part it is bound to play in the development of commercial aviation, and as it is impossible for us to deal with this subject as it deserves in the limited space here at our disposal, we propose in the near future to publish a series of articles dealing with this important subject.

The Palmer Tyre, Ltd.

On this stand there is a very representative collection of Palmer aero wheels and tyres, covering a range from the small size wheels used on a motor scooter to the huge wheels, as tall as a man, used on the Handley Page V. 1500. The Palmer wheels are so well known that nothing remains to be said about them. Whenever aero wheels and tyres are mentioned there is one name which comes to mind instantly —Palmer.

R. S. Watling and Son, Great Yarmouth,

show a number of very fine specimens of the propeller builders' art, the airscrews shown being of excellent workmanship, with good long joints in the case of the four-bladers, and very highly finished off.

Geo. Williams and Co.,

of Alfred Place, Tottenham Court Road, have on view a very extensive collection of their "Adastra" clothing, and have, we understand, established an agency in Holland during the exhibition.

THE E.L.T.A. AERODROME

As already mentioned, one of the special attractions of the aircraft exhibition in Amsterdam, and one not usually found in connection with aero shows, is formed by the aerodrome adjoining the show. The presence of this aerodrome has meant not only a greatly increased attendance at the exhibition, but also that exhibitors have been able to fly their machines right to the doors of the exhibition, as it were, an opportunity of which nearly all the exhibiting firms have availed themselves. A further advantage of running an aerodrome in conjunction with the show is that firms are able to bring to the notice of the public a far greater number of their different types than would, for lack of stand space, have been possible in the exhibition itself.

The countries represented by machines on the aerodrome include Britain, France, Holland, Italy and Germany. This refers to a week or so ago, but as many of the aerial visitors to the E.L.T.A. aerodrome are of a migratory nature it is impossible to state definitely who is there and who is not. However, going back a week or so, as postal and telegraphic conditions force us to do, we obtain a fairly representative picture of the E.L.T.A. aerodrome as it is during most weeks.

Probably the machines which have done most passenger work up till now are the Avros, which are kept busy from morning till night taking up joy-riders. The fees charged, and this applies to all the firms, are fairly high compared with British standards, but it must be admitted that value is given for the money, passengers being taken over the harbours, rivers and part of the town itself, while those who so prefer are treated to a series of stunts, including loops, spins, rolls, etc. The Avro machines were flown over from England, landing at Evere, in Belgium, to replenish their fuel tanks. An Avro five-seater, piloted by Mr. Hinchliffe, accompanied by two mechanics, Hargreaves and Yates, also arrived by air, making a landing at Utrecht *en route*. Another Avro, piloted by Mr. Shanks, was unable to find the aerodrome, as it was getting dark, and made a landing in a field near Vondel Park, flying to the aerodrome the next morning. During our visit to the E.L.T.A. one of the Avro pilots—Mr. Brown, we believe—gave a very fine exhibition of night flying. The ground was illuminated by searchlights, and the Avro pilot signalled instructions to the searchlight operators by means of coloured signals. Two of the searchlights picked up the machine and kept it illuminated, while a third searchlight swung its beam horizontally so as to illuminate in turn all the hangars and pavilions of the aerodrome, thus giving the pilot his bearings. This accomplished, the pilot commenced a series of evolutions, still in the beams of the searchlights, and a very pretty sight it was. The pilot was hailed with applause on landing, and well he deserved it.

In addition to their exhibits on the stand, the Aircraft Manufacturing Co. had on the aerodrome two machines, both flown over from this country. One of these was a D.H. (Airco) 4 A, with Rolls-Royce engine, which was flown over by Capt. Saint, who covered the distance from London to Amsterdam, *via* Marquise, in a total flying time of 2 hrs. 35 min. The Airco 4 A is already so well known to our readers as to require no description here. It is, of course, the type which has done so much useful work during the Peace Negotiations, carrying statesmen to and from Paris. The second Airco machine on the Elta aerodrome is a D.H. 9, with B.H.P. (low-compression) engine. This machine was flown over by Mr. Eric Lawford, who will be remembered as the owner of the Champel biplane, and previous to that as a pupil at the Ewen flying school at Hendon. Mr. Lawford has now joined the large staff of pilots of the Aircraft Manufacturing Co., and after the Amsterdam show he will be back at Hendon again, where many of the old-time "boys" are gradually collecting.

On August 8 a Blackburn Kangaroo, piloted by Mr. Kenworthy, another old-time Hendon pilot, left Leeds and flew to Hounslow, where the necessary formalities were attended to, and the machine then left for Holland, Mr. Kenworthy being accompanied by five passengers. Darkness prevented the machine from reaching Amsterdam on the Friday, and a landing was made at Brussels at 8.30, where the night was spent. The next morning the Belgian King inspected the machine, and after a series of exhibition flights over Brussels the machine left for Amsterdam, which was reached in 1 hr. 35 mins. The Kangaroo has had its *fuselage* roofed over for a certain distance, thus providing cabin accommodation for a number of passengers. When our representative left Amsterdam last week the Blackburn was busy taking up passengers, which it did successfully in spite of the unsatisfactory condition of the aerodrome.

The British Aerial Transport Co. is represented, in addition to the two machines shown on their stand, by a Bantam and a passenger machine, the F.K. 26. The latter machine was piloted across by Maj. Draper, who was accompanied by Mr. and Mrs. Koolhoven and Mr. Tom van Laar, Mr. Koolhoven's chief engineer. In addition, some 200 lbs. of luggage was carried, as well as engine spares, spare wheels, etc., and a consignment of Cellon sheet for a Dutch firm (van Berkels). The machine flew over the shell swept zones of Belgium and entered Holland. Here Draper had a slight argument with his map, which failed to show a large sheet of water that could be seen below. Draper then came down low along a railway and Mr. Koolhoven read the name of a station, marking the position down on the map which was handed back to Draper, who then proceeded on his proper course. A landing was made at Soesterberg where the machine arrived at 7.35, having left Hounslow at 5.5, and thus doing the distance in 2½ hrs. At Soesterberg the party was entertained by the military aviators, who would not hear of them going on that day, and consequently the F.K. 26 did not reach Amsterdam until the Saturday. The Bat Bantam, piloted by Lieut. Duke, left England on the Saturday, stopping *en route* to see a friend at Antwerp, where he was detained by the Belgian authorities, who mistook the black and orange rings painted around the *fuselage* of the Bantam for German marks. However, he managed to "escape" and arrived at Amsterdam, where he gave a very fine exhibition of flying, much to the joy of the Amsterdammers. Without offending anybody, it may be said that the exhibition flights by Messrs. Draper and Duke on the Bat Bantam are some of the finest seen at the E.L.T.A. aerodrome, and since the arrival of these two pilots Herr Fokker, who up till then had been the idol of the visitors, has been obliged to take second or third place.

As already mentioned, the Handley Page firm, in addition to the V 1500 shown on their stand, have on the aerodrome a twin-engined type with a luxuriously furnished cabin seating 14 passengers. This machine, photographs of which were published last week, was flown across by Capt. Meintjes, a South African pilot, who was accompanied by a party of Dutch and English passengers. One of these was Mr. Tervooren, Editor of the weekly illustrated Amsterdam paper "Het Leven," who took a series of excellent photographs of the trip. A forced landing was successfully made at Breda, the weather being anything but favourable, with rain and mist. The next day the H.P. reached Amsterdam *via* Soesterberg. Owing to the bad condition of the aerodrome the machine sank into the mud and gently stood on her nose, without, however, sustaining any damage beyond a slight telescoping of her wireless mast. During our visit to Amsterdam the H.P. was not able to make passenger flights, as the ground, although getting better, was still too unreliable for such a heavy machine. Otherwise there is not the slightest doubt that the Handley Page would have been kept busy carrying passengers, as the comfortable cabin appealed very strongly to the visitors.

Messrs. Vickers, Ltd., had on the aerodrome one of their Vimy-Commercial machines, which was flown by Sir John Alcock and by Capt. Cockerell, the latter having flown it across from England, accompanied by a large party of passengers with their luggage. During this flight one of the passengers, Mr. Mullens, "filmed" the journey and took an excellent series of pictures of the start, the journey itself, "life on board" and the arrival at the E.L.T.A. This film was later shown at the Cinema de Munt, where it was greatly appreciated. As regards regular passenger carrying, the same applies to the Vickers as to the Handley Page, the ground was far too soft, although the little front wheel of the Vimy-Commercial was very effective in preventing the machine from turning on to her nose.

Apart from the Caudron and Breguet machines shown in the exhibition, France was only represented by one ancient type Caudron of the G 3 type, which, however, did a great deal of flying and, with its long skids, made light of the bad condition of the aerodrome.

As already mentioned, the two Italian machines, the Fiat and the Caproni, did not stay long at the aerodrome but were transferred to the show. A little S.V.A. two-seater, piloted by Signor Guglielmotti, remained at the 'drome and did quite a lot of flying. One does not altogether like the way this machine takes off, with its tail skid never leaving the ground during the preliminary run, but it appears to fly very well, and its pilot can make it do most of the things that an aeroplane can do, so probably it is only a matter of getting accustomed to it.

Holland is well represented on the aerodrome. We counted at least three different types of Fokker machines, a biplane with rotary engine, one with stationary engine, and a parasol monoplane. During the early part of the exhibition Herr

Fokker did quite a lot of flying, but since the arrival of some of the British pilots he is rarely seen. The task of upholding the honour of the Nederlands falls upon another Dutch pilot, Lieut. Versteegh, for whom we have nothing but praise. The way he handles a Fokker parasol monoplane, one of the cantilever type without external lift bracing, is little short of marvellous. He does steep climbs, tail slides, vertical banks, loops and rolls. We frankly admit that hitherto we had been under the impression that aeroplanes of the parasol monoplane type were tricky, having a nasty habit of side-slipping on the least provocation, but we must admit that Lieut. Versteegh somewhat altered our view by his exhibitions on the Fokker. All the same, we, if not the pilot, should feel much happier if the machine had one or two lift wires.

One of the Spyker school machines, to which reference has already been made, is also flying at the E.L.T.A. aerodrome, and for its low power, 80 h.p., flies remarkably well. There is a tractor biplane with enclosed passengers' cabin, which is usually known as a Fokker, but when we had a closer look at it we found it to have such a strong family resemblance to the German L.V.G. tribe that there can be little doubt that it belongs to that family. For a heavy type of machine it flies fairly well, and it could always be recognised in the air by the smoke issuing from the exhaust collector. In addition to this L.V.G., one noticed a couple of biplanes which were unmistakably Rumplers, probably captured and interned during the War.

Taking it all around, the E.L.T.A. show must be said to be a great success from the popular point of view, the attendance being extraordinarily good every day. That little business may be done immediately, except by passenger carrying and by a few accessories firms, must be admitted, but on the other hand the show will go a long way towards popularising aviation, and after all is said and done this is, perhaps, all than can be expected for the next couple of years. The propaganda work thus done cannot fail to be of great benefit once commercial aviation does become firmly established. We would like to impress this fact on those firms which were inclined to be a little disappointed at the absence of immediate business at the E.L.T.A. show.

In conclusion, the writer would like to express his indebtedness to Mr. van der Steen, Organising Manager of the British section at the E.L.T.A., who works like a Trojan for British interests, for valuable assistance, and also to the group of Dutch editors and journalists whom he had the pleasure of meeting in the Press room. Especially does he wish to express his thanks to Mr. G. J. Nijland, editor of the Amsterdam *Algemeene Handelsblad*, for his untiring assistance in getting passes, photographic permits, etc., and to Mr. J. C. E. Sand, of *De Telegraaf*. The kind assistance and advice of these gentlemen, all of whom speak English fluently, have been of the greatest value, and have rendered the task of reporting the exhibition very much easier than it would otherwise have been.

HONOURS

G.B.E. for Sir F. Sykes

It was announced in the *London Gazette* of August 26 that the King has conferred the appointment of a Knight Grand Cross of the Order of the British Empire (Military Division) upon Major-General Sir Frederick Hugh Sykes, K.C.B., C.M.G., Retired List, late Royal Air Force, "for distinguished services to aviation in general, and in particular for invaluable work as former Chief of the Air Staff."

Honours for Crew of R. 34

It was announced in a supplement to the *London Gazette* on August 23 that the King has been pleased to give orders for the following appointment, in recognition of distinguished services to aviation :—

C.B.E. (*Military Division*)

Maj. George Herbert Scott, A.F.C., R.A.F., Commander of H.M. Airship R. 34 on the outward voyage to United States of America and also on the homeward journey.

The King has been pleased to confer the following rewards in recognition of distinguished services rendered to aviation, in the successful voyages of airship R. 34 from the United Kingdom to the United States of America and back.

Outward journey.—Left East Fortune at 1.42 a.m., July 2, 1919, and arrived at Hazlehurst Field, Long Island, at 1.54 p.m. (G.M.T.), July 6, 1919. (Duration, 108 hours 12 minutes.)

Homeward journey.—Left Long Island 3.54 a.m. (G.M.T.), July 10, 1919, and arrived at Pulham, Norfolk, at 6.57 a.m., July 13, 1919. (Duration, 75 hours 3 minutes.)

Royal Air Force

Air Force Cross

Col. (A./Brig.-Gen.) Edward Maitland, C.M.G., D.S.O.
Capt. (A./Maj.) Gilbert George Herbert Cooke, D.S.C.
Lieut. Guy Harris.
Sec. Lieut. John Durham Shotter.

Air Force Medal

No. 206345 Flight-Sergt. William Rose Gent.
No. 200965 Sergt.-Major. II. Walter Robert Mayes, D.S.M.
No. 314353 Flight-Sergt. Walter James Robinson.
No. 200079 Flight-Sergt. Reginald William Ripley.
No. 201741 Flight-Sergt. Norman Albert Scull.
No. J./3349 Sergt. Herbert Murray Watson, D.S.M.

Foreign Honours for R.A.F. Officers

It was announced in a supplement to the *London Gazette* on August 23 that the King has granted unrestricted permission for the wearing of the following decorations, conferred on the officers and other ranks indicated for valuable services rendered in connection with the War :—

Royal Air Force

By the President of the French Republic

Legion d'Honneur, Officier.—Maj.-Gen. Sir F. H. Sykes, K.C.B., C.M.G. (Ret. List).

Legion d'Honneur, Chevalier.—Lieut.-Col. G. W. F. Fraser, O.B.E. ; Capt. (A./Maj.) G. Gude, O.B.E. ; Maj. C. A. L. Harrison, O.B.E. ; Capt. L. E. Innes-Baillie (R.M.L.I.).

Croix de Guerre, avec Palme.—Capt. A./Maj.) E. J. Briscoe, O.B.E. ; Capt. C. B. Dalison, A.F.C. ; Lieut.-Col. R. B. Davies, V.C., D.S.O. ; Maj. C. Draper, D.S.O. ; Capt. W. L. Elder, C.M.G., R.N. (formerly R.N.A.S.) ; Lieut. W. J. Gillespie, 41 Sqn. ; Capt. J. A. Glen, D.S.C. ; Maj. H. P. L. Higman, D.F.C. ; Lieut. J. D. Newberry (deceased) ; Capt. L. V. Pearkes ; Lieut. E. C. Potter ; Wt. Offr., Cl. II. (now Sec. Lieut.) J. Rees.

Croix de Guerre, avec Etoile, en Vermeil.—245207 Sergt.-Mech. J. P. Hazell, 107th Sqn.

Medaille d'Honneur avec Glaives, en Argent.—216604 Sergt.-Obsr. W. J. Middleton, D.F.M.

Medaille d'Honneur avec Glaives, en Bronze.—25970 Pte. A. Weickers ; 8259 A./Mech. II. C. H. Cobden.

By the King of Italy

Officer of the Order of St. Lazarus.—Lieut.-Col. (A./Brig.-Gen.) R. H. More, C.M.G., C.B.E.

Cavalier of the Order of St. Maurice and St. Lazarus.—Maj. A. McAlister ; Lieut. L. F. de Peyrecave.

Cavalier of the Order of the Crown of Italy.—Maj. R. P. Whitehead.

By the King of the Belgians

Medaille de la Reine Elizabeth.—Asst. Admtr. Miss M. S. Cole-Hamilton, W.R.A.F.

By the King of Rumania

Officer of the Order of the Crown, with Swords, and Knight of the Star of Rumania, with Swords.—Capt. (A./Maj.) F. S. Moller, M.C., D.F.C.

By the Bey of Tunis

For Services at Bizerta

The Order of Nichan Iftikhar, Third Class.—Lieut. F. H. Bell (Flying Officer) ; Lieut. A. V. Gash ; Lieut. A. Smith (Flying Officer).

Order of Nichan Iftikhar, Chevalier, Classe 1.—209246 L.A.C. F. Blight (St. Austell) ; 208551 A./C.1 G. C. Crane (Stratford) ; 206142 L.A.C. F. Coward (Ventnor) ; 211479 L.A.C. S. Reeve (Norfolk) ; 209464 L.A.C. A. F. Mason (Newmarket) ; 206403 L.A.C. E. Thompson (Wimbledon).

Correction

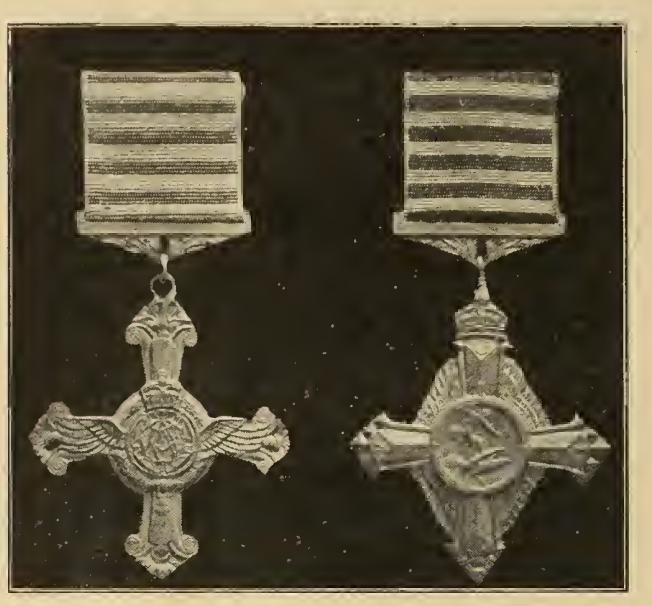
Maj. James Percy Carre Cooper, O.B.E., M.C., 10th Bde. (France), is the correct description of the officer awarded the Star of Roumania, Officier, in the *Gazette* of July 15, 1919.

Foreign Decorations for the R.A.F.

As a considerable number of officers and other ranks of the R.A.F. have been awarded a foreign decoration during the war and have not yet received the insignia, a list of such cases is being compiled by the Air Ministry with a view to the decorations being obtained. Officers and other ranks concerned (*a*) who have now been released from the service or (*b*) who are not serving either abroad or in the area commands at home, are accordingly requested to communicate with the Secretary, Air Ministry, quoting A.M.W.O. 946 and giving the following particulars : Air Force number ; rank ; full Christian names and surname ; designation of decoration not received ; date (approximately) of *Gazette* in which notification of award was made ; and full postal address.

AIRISMS FROM THE FOUR WINDS

As an example of a Hun War-Kultur legacy to the world in general, the indiscriminate laying of floating mines will be hard to beat, accepting as facts the statements upon the subject as set out in a paper to the French Academy of Sciences by the Prince of Monaco, who for many years has been known as one of the leading European oceanographers. The paper deals with the probable route of these floating mines in the North Atlantic and Arctic Oceans.



The Distinguished Flying Cross and **The Air Force Cross.**

The Prince's conclusions are based on observations which he has made over a series of years on ocean currents. To avoid confusion from the effects of surface wind-driftage, he employed the device of dropping objects weighted so that they would float just under the surface.

He is of opinion that mines sown or set adrift in the North Sea will wander along the northern coasts of Europe until they are finally swept into the fjords of Norway. Those which have been set free on the Atlantic coasts of Europe will fall into the system of currents dominated by the Gulf Stream. Some, no doubt, will be held up on the Canaries or the Antilles, others will fall into, and find difficulty in emerging from, the Sargasso Sea, the great Atlantic whirlpool. Those that escape these obstacles will float down the coasts of Europe and of North Africa, travel across to the West Indies, return by the Gulf Stream, and then either renew their journey or pass up the West of Ireland to end in the Arctic ice or Norwegian fjords. The average speed of these journeys is about 5 miles in 24 hours, so that the return voyage from the Channel to the West Indies would take about four years.

- - -

The great American war correspondent, Irvin Cobb, who weighs 20 stone, and every ounce of him genial and humorous (he boasts of his bulk in an easy Chestertonian way, so we need feel no diffidence in mentioning it), had an interesting experience in the early days of the war, being the only civilian to be permitted an ascent in a German observation balloon.

We quote from his description :—

"On observation balloons, in time of war, no casualty insurance is available at any rate of premium. I believe those who ride in them are also regarded as highly unsuitable risks. My pilot was successor to a man who had been burned to death in mid-air a week before, and on the day before a French airman had dropped a bomb from the clouds that had missed this same balloon by a margin of less than 100 yards—no bad cast, all things considered. I clambered into the overgrown clothes hamper, wherein we had to stand back to back, the canvas saddle between us and the telephone in front of the lieutenant, where he could reach the transmitter by stooping a little.

"I looked up at the balloon's flaccid abdomen above me, which flinched in and puffed out, and the snout wobbled to and fro. The lieutenant explained, with a tinge of polite regret in his voice, that he was sorry I had not put on a uniform overcoat before boarding the car, as in the event of the cable parting and our drifting over the Allies' lines and descending, I should most certainly be shot as a spy before I had a chance to explain. 'However,' he added consolingly, 'these possibilities are most remote. The rope is not likely to break, and if it did we should both probably be dead before ever we reached the earth.'"

The fascination of aviation: Mr. G. T. F. Hunter, late R.A.F. pilot, who lost the use of both legs through a crash while on service, now takes the air at Hendon as a passenger

Having done his duty as a host, the lieutenant gave the order to pay out the cable, and Cobb became sufficiently occupied between his tendency to be air-sick and watching the rapidly receding earth. From his high vantage point he could readily pick out the French infantry, red-trousered, "like cochineal insects" crawling over the green-yellow face of a ridged field. "Some of them got there, and some did not. Certain puff balls of white smoke and one black smudge of high-explosive broke over them and among them, hiding all from sight for a space of seconds. Dust clouds succeeded the smoke, and then the dust lifted slowly. Those ants were not to be seen. They had altogether vanished. It was as though an ant-eater had come forth invisibly and eaten them all up. Marvelling at this phenomenon and unable to convince myself that I had seen men destroyed, not insects, I turned to watch another line of red ladybugs that had been painfully crawling nearer by. Lo! they were gone too! Either they had reached shelter or a painful thing had befallen them. The telephone spoke a brisk warning. 'I think we should return at once,' said the lieutenant. 'Are you sufficiently wearied?' An Allied aviator had been signalled."

- - -

The magic mantle of Jules Verne (do you remember the imperturbable Captain Nemo?) seems to have descended as by right to Mr. Rudyard Kipling. In his story "With the Night Mail," he tells of a new type of aircraft, metallic and enclosed, which may yet crystallise from dream into reality. The description of the engine-room of this craft (which runs 16 seconds to the mile) is as suggestive as it is plausible :—

"Here we find Fleury's paradox of the bulk-headed vacuum, which we accept now without thought, literally in full blast. The three engines are H.T. and T. assisted-vacuo Fleury turbines running from 3,000 to the limit—that is to say, up to the point when the blades make the air "bell"—cut out a vacuum for themselves precisely as over-driven marine propellers used to do. . . . The turbines whistle reflectively. From the low-arched expansion tanks on either side the valves descend pillar-wise to the turbine chests, and thence the obedient gas whirls through the spirals of blades with a force that would whip the teeth out of a power-saw. Behind is its own pressure held in leash or spurred on by the lift-shunts; before it, the vacuum where Fleury's ray dances in violet-green bands and whirled turbillons of flame. The jointed U-tubes of the gas-chamber are pressure-tempered colloid (no glass would endure the strain for an instant), and a junior engineer with tinted spectacles watches the ray intently. It is the very heart of the machine, a mystery to this day. Even Fleury, who begat it . . . could not explain how the restless little imp shuddering in the U-tube can, in the fractional fraction of a second, strike the furious blast of gas into a chill greyish-green liquid that drains (you can hear it trickle) from the far end of the vacuum through the eduction-pipes and the mains back to the bilges. . . . If a speck of oil, if even the natural grease of the human finger touch the hooded terminals, Fleury's ray will wink and disappear and must be laboriously built up again. This means half a day's work for all hands and an expense of one hundred and seventy odd pounds to the G.P.O. for radium-salts and such trifles."

Air and Water
DID YOU 'BRING ANYTHING WITH YOU, FROM SCOTLAND, EH?
R.34

"DRY" HUMOUR. (*Dallas News.*)

A WEIGHTY PROPOSITION: Stout Lady (*about to "go up"*): **"I wonder if you could accommodate me in the front seat? I should have so *much* more confidence, and besides I'm *so* interested in your instruments."**

-

In primitive times the catapult and the sling formed the "last argument of kings," but now our alchemists brew the means of death in retorts, and the bowels of the earth are wracked for new and improved solutions of continuity. Among the necessary war materials are manganese, chromium, tungsten, nickel, cobalt, molybdenum, vanadium, uranium, antimony for hardening lead bullets, magnesium for smoke shells, nitric acid and iron disulphide for explosives, mercury for detonators, mica for gasmasks and platinum.

◆ ◆ ◆ ◆

An Airship Over Berlin

For the first time in nine months, a German airship flew over the housetops of Berlin, on August 24, writes *The Times* correspondent in the German capital. This airship, named the Bodensee, will convey passengers and mails between Berlin, Munich and Fredrichshafen.

The Bodensee is shaped like the British R 34. and is unlike the former Zeppelins. It is 394 ft. long, and carries 35 passengers. Yesterday it attained a speed of 75 miles an hour.

German Aviators Catch Smugglers

According to a story from Berlin an attempt to smuggle 20,000,000 m. to Switzerland from Berlin was frustrated by the action of aviators. The smugglers left Berlin on the afternoon of August 18 by the Basel express. When the police received this information three aeroplanes started off in pursuit, and succeeded in overtaking the train at Nurnberg, where the smugglers were arrested and the 20,000,000 m. were confiscated.

Aerial Police for Germany

In the reorganisation of the German police system the authorities are evidently determined to bring it right up to date. It is stated from Berlin that a network of aerial police patrols has been organised, one of the chief duties of which will be to prevent the migration of capital from Germany, in addition to fighting against criminals generally. A landing-place for police aeroplanes is already being laid out on the Swiss frontier. Similar establishments are planned for Hamburg, Hanover, Breslau, and other towns.

THE LONDON FLYING CLUB, HENDON

EVERYONE knows the old story of the countryman at the Zoo, who being asked what he thought of the giraffe which he then saw for the first time, after a pause, which could almost be heard, muttered : " Well, I don't believe it."

In somewhat similar vein a month or so back, our thoughts were inclined to march in sympathy with that yokel when we heard forecasts of the London Flying Club which was then in course of completion at the Hendon Aerodrome. The picture painted of what was to be the outcome of this scheme to provide London society with a real country club in London, with the added attraction of a Flying Club and all that that carries with it, was so elaborate that it was not easy to visualise what was really going on at Hendon—one has become so accustomed to roughly fashioned and none too sightly hangars, whether in canvas, wood or otherwise. But a casual visit the other day to the Grahame White 'drome and works down by Collingdale Avenue, served as an excuse to " drop in " at the other side of the scene and have a peep at what really was being accomplished in readiness for the launching of the London Flying Club. Surprise is hardly the word. Frankly we were utterly astounded at what we saw. Instead of the anticipated more or less flimsy erections "in series " which we expected to encounter, upon arrival at the Club main gates, our car passed through and round a broad gravelled drive to the entrance to the Club itself, where were hall porters and attendants in Club uniform, immediately in evidence to attend to members or their friends. Therefore, we argued, the Club must already be in actual operation. And in another moment, upon actually entering the hall, this idea again forced itself forward. But a second or two and Mr. Claude Grahame White was notified of a visitor. During the short interval pending his arrival from some remote part of the range of buildings, we entered the reception hall of the Club with an instant feeling of comfort, luxury and content gradually spreading over us in spite of the pelting ghastly rain out of which we had just passed. Scattered about in apparent haphazard positions were roomy armchairs of all shapes and sizes, settees in keeping which, with their big downy-looking cushions, seemed to silently invite to repose ; around the walls were writing tables at regular intervals, whilst in squares enclosed by more settees were collections of huge palms and cool-looking ferns, which on the torrid day of our visit were a very welcome antidote to the general sun-heat prevailing. Glancing through the tall windows of this capacious lounge, in the forefront a delightful series of lawns with garden seats by the hundred, and a plashing fountain on the wide terrace which runs the entire length of the Club building, met the view. On the lawns were hard tennis courts in play, with an old-world garden stone path ending with a summer-house, dividing the courts. And away beyond is a grand stretch of level grassland with a natural background of stately trees stretching away to the right as far as the range of sight reached. Here some 80 acres are available for the Club's actual flying members and their friends, and for the future development of sports, as circumstances may in the immediate future call for.

In this connection arrangements include provision for polo, golf, squash rackets, covered tennis-courts, real ice-skating, etc.

During these few moments of looking round, Mr. Grahame White, the prime mover in this delightful transformation of what was originally a portion of the old Hendon aerodrome, had materialised and under his guidance the rest of the really attractive Club premises were revealed. Adjoining the lounge and coupled up with it by a well-appointed "corridor," of such spacious dimensions as really to constitute a " junior " lounge, the ball-room was the next item. Here again the most admirable taste and forethought has been exercised in planning as charming a dancing-room as can be seen either in or out of London. It required no emphasising to convince that 2,000 could easily be accommodated in this building, whilst a very suggestive provision for future entertainment is provided at one end in the form of a large stage, suitable, we should say, for the production in reason of almost any ordinary play. Hereon to start with will perform the Club's bands—a Hawaiian orchestral combination is the attraction which has been secured for the opening months of the autumn. At the opposite end of the " corridor " is the main dining-room, where accommodation for a very large number of members is provided for. As to the cuisine and cellar, which later we were able to sample, if there were nothing else to attract at the L.F.C. this side of the new Club will probably quickly draw Hendon-way the cream of those who appreciate the *haute cuisine* with good service, midst charming surroundings. It was an experience afterwards to wander through the kitchen and its " satellites " which makes the exceptional service at all possible. No point of up-to-dateness has here been overlooked, not forgetting a very complete refrigerating plant. Everywhere the guiding hand of experience emerges in the result. Round the huge " kitchener " in the centre of this organisation of " service " is ranged a series of sub-departments, each so placed and equipped as to ensure the minimum of walking for the staff—an important provision—the least confusion and the highest efficiency throughout the system. Wherever possible electricity has been harnessed to do the work usually and wearily carried through by hand, and the white-tiled walls, which are characteristic of this section of the Club, suggest the impossibility of anything but the most perfect cleanliness.

A move was then made to the upper floor, where, facing the sports ground, a large, light library and writing-room occupies one corner, whilst another noble apartment adjoining caters for the card-playing section of the Club. Side by side with these are dressing-rooms, where both sexes can before and after play ensure comfort in attire and the luxury of a bath, etc., to follow the exertions of their particular sport. And then, beyond, right round the great building run corridors, off which the 80 bedrooms, which form a not unconsidered part of the members' accommodation, range, besides the necessary attendants' offices, bath-rooms, etc. A feature of these bedrooms is that hot and cold water is provided in every one, thus again economising labour, and a Government telephone is also installed in each of the apartments, available either for internal inter-communication or for the ordinary 'phone service, including trunk calls. In these days of increased cost what the entire undertaking means in £ *s. d.* makes one to think furiously, for no item which tends to comfort has been overlooked in equipping this the latest addition to London's outlets for boredom. Possibly the gross cost has been somewhat discounted by reason of Mr. Grahame White having elected to be his own contractor, and he has carried this through even to the furnishing of the place, the whole of this item having been manufactured " upon the premises " by the G.W. Co. Altogether it is hardly surprising to learn that practically without exception every visitor to the L.F.C. has put his name down for election as a member and that already, although the Club can hardly be said to have opened its doors yet, quite a lengthy list for the committee to go through is on hand, and by the time, about the middle of September, when the President of the Club, Lord Lonsdale, presides at the formal inauguration of the Club, a formidable first list of members should be in being. In the list of vice-presidents is found a number of leaders in the worlds of fashion and of sport, and with the backing which the Club now has, it is fairly safe to prophesy that it should be *the* vogue commencing with its opening. Ample provision has been made for the convenience of members getting to the Club, by a range of Club cars and other larger conveyances, either direct from town, where the L.F.C. headquarters are at the Ritz Hotel, or from Golders Green station or any other point of attack.

Altogether those mainly responsible, working with Mr. Grahame-White, for the carrying through of this important undertaking are to be heartily congratulated. Mr. W. H. Mathews, one of the Directors of the G.W. Co., throughout has given his attention to the plans, architectural work, etc., whilst Signor Nobilli, the Manager of the Club, late of Claridges, Ranelagh, etc., has given invaluable aid in devising and installing the model systems of service which are such a strong point.

The secretarial arrangements are in the very capable hands of Maj. G. B. Ollivant, to whom, at Hendon, any inquiries as to membership, etc., should be addressed. Election is by ballot, but members of the Service, sporting and other leading clubs have the privilege of going for election without the formality of a proposer or seconder. The subscription is moderate for the accommodation provided, and members of the Royal Aero Club and R.A.F. officers, past or present, have special consideration respectively in regard to modified subscriptions. In conclusion, we wish the Club a highly successful future, and can well imagine that before long late joiners-up will find that it has become necessary to enforce an entrance fee, which for the moment is not being imposed.

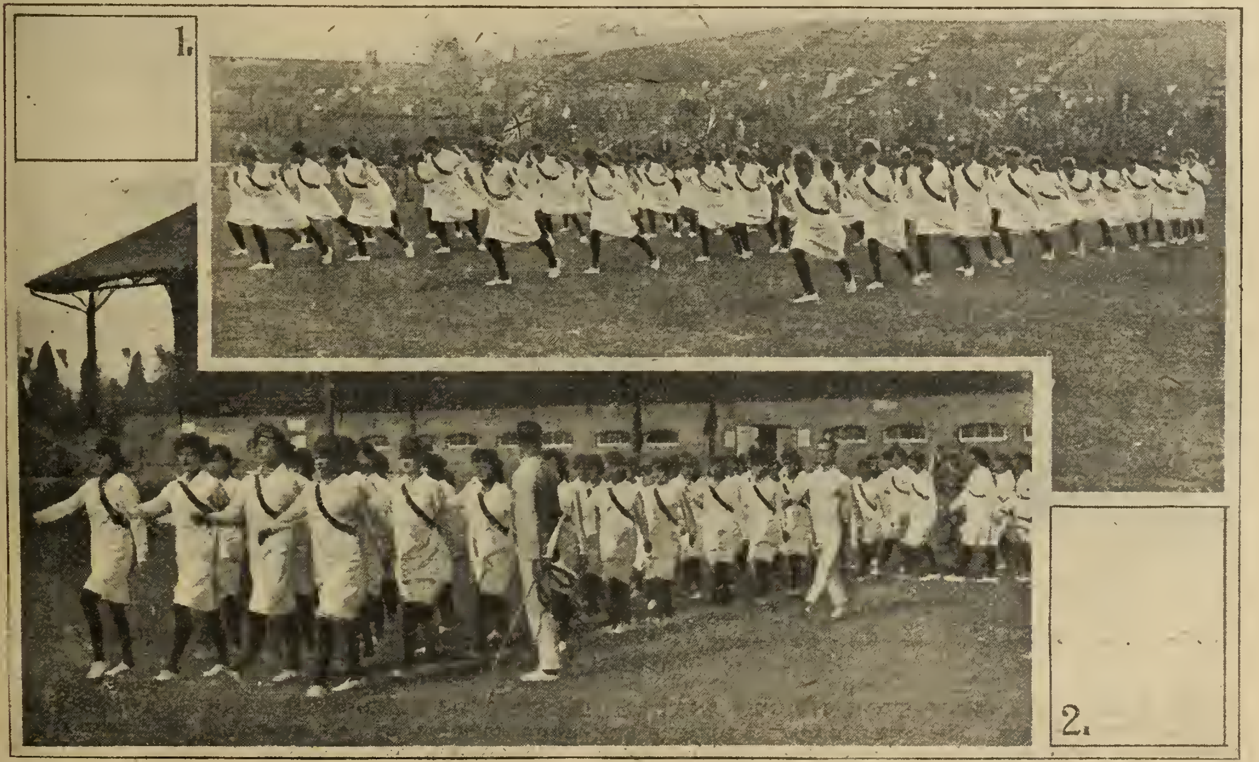
THE R.A.F. SPORTS

"Flight" Copyright

At the R.A.F. Athletic Association's meeting, Stamford Bridge. A parade of competitors before the meeting

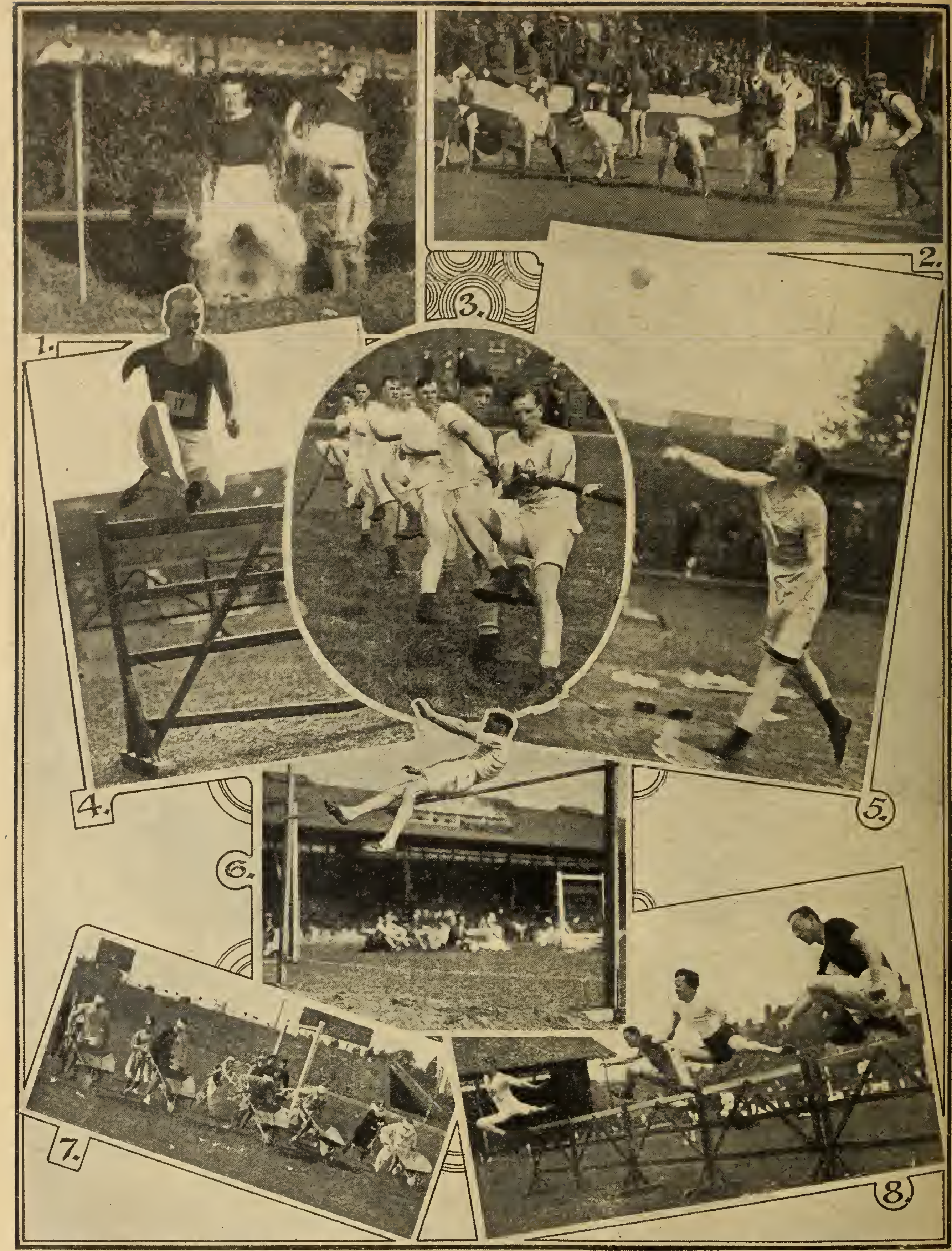
Excellently organised and well conducted, the sports held by the R.A.F. Athletic Association at Stamford Bridge were a great success. The 30 events on the card provided a great deal of sport and the competition in the 19 events which counted for the King's Cup—awarded to the area compiling most points—was especially keen. When the runners went to their marks for the mile relay race the South-Western Area and the Midland Area were level. In that event, however, the Midland team dropped their flag, and victory went to the South-Western, who won the race from the Northern Area and secured the trophy. Some good individual performances were accomplished—notably by the old Pauline captain, A. P. Mitchell, who won the quarter-mile in 51 3-5 sec.; by Capt. Gibbs, who won the mile in 4 min 34 1-5 sec.; and by Capt. Irwine, who won the three miles after a close race with Sergt. C. I. Clibbon in 15 min. 15 3-5 sec. Good long-jumping by Flying Officer Fraser, who won his event at 21 ft. 4¾ ins., and a physical training display by the Women's Royal Air Force were further noteworthy features.

Three-mile Race.—Capt. Irwine (Northern Area), 1;



"Flight" Copyright.

Physical Training display by the W.R.A.F.s at the R.A.F. Athletic Association's meeting



"Flight" Copyright

R.A.F. ATHLETIC ASSOCIATION'S FIRST ANNUAL MEETING AT STAMFORD BRIDGE, AUGUST 21.—1. Pals' obstacle race. The water jump. A study in expression when taking their medicine. 2. Start, in quite professional form, of W.R.A.F. relay race. 3. Tug-of-War. The winning team, Midland Area, had a style of their own; in "taking the strain" all had one leg in the air, which in unison came down with a thud on the word "Pull." 4. Capt. Cording, with one arm, won his heat in the 120 yards hurdle race. 5. Putting the shot. Winner, Capt. Jones, putting the winning shot. 6. High jump. Sergt.-Major Miller clearing 5 ft. 8 ins. He tied for first place with Lieut. F. C. Penny. 7. Blindfold chariot race in fancy dress. 8. A heat for the 120 yards hurdles. The nearest to camera won

Sergt. C. I. Clibbon (Halton), 2; A. C. Pratt (S.E. Area), 3; Capt. Austin (R.A.F., Rhine), 4. Won by a yard. Time, 15 min. 15 3-5 sec.

W.R.A.F. Relay Race (440 yds).—S.W. Area, 1; Halton, 2; Northern Area, 3. Won by 8 yds. Time, 57 1-5 sec.

440 Yards Race.—Capt. A. P. Mitchell (Halton), 1; Cpl. Bosberry (R.A.F., Rhine), 2; Sergt. Poigndestre (S.E. Area), 3; Lieut. Jones (R.A.F., Rhine), 4. Won by 12 yds. Time, 51 4-5 sec.

One Mile Race (open to members of Imperial Allied Forces).—Lieut. R. D. Chalmers (A.I.F.), 1; Dvr. W. G. Battersbie (R.F.A.), 2; H. C. H. Ashby (late R.A.F.), 3; Sergt. R. H. Geary (R.A.F.), 4. Won by 20 yds. Time, 4 min. 51 1-5 sec.

880 Yards Race (open to former members of the R.A.F.).—Cpl. P. A. Beard, 1; Cadet J. Noble, 2. Won by 10 yds. Time, 2 min. 9 4-5 sec.

One Mile Race (R.A.F.).—Capt. Gibbs (Midland Area), 1; A. C. Nix (S.W. Area), 2; Flight-Sergt. Darlington, 3. Won by 15 yds. Time, 4 min. 34 1-5 sec.

100 Yards Race.—Sergt.-Maj. Mawbey (Midland Area), 1; Sergt.-Maj. Kressler (Northern Area), 2; Cpl. Bosberry (R.A.F., Rhine), 3. Won by half a yard. Time, 10 3-5 sec.

880 Yards Race.—Flying Officer Shaw (S.W. Area), 1; A./M. Morris (Midland Area), 2; Lieut. Catchpole (Northern Area), 3. Won by 10 yds. Time, 2 min. 3 2-5 sec.

120 yards Hurdles.—Flying Officer Fraser (S.W. Area), 1; Flight-Lieut. Scott (S.W. Area), 2; Lieut. Bellin (R.A.F., Rhine), 3. Won by 5 yds. Time, 17 1-5 sec.

880 Yards Race (for Enlisted Boys).—Snaith (Northern Area), 1; T. Weatherall (S.E. Area), 2; Fox (Midland Area), 3. Won by 6 yds. Time, 2 min. 9 1-5 sec.

220 Yards Race.—Sergt.-Maj. Mawby (Midland Area), 1; Capt. A. P. Mitchell (Halton), 2; Sergt. Clarkson (Midland Area), 3. Won by 3 yds. Time, 23 1-5 sec.

100 Yards Race (Imperial and Allied Forces).—Sergt. Wilson (New Zealand), 1; Dvr. L. J. Hume (Australia), 2; Lieut. N. V. Webbe, 3. Won by a yard, after a dead-heat. Time, 10 3-5 sec.

Tug-o'-War.—Midland Area beat R.A.F., Rhine, by two pulls to none.

High Jump.—Lieut. F. C. Penny (Irish Group) and Sergt.-Maj. Miller (Midland Area) tied at 5 ft. 7 ins. for first place; Lieut. Walmsley (Midland Area), 5 ft. 3 ins., 3.

Putting the Weight.—Sergt.-Maj. Mawby (Midland Area), 32 ft. 3 ins., 1; Lieut. Fish (Midland Area), 32 ft. 2; Capt. Jones (Northern Area), 31 ft. 8½ ins., 3.

Long Jump.—Flying Officer Fraser (S.W. Area), 21 ft. 4¾ ins., 1; Flight-Lieut. Scott (S.W. Area), 20 ft. 7 ins., 2; Maj. Saul (R.A.F., Rhine), 20 ft. 6½ ins., 3.

One Mile Relay Race.—S.W. Area, 1; Northern Area, 2. Won by 12 yds. Time, 3 min. 47 1-5 sec.

Composite Relay Race (Field Officer, Officer, Warrant Officer, N.C.O., or Man, each to run 100 yds; W.R.A.F. to run 40 yds).—Midland Area, 1; Northern Area, 2; R.A.F., Rhine, 3; South-Eastern Area, 4. Won by 6 yds. Time, 49 4-5 sec.

AVIATION IN PARLIAMENT

Air Ministry Clerks' Holidays

MR. ANEURIN WILLIAMS, in the House of Commons on August 11, asked the Under-Secretary of State to the Air Ministry whether girl clerks in his Department receive 12 days' holidays and men clerks 28 days; and, if so, what is the reason for the difference?

Major-Gen. Seely: The leave of temporary clerks, to whom I assume that my hon. friend is referring, is governed by the rules made by the Treasury, and is the same for both males and females, the minimum being 12 working days, or one day for each month's service. The leave of permanent Civil servants is governed by a different set of rules, also made by the Treasury. If my hon. friend wishes for further information, perhaps he would be good enough to put a question to my hon. friend the Secretary of the Treasury.

Medal for Anti-Aircraft Service

MR. J. JONES, on August 12, asked the Secretary of State for War if he will reconsider the question of granting the general service medal to the members of the anti-aircraft service who rendered such valuable services during the War?

Capt. Guest: As I have already stated, the question of an award to those who served at home during the War is under consideration. I would refer the hon. member to my reply on Tuesday last to the hon. and gallant member for Wavertree.

Mr. J. Jones: Is the hon. and gallant gentleman aware that large numbers of these men were actually in danger, while some men who have the medal were never near the firing line and were never in any danger?

Capt. Guest: There is a certain amount of truth in what the hon. member says, but the Committees which have been considering this have been composed of men who have taken part in the operations and have also been on home service during the War, and the War Office has been very largely guided by their advice.

R.A.F. Demobilisation

SIR W. JOYNSON-HICKS, on August 13, asked the Under-Secretary to the Air Ministry how far demobilisation of the Air Force and Ministry, in men, hotels, and flying grounds, has proceeded since the date of the Armistice?

Major-Gen. Seely: So far as officers and other ranks of the Royal Air Force are concerned, I would refer my hon. friend to the figures I gave in my speech of yesterday. So far as the Women's Royal Air Force is concerned, the strength at the time of the Armistice of officers and other ranks were 532 and 23,485 respectively; the corresponding figures for August 1 were 407 and 15,700. I also gave yesterday the number of officers employed in all departments of the Air Ministry at the date of the Armistice and the present strength, but on reference to the report of my speech, I see that I am reported as having said that the figures in question, namely, 806 and 402, referred to the staff of the Ministry in all departments. The figure I quoted from the paper before me referred to the officer staff. The total strength of the Air Ministry departments on November 11 was 4,640, and the corresponding figure for August 1 was 3,230. It must be remembered that the staff of the Civil Aviation Department has been added during this time. Arrangements are in contemplation for further considerable reductions to be made during the next two months, and the transfer of the Air Ministry from the Hotel Cecil to Kingsway, which has now taken place, is expected to facilitate such reduction. As regards the surrender of flying grounds, I would again refer my hon. friend to my speech of yesterday, and as regards the evacuation of hotels the reply I made on the 7th inst. to the hon. and gallant member for Leith.

Central Pay Office; Errors in Payments

CAPT. SIR DOUGLAS HALL asked the Under-Secretary of State to the Air Ministry what action is taken if the central pay office of the Air Force pay a man too much on his being demobilised or otherwise, and find out their mistake and demand it back from the man and he declines to return it?

Major-Gen. Seely: It is not possible to give a general reply to this question. Each case is dealt with on its merits.

Suffolk Aerodromes and Release of Labourers

LIEUT.-COL. GUINNESS on August 14, asked the Under-Secretary of State to the Air Ministry whether he had now given instructions to release from the Orfordness and Aldeburgh aerodromes agricultural labourers employed there, so that their labour might be available in the harvest field in that district of Suffolk; and whether these men employed at Orfordness and Aldeburgh were amongst the 70,000 whom Sir J. Hunter described as not having earned their money?

Major-Gen. Seely: The men at Aldeburgh and Orfordness, employed on the removal of the surplus material referred to in my previous answer to my hon. and gallant friend's question of July 16, have now been reduced to six and 33 respectively. Instructions have been issued to the resident engineer-in-charge that any *bona-fide* agricultural labourers included amongst them shall be immediately released for work on the land. There are, in addition, 40 men who have been employed for some weeks by the Air Ministry on the very urgent work of repairing sluices and sea-walls. I understand that some local labour may be included in this number, but as it is considered that such labour is the most suitable for the purpose, it is not possible to dispense with these men until their work is finished, which it is expected will be in about a month from now. I am not aware whether Sir J. Hunter had in mind Aldeburgh and Orfordness when he made the statement referred to.

Lieut.-Col. Guinness: Has the work on this aerodrome been carried on under the "time and line" contract system, under which the more money a contractor manages to expend the greater his reward?

Major-Gen. Seely: I must have notice of that.

Lieut.-Commander Kenworthy: Were these two aerodromes not started to meet the submarine menace?

Major-Gen. Seely: The hon. and gallant member is in error in thinking that. They were started long before the war.

British Army and Air Forces Statistics

MAJOR FARQUHARSON asked the Secretary of State for War the total number of men who have served in the Army and Air Forces from the commencement of the war till November, 1918, and the total number discharged from these Services to the end of July, 1919; the total number discharged invalided to the same date; the total number receiving pensions who were discharged not invalided; and the total number discharged not invalided who have applied for pensions but whose pensions have not yet been awarded?

Mr. Forster: The figures asked for in the first three parts of my hon. and gallant friend's question are as follows:—

Number of men who have served in the Army and Royal Air Force from the commencement of the war till November, 1918 ..	5,756,252
Number discharged or demobilised to the end of July, 1919	3,719,950
Number discharged invalided to the end of July, 1919	722,903

The above figures do not include the Royal Naval Air Service up to March 31, 1918. As regards the last two parts of the question, I would refer my hon. and gallant friend to my right hon. friend the Minister of Pensions.

Railway Warrants for W.R.A.F. Members

MR. F. C. THOMSON, on August 18, asked the Under-Secretary of State to the Air Ministry whether it has now been decided to give free railway warrants to members of the Women's Royal Air Force when proceeding home on leave?

Maj.-Gen. Seely: Officers and other ranks of the Women's Royal Air Force serving in the United Kingdom are not given free warrants when proceeding on leave; but officers and other ranks serving overseas receive two free warrants a year. In July last, as a special concession, those officers and other ranks who had been unable, owing to the exigencies of service, to take leave at Christmas, 1918, were granted a free warrant in respect of leave taken prior to August 31.

Female Civilian Subordinates

LIEUT.-COM. KENWORTHY asked the Under-Secretary of State to the Air Ministry how many women, other than members of the Women's Royal Air Force, were employed by the R.A.F. on January 1, July 1, and August 1, 1919?

Maj.-Gen. Seely: The number of female civilian subordinates employed by the R.A.F. (exclusive of the female staff at the Air Ministry) on the dates mentioned by the hon. and gallant member was as follows:—

January 1, 1919	1,823
July 1, 1919	2,547
August 1, 1919	2,500

This increase has been rendered necessary in order to facilitate the very rapid demobilisation of the R.A.F.

Air Ministry (Ex-Service Men Discharged)

MR. J. JONES asked the Under-Secretary of State to the Air Ministry whether thousands of ex-Service men employed under the Air Ministry in the South-Eastern area have been discharged or are under notice; if so, whether he can state the reason for so many men being thrown out of employment at the same time; and whether any effort is being made in conjunction with the Ministry of Labour to find alternative employment for these men?

Maj.-Gen. Seely: The answer to the first and second parts of the question is that civilian subordinates have been, or are being, discharged as a consequence of the very large reduction of the R.A.F. With regard to the last part of the question, as I have previously stated, the anxiety caused to these men and their families is greatly regretted, but it is unavoidable under the circumstances. I am in communication with the Minister of Labour with a view to mitigating the hardship caused as far as possible.

Airship Flight to India

LIEUT.-COM. KENWORTHY asked the Under-Secretary of State to the Air Department, whether it is intended to attempt a flight to India by rigid airship; what is the estimated cost, including the return journey, of such a flight; how many officers and other ranks, respectively, will be required on the line of flight, including the Indian terminus; and whether Treasury approval for the estimated expenditure has been sought and granted?

Maj.-Gen. Seely: The reply to the first part of the hon. and gallant member's question is that there is no present intention of arranging a flight by rigid airship to India. The remainder of this question, therefore, does not arise.

Miss Douglas-Pennant

SIR ROBERT THOMAS on August 19 asked the Lord Privy Seal whether the Government are prepared, on certain conditions, to take part in the House of Lords Inquiry concerning the dismissal of Miss Douglas-Pennant; if so, whether he will inform this House what those conditions are; and will he state the reasons which have led the Government to take this course after refusing in this House the demand for a judicial inquiry?

Mr. Bonar Law: The Committee has power to summon witnesses and to ask for papers. I am informed that the Air Ministry will assist the Committee in making any necessary arrangements for the attendance of witnesses, and will produce papers which the Committee wish to have. The Secretary of State has approved the appointment of counsel to represent the Air Ministry before the Committee.

Anti-Aircraft Gun Defences

SIR JOHN BUTCHER on August 19 asked the Secertary for War whether he will state the number of officers and men who are now employed in this country for anti-aircraft gun defences?

Mr. Forster: The numbers employed in this country in connection with anti-aircraft defences on August 11 were: Officers, 273; other ranks, 2,319. The corresponding numbers on November 11, 1918, were: Officers, 717; other ranks, 11,948. The work of removing the equipment from stations that are no longer required is in progress, and when this is completed the personnel will be further reduced.

Civil Aviation

LIEUT.-COL. MALONE asked the Under-Secretary of State to the Air Ministry whether he can give an assurance that, in taking every step to cut down expenditure and ensure economy in his Department, he will support and strengthen the Department of Civil Aviation in order to assist the development of British aircraft production, the success of which industry will add materially to the general prosperity of the country; and whether he will be prepared to give an account of the progress and work of that Department when Parliament reassembles?

Maj.-Gen. Seely: With regard to the first part of the question, I am not at present in a position to add anything to the statement I made when introducing the Estimates, but my hon. and gallant friend may rest assured that the Government are fully alive to the importance of civil aviation to this country. The answer to the second part of the question is in the affirmative.

The Transatlantic Vickers-Vimy Aeroplane

LIEUT.-COL. MALONE asked the Under-Secretary of State to the Air Ministry whether arrangements can be made for the Vickers-Vimy aeroplane which flew the Atlantic to be placed in the South Kensington Museum with other pioneer examples of locomotion?

Maj.-Gen. Seely: The machine referred to by my hon. and gallant friend is the property of a private firm (Vickers, Ltd.), and I have not yet been informed officially whether this firm wish to part with it for the purpose stated. I am asking my right hon. friend whether he could arrange for the placing of the machine in the South Kensington or other suitable public museum, in the event of the firm desiring to present it to the nation for this purpose.

Staff at Tadcaster and Sherburn-in-Elmet

MAJ. LANE-FOX asked the Under-Secretary of State to the Air Ministry what is the present staff of officers and other ranks, including women of the Women's Army Auxiliary Corps, at present stationed at the aerodromes at Tadcaster and Sherburn-in-Elmet respectively; to what purpose these aerodromes are to be devoted; and what has been the total cost of their erection and equipment?

Maj.-Gen. Seely: The staff of officers and other ranks at July 31, 1919, at the aerodromes referred to in my hon. and gallant friend's question was as follows:—

	Tadcaster.	Sherburn in-Elmet.
R.A.F.—		
Officers	48	2
Other ranks	159	58
W.R.A.F.—		
Officers	2	0
Other ranks	66	0
Civilian Subordinates—		
Male	2	22
Female	2	9
	259	91

There are no members of the Q.M.A.A.C. employed. Neither of these stations are included in the R.A.F. post-War programme, but the use of one of them will have to be retained for civil aviation until a more suitable aerodrome, closer to the City of Leeds, has been provided. These aerodromes will shortly be handed over to the Disposal Board for disposal. The cost of construction has been: Tadcaster, £108,000; Sherburn-in-Elmet, £195,000.

The Training of Pilots

COL. ASHLEY asked the Secretary of State for War if he is aware of the contents of the Adjutant-General in India's letter, No. 49259/1 (A.G. 5), dated May 28, 1917, in which warrant officers, non-commissioned officers, and men who volunteered for training as pilots in the R.F.C. were promised commissions as second lieutenants on the general list on passing a six weeks' cadet course in Egypt under certain conditions; whether no notification was given that these conditions had been altered when the R.F.C. was absorbed in the R.A.F. until the issue of the Adjt.-Gen. in India's No. 56699/ A.G. 1, dated September 27, 1918; whether, in the meantime, many of those concerned had fulfilled the conditions to qualify for a commission under which they accepted training; and, under these circumstances, will he cause an inquiry to be made with a view to the original contract being carried out?

Maj.-Gen. Seely: I regret that up to the present I have not been able to complete my inquiries into the points raised by my hon. and gallant friend. I will, however, if he will permit me, communicate with him as soon as the information I require is available.

The Dorchester Aerodrome

LORD ISLINGTON, in the House of Lords on August 18, asked the Government to what service it was intended to put the aerodrome near Dorchester; what amount of public money had been expended on it up to date; what amount was being expended monthly; whether the Government intended to complete the aerodrome, and if not, whether steps would immediately be taken to stop the expenditure. The Government should explain why valuable agricultural land had been absorbed at a time when every acre was required for the supply of food.

The Earl of Lytton said that it was Viscount Midleton who had first discovered in this matter the elements of a new scandal. Lord Midleton had been actuated by the highest possible motives, but he would be glad to know that in regard to some of the facts in a letter he had sent to the *Times* he had not been quite accurately informed, and in regard to others the facts were not quite so discreditable to the Government as he had supposed. The site was selected in September, 1917, for a coastal non-rigid airship station for the defence of the South Coast. No suitable alternative site could be found fulfilling the requirements, and the opposition by the Board of Agriculture was withdrawn and the site requisitioned on February 12, 1918. Only 70 out of the 370 acres of the farm concerned were disturbed, and the tenant's claim to compensation, recently agreed, amounted, to Michaelmas, 1919, only to £268 10s., including rent of the part of the farm occupied by the Government. That showed that, although the land was of agricultural value, very little damage had been done to it. The estimated cost of the whole scheme was £200,000, of which the shed was to cost £80,000. At the date of the Armistice nearly £100,000 had been spent. Work on the subsidiary buildings was then reduced, but the work on the shed was continued, the intention being to retain the station. It was not until May of this year that the staff finally decided to abandon the site for an air station. Upon that decision it was arranged to complete the roof of the shed and to use the shed for the storage of mines, a very large number of which were stored in commercial accommodation. The expenditure up to date was £182,000. At one time the owners were averse to selling this property, but they were now willing to sell it if the Government desired it, and he was inclined to think that that was the best course. The whole farm could, if it was so desired, be utilised for small holdings or experimental farms.

Viscount Midleton said that if his noble friend had gone down to the actual site in question he would have given rather a different account from that which he had given from official information.

The Earl of Lytton said that the noble Viscount assumed that November 11, 1918, was the end of the war. That, however, was not the case. That was the date when hostilities ceased, but, of course, they had to be in a position to resume hostilities if necessary.

◆ ◆

The "Goliath" Found

IT was with a sense of relief that Paris heard the news on August 23 that the Farman Goliath, which had left Mogador on August 15, and was last heard of at 5.45 a.m. on August 16, when it sent a wireless to Dakar asking for the direction of the wind, had been found. It appears that shortly afterwards the machine had to land at the negro village, Kayor, between St. Louis and Dakar, owing to trouble with propeller. The machine left Paris at noon on Sunday, August 10, with eight passengers, and reached Casablanca, a distance of 1,280 miles, at 5.40 p.m. on August 11. On August 14 the journey was continued as far as Mogador (190 miles), whence at 4 p.m. on the day following it started for Dakar. It travelled a further 900 miles and passed Port Etienne (by Cape Blanco) at 3.30 a.m. on Saturday, August 16.

Flying Under a Bridge

ANOTHER exploit of the same order as that of Godfroi, who flew through the Arc de Triomphe, has been carried out by the French pilot Malicon, who on Sunday last twice passed under the Var Bridge, near Nice. His machine, a Caudron, was of 14 metres (46 ft.) span, and the bridge has a span of 20 metres (65 ft.), while it is only 6 metres (20 ft.) high.

◆ ◆

A "Round the World" Prize

A BRIEF message from Hoquam, Washington, states that deeds to 1,000 acres of Gray's Harbour land, lying within what it has been hoped for years will prove an oil belt, are to be placed in a local bank as a reward for the aviator who first encircles the globe. Mr. George J. Hibbard, a Seattle lawyer, makes the offer and has set the time limit for winning the prize at August 1, 1920.

A "Record" Glide

A CLAIM for a "record" glide comes from Ithaca, N.Y. It is stated that on August 2 Mr. Rex Marshall, on a Thomas-Morse machine, when at an altitude of 17,000 ft. at the northern end of Lake Cayuga, glided 35 miles to Ithaca, restarting the engine when at a height of 6,000 ft.

On and Off a Roof

A CIRCUMSTANTIAL story comes from New York that on August 22 a machine, piloted by Mr. Edwin Ballough, alighted on the roof of a warehouse belonging to the Army authorities at Newark, N.J. The roof is described as 978 ft. long with a slight peak, which the machine straddled. After a few minutes the machine flew off again.

THE ROYAL AIR FORCE

London Gazette, August 12

The following temporary appointment is made:—

Staff Officer, 2nd Class (Air).—Maj. G. S. Trewin, A.F.C.; July 6 (substituted for the notification in *Gazette* July 18).

Flying Branch.

Sec. Lieut. W. D. Wood is antedated in his appointment as Sec. Lieut. (A.); May 1n.

The following Flight Cdts. are granted temporary commissions as Sec. Lieuts. (S.):—A. H. Murphy; Oct. 19, 1918. A. C. Kennedy; Oct. 25, 1918. W. F. McCunn, R. E. Parker, H. Small; Nov. 1, 1918.

The following relinquish their commissions, on ceasing to be employed:—Sec. Lieut. H. R. Herbert (Lieut., E. Ont. R.); Feb. 28. Lieut. S. D. Morrison (Lieut., Nova Scotia R.); April 29. Capt. G. H. Morton (Capt., Brit. Col. R.); May 26. Sec. Lieut. (Hon. Lieut.) H. B. Kennedy (Lieut., Can. Fld. Art.); June 1. Lieut. H. T. Singleton (Lieut., R. Dublin Fus.); July 24). Sec. Lieut. (Hon. Lieut.) W. M. F. Bayliss (Lieut., Lancers); July 26.

(Then follow the names of 32 officers who are transferred to the Unemployed List under various dates.)

Maj. H. S. Shield, M.C. (Lieut., N. Staffs. R.), resigns his commission, and is permitted to retain his rank; Aug. 13.

The date of appointment of the following Sec. Lieuts. to be Lieuts. is May 8, 1919, and not May 8, 1918, as stated in *Gazette* July 22:—A. Beedie, E. A. C. Britton, W. B. Crouch, R. Henderson, C. N. James, W. S. Jenkins, D.F.C., W. H. Jordan, A. D. Kiernander, H. W. Matthews, T. H. Mercer, F. R. Oddy, T. G. Reed, J. W. Sole, A. G. B. Whittaker, L. A. Williamson.

The notification in *Gazette* March 18 concerning Sec. Lieut. H. R. Herbert (Lieut., E. Ont. R.), is cancelled.

Administrative Branch.

P. S. Stewart is granted a temporary commission as Sec. Lieut.; Aug. 7.

(Six officers transferred to the Unemployed List.)

Sec. Lieut. J. Nnwell (Lieut., Worc. R.) relinquishes his commission on account of ill-health contracted on active service; Aug. 12.

Technical Branch.

(Five officers transferred to the Unemployed List.)

Memoranda.

(Two Oversea Cadets granted temporary commissions as Sec. Lieuts.)

London Gazette, August 15.

Lieut. W. B. Farrington is granted a permanent commn. as Lieut. (A.) (Aug. 1) (substituted for notification in *Gazette*, Aug. 1).

The surname of Capt. W. B. Callaway is as now described, and not "Gallaway," as stated in *Gazette*, Aug. 1.

The following temporary appointments are made:—

Staff Officer, 2nd Class.—(Air) Capt. A. D. Spiers; Nov. 11, 1918; and to be actg. Major while so employed, till April 30.

Staff Officers, 3rd Class.—(Air) Capt. V. Buxton, from S.O. 2; Aug. 2. Sec. Lieut. A. Jukes; July 13, and to be actg. Capt. while so employed.

Flying Branch.

Capt. A. W. Bird, D.S.O., to be graded for purposes of pay and allowances, as Major while employed as Major (A.); May 1.

Lieut. R. G. Rolfe-Rogers to be graded for purposes of pay and allowances as Capt. while employed as Capt. (A.); May 1.

Lieut. H. C. Leaver to be Lieut. (A.), from (O.); June 3, 1918.

Sec. Lieut. C. L. C. Craft (late Gen. List, R.F.C., on prob.) is confirmed in his rank as Sec. Lieut. (A.); Nov. 2, 1918.

J. E. Tarlton (Sec. Lieut., R.G.A.) is granted a temp. commn. as Sec. Lieut, (A.); July 7, 1918.

T. A. Woodward (Sec. Lieut., L'pool R.) is granted a temp. commn as Sec. Lieut. (O.); Nov. 16, 1918.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. F. W. F. Turner; Sept. 14, 1918. Lieut. J. G. MacKenzie (Lieut, Cent. Ont. R.); March 31. Lieut. H. Cassels (Capt., Can Highrs.); April 14 Lieut. R. Grandy (Lieut. (actg. Capt.), R. Newfoundland R.); June 22. Lieut. (Hon. Major) J. L. Booth (Major, R.E., T.F.); June 30. Sec. Lieut. A. W. Wyncoll (Lieut., R. Lancs. R.); July 29. Sec. Lieut. (Hon. Lieut.) J. F. D. Tanqueray (Lieut., Can. Engrs.); Aug. 6.

(Then follow the names of 93 officers transferred to unemployed list under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—H. F. N. Jones (contracted on active service); June 12. C. Miller (contracted on active service); June 25. W. R. Elson, E. R. Salter (contracted on active service); July 31. J. Burdekin (contracted on active service), A. E. Garrison, M.C. (caused by wounds), E. Snell; Aug. 1.

Sec. Lieut. W. D. Wood is antedated in his appointment as Sec. Lieut. (A.); May 10, 1918 (substituted for the notification in the *Gazette* of Aug. 12),

The rank of Lieut. D. F. Brookes is as now described, and not "Sec. Lieut.," as stated in the *Gazette* of May 6.

The notification in the *Gazette* of Dec. 31, 1918, concerning Sec. Lieut. D. G. Fraser, is cancelled.

The notification in the *Gazette* of June 3 concerning Lieut. G. F. Bell, is cancelled.

The notification in the *Gazette* of July 4 concerning Sec. Lieut. C. Butcher, is cancelled.

The notification in the *Gazette* of July 11 concerning Sec. Lieut. R. J. Acheson, is cancelled.

Administrative Branch.

Sec. Lieuts. to be Lieuts.:—H. V. Hall; Nov. 2, 1918. R. W. Johnson; Aug. 5.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. P. C. Cnoper (Sec. Lieut., Northants. R.); April 20, 1918 (substituted for notification in the *Gazette* of July 22). Lieut. V. M. McMahon, M.C. (Lieut., R. Dub. Fus.); Feb. 9. Lieut.-Col. E. H. Davidson, O.B.E., M.C. (Capt., Gord. Highrs.); June 12. Lieut. C. M. Sinclair (Lieut., R.A.S.C.); June 24. Lieut. (Hon. Capt.) W. F. T. James (Capt., Glam. Yeo.); July 9. Lieut. J. Redmond, M.C. (Lieut., R.I. Rif.); Aug. 1. Lieut. W. S. King, (Lieut., R. Newfoundland R.); Aug. 10.

(Then follow the names of 18 officers transferred to unemployed list under various dates.)

Capt. R. B. H. Lechmere (Dragoon Gds.) relinquishes his commn. on account of ill-health caused by wounds; Aug. 12.

Lieut. H. F. Proctor relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; July 30.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—C. Mc.I. French; July 12 (substituted for notification in *Gazette*, Jan. 21). C. Hunter; Aug. 6.

Technical Branch.

Capt. A. D. Spiers to be actg. Major while employed as Major, Grade (A.); May 1.

E. L. M. Emtage; July 12, 1918 (substituted for notification in *Gazette*, Jan. 3).

Sec. Lieut. (Hon. Lieut.) R. V. Weeks to be Lieut.; May 23, 1918, without pay and allowances of that rank prior to Nov. 3 (substituted for notification in *Gazette*, May 9).

Sec. Lieut. (Hon. Lieut.) L. G. Martin is transferred temporarily to unemployed list, from March 27 to May 29 (substituted for notification in *Gazette*, June 17).

(Then follow the names of 21 officers transferred to unemployed list under various dates.)

Lieut. C. J. M. Lowe, (R.E.) relinquishes his commn. on account of ill-health (Aug. 12).

Sec. Lieut. A. C. Wright relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Aug. 1.

Medical Branch.

Major (actg. Lieut.-Col.) B. R. Bickford, D.S.O. (Staff Surg., R.N.) relinquishes his commn. on ceasing to be employed; Aug. 1.

Capt. R. Hall is transferred to unemployed list; July 15.

Capt. T. E. Mulvany relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Aug. 13, 1918.

Memoranda.

The following warrant officers are granted hon. commns. as Sec. Lieuts.:—L. L. Lipsky, I. V. Smyrnoff; July 30.

Capt. M. McK. Wood, O.B.E. (Capt., Gordon Highrs.), relinquishes his commn. on being elected M.P.; April 15.

Lieut. W. Lingard, M.B.E., is transferred to unemployed list from (S.O.); July 31.

The notification in *Gazette*, July 4, concerning Sec. Lieut. C. W. Kerr is cancelled. The notification in *Gazette*, July 11, to stand.

London Gazette, August 19.

Permanent Officers.

Promotions.

Air Vice-Marshal Sir Hugh Montague Trenchard, Bart, K.C.B., D.S.O., to be Air Marshal; Aug. 11.

The following temporary appointments are made at the Air Ministry:—

Staff Officer, 1st Class (Air).—Lieut.-Col. J. A. Chamier, C.M.G., D.S.O., O.B.E.; Aug. 1.

Staff Officer, 2nd Class (Air).—Maj. B. E. Sutton, D.S.O., O.B.E., M.C.; July 31, vice Capt. W. A. A. Chauncy.

Staff Officer, 3rd-Class (Air).—Capt. W. A. A. Chauncy, from (S.O. 2); July 31.

The following temporary appointments are made:—

Staff Officers, 1st Class (P.).—Lieut.-Col. C. T. MacLean, D.S.O., M.C.; Aug. 15. (T.)—Maj. A. Levick, from (S.O. 2); Aug. 2.

Staff Officers, 2nd Class (Q.).—Lieut. C. E. Hodgson, M.B.E.; May. 5. (T.)—Maj. A. Levick; June 14.

Staff Officers, 3rd Class. (P.).—Capt. G. M. Broadburn; April 30; Sec. Lieut. J. M. McEntegart, and to be actg. Capt. till April. 3n (substituted for the notification in *Gazette* Jan. 21); Dec. 20, 1918. (T.)—Lieut. J. A. H. Savage; Feb. 14.

Staff Officers, 4th Class (2nd Grade).—Capt. A. W. Hammans; June 2.

The notification in *Gazette* July 18, concerning Sec. Lieut. (Actg. Lieut.) J. M. McEntegart is cancelled.

The notification in *Gazette* Aug. 5, concerning Maj. R. C. Lane. is cancelled.

Flying Branch.

Capt. F. D. Lord Doune, M.C., to be Capt. (A.), from Aide-de-Camp; July 22.

Capt. E. J. D. Routh to be Capt. (A.), from (S.O.); July 1.

Lieuts, to be actg. Capts. whilst empld. as Capts. (A.):—L. H. Browning, M.C., N. C. Bucktnn, F. H. Davies, M.C., C. J. S. Dearlove, W. F. J. Harvey, D.F.C., G. L. Hobbs, M.C., C. L. King, M.C., D.F.C., H. F. Nicholls, D.F.C., A. D. K. Perkins; May 1.

Lieuts. to be graded for purposes of pay and allowances as Capts. whilst employed as Capts. (A.):—C. T. Black, F. W. Clark, J. Cottle, D.F.C., H. G. W. Debenham, G. Eastwood, I. G. Elias, M. M. Freehill, D.F.C., R. J. Gammon, D.F.C., R. A. George, M.C., J. G. Gillanders, D.F.C., R. Grice, C. W. Hamilton, T. Hayes, A.F.C., F. R. Hockney, L. N. Hollinghurst, D.F.C., J. W. Jones, S. Jones, D.F.C., H. P. M. Kesterton, M.C., H. P. Lale, D.F.C., A. O. Lewis-Roberts, D.F.C., J. McBain, D.F.C., B. McEntegart, A. McGregor, D.F.C., W. F. Mayoss, H. Munden, D.F.C., G. S. Peffers, D.F.C., H. B. Pett, M.C., F. J. Phillips, W. O. Phillips, S. L. Pnpe, A. W. E. Reeves, D.F.C., G. T. Richardson, E. L. Roberts, T. Roberts, C. D. Skinner, S. J. Stewart, W. D. B. Taylor, S. H. Wallage, M.C., F. G. C. Ware, M.C.; May 1.

Lieut. E. D. Harding to be graded for purposes of pay and allowances as Capt. whilst empld. as Capt. (O.); May 1.

Sec. Lieuts, to be graded for purposes of pay and allowances as Capts. whilst employed as Capts. (A.):—O. A. P. Heron, D.F.C., C. H. Howitt; May 1.

Sec. Lieut. (Hon. Lieut.) J. F. D. Tanqueray, D.F.C., to be graded for purposes of pay and allowances as Capt. whilst empld. as Capt. (O.); May 1.

Sec. Lieuts. to be Lieuts.:—(Hon. Lieut.) L. R. Wheeler; April 21, 1918. R. T. Tarrant; Mar. 26.

Flight-Cadet 64479 C. R. Humphries is granted a temp. commn. as Sec. Lieut. (O.); Nov. 8, 1918.

The following relinquish their commns. on ceasing to be empld.:—Sec. Lieut. (Hon. Lieut.) D. M. Layton (Lieut., W. Ont. R.); Jan. 10. Lieut. G. B. Wootten (Lieut., New Brunswick R.); May 21. Maj. C. M. Murphy (Lieut.-Comdr., R.N.); July 24. Lieut. W. L. Christian (Lieut., R.G.A.), Lieut. J. E. Cole (Lieut., Quebec R.), Lieut. T. I. Findley (Lieut., Can. F.A.), Lieut. H. N. Price (Lieut., Nova Scotia R.); July 31. Lieut. C. R Gross (Lieut., Manitoba R.); Aug. 8. Lieut. A. C. S. Irwin (Lieut., R.I. Rif.); Aug. 9.

(Then follow the names of 117 officers transferred to Unemployed List.)

Capt. C. H. W. Godfrey relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Aug. 8.

Lieut. L. Francis relinquishes his commn. on account of ill-health, and is permitted to retain his rank; May 20 (substituted for the notification in the *Gazettes* of March 25 and April 29).

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—L. F. Chisenhall (contracted on active service); May 20 (substituted for notification in *Gazette* of May 13). R. J Acheson; July 3 (substituted for notification in *Gazette* of May 23). J. D. Fitzsimmons; Aug. 8.

The rank of Lieut. A. E. Baxter is as now described, and not Sec. Lieut. as stated in the *Gazette* of June 17.

The rank of Lieut, J. G. Angus, is as now described, and not Sec. Lieut. as stated in the *Gazette* of Aug. 8.

The name of Lieut. G. P. Packenham-Walsh is as now described and not "G. P. P. Wash," as stated in the *Gazette* of July 18.

The surname of Lieut. D. F. Cox is as now described, and not "Fox" as stated in the *Gazette* of Aug. 1.

The notification in the Gazette of Aug. 23, 1918, concerning T. J. Southern (Lieut., W. Yorks R.) is cancelled.

The notification in *Gazette* Feb. 14 concerning Sec. Lieut. C. H. Wilcox is cancelled.

The notification in *Gazette* April 11 concerning Sec. Lieut. W. T. Leonard is cancelled. The *Gazette* of May 16 stands.

The notification in *Gazette* July 8 concerning Sec. Lieut. D. J. Brooks is cancelled.

The notification in *Gazette* July 11 concerning Sec. Lieut. G. J. Ellsmere is cancelled.

The notification in *Gazette* July 18 concerning Sec. Lieut. F. H. Newton is cancelled.

Administrative Branch.

Maj. C. S. Danby, M.C., to be Maj. from (A.); March 24.

Capt. D. S. Jillings, M.C., to be graded for purposes of pay and allowances as Maj. while employed as Maj.; May 1.

Capts. to be Capts. ;—H. Thompson, from (T.); Jan. 18. W. J. Coombes, from (S.O.), F. E. B. Whitfield, M.B.E., from (S.O.); July 1.

To be actg. Capts. while employed as Capts. :—Lieut. F. R. C. Davidson; from Aug. 29, 1918, to April 30. Sec. Lieut. W. Rollinson; May 1.

Lieuts. to be graded for purposes of pay and allowances as Capts. while employed as Capts. :—H. G. Bellamy, T. D. S. Purdey; May 1.

Lieut. W. E. N. Growden to be graded for purposes of pay and allowances as Capt. while employed as P.T. Officer; May 1.

Lieuts, to be Lieuts, from (S.O.) :—L. V. Boxer; June 13. J. C. Nairn; July 1. R. B. Fricker; July 10.

Lieut. R. R. Money to be Lieut., from (A.); July 14.

G. Heard (Temp. Lieut. and Qmr., Gen. List) is granted a temp. commn. as Lieut.; April 1, 1918.

Sec. Lieut. S. A. E. Cowell to be Lieut.; Aug. 7.

Sec. Lieut. (Hon. Capt.) R. Hodge to be graded for pay and allowances as Lieut. while employed as Lieut.; May 1.

T. J. Southern (Lieut., York Hrs.) is granted a temp. commn. as Lieut.; Aug. 7, 1918, with seniority April 1, 1918 (substituted for notification in *Gazette* May 2).

Sec. Lieut. A. C. Cunison to be Sec. Lieut., from unemployed list; May 5, precd. next below W. Borland).

Sec. Lieut. J. G. Renshaw to be Sec. Lieut., from (A.); July 11.

Sec. Lieut. (Hon. Lieut.) G. F. A. Lewin, M.C., to be Sec. Lieut. (Hon. Lieut.) from K.B.); April 15.

Sec. Lieut. S. J. Dodson to be Sec. Lieut., from (S.O.); June 16.

Sec. Lieut. D. D. Carcary (late Gen. List, R.F.C., on prob.) is confirmed in his rank as Sec. Lieut.; Nov. 9, 1918.

(Then follow the names of 30 officers transfered to Unemployed List.)

Lieut. C. Baines relinquishes his commn, on account of ill-health caused by wounds and is granted the rank of Capt.; Aug. 7.

Lieut. R. H. Harmer relinquishes his commn. on account of ill-health caused by wounds and is permitted to retain his rank; Aug. 7.

The surname of Maj. R. Money is as now described, and not "Honey" as stated in *Gazette* Aug. 1.

The date of resignation of commn, of Sec. Lieut. H. W. Gallagber is April 16, and not March 15, as stated in *Gazette* April 15.

The notification in *Gazette* April 1 concerning Sec. Lieut. J. H. P. W. Hitber is cancelled.

The notification in *Gazette* of April 1 concerning Sec. Lieut. E. Rendle is cancelled.

The notification in *Gazette* of July 15 concerning Lieut. C. Baines is cancelled.

The notification in *Gazette* of July 25 granting C. H. Haward a temp. commn. as Sec. Lieut is cancelled at his own request.

The notification in *Gazette* of March 18 concerning Sec. Lieut. D. J. Brookes is cancelled.

Technical Branch.

Lieut. (Hon. Maj.) W. R. Bernard to be actg. Maj. whilst employed as Maj., Grade (A.) (from Sept. 9, 1918, to April 30.

Capts. to be graded for purposes of pay and allowances as Majs. whilst employed as Majs., Grade (A.) :—G. L. Gooden, D. MacK. P. Riach, M.B.E., O. V. Thomas, O.B.E.; May 1. J. Robinson; July 20.

Capt. H. G. Ford, O.B.E., to be graded for purposes of pay and allowances as Maj. whilst employed as Maj., Grade (B.); from May 1 to June 24.

Capt. A. J. Hurst to be Capt., Grade (A.) from (S.O.) May 1

Lieut. P. M. Brambley to be actg. Capt. whilst employed. as Capt., Grade (B.) May 1.

Lieuts. to be graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (A) :—D. Drover, H. W. G. Drummond, W. B. Everton, P. R. Hutchinson, N. Liodall, A. W. H. Phillips, C. A. Stevenson, J. D. Whiteman; May 1.

Lieuts. to be graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (B) :—C. H. Boyle, H. L. Connor, A. H. Dye, F. Hitchins, from (Ad.) H. Stansfield, W. Yonge (May 1).

Sec. Lieuts. to be graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (A) :—F. A. Dickinson, N. B. Helmsley, M.B.E., J. W. Jean, D.S.M., May 1; J. R. Brown, M.C. (from May 12 to July 14); T. E. H. P. Kennedy, May 22; (Hon. Lieut.) J. K. M. Dodds, June 16.

Sec. Lieuts. to be graded for purposes of pay and allowances as Capts. while employed as Capts., Grade (B) :—C. F. Chinery, J. V. Martyn, N. Openshaw, H. H. Williams, May 1.

Sec. Lieut. (Hon. Lieut.) T. E. Pennington to be actg. Capt., without pay and allowances of that rank, while specially employed; June 28.

Lieut. A. E. W. Finch to be Lieut., Grade (A.), from Grade (B.); May 1.

Sec. Lieuts. to be graded for purposes of pay and allowances as Lieuts. while employed as Lieuts., Grade (A.) :—N. F. Burch, F. O. Burnley, J. O. Cooper, R. M. Duke, M. B. Fitzgerald (Hon. Lieut.) R. A. Law, W. St. J. Littlewood, G. J. H. Stein, E. J. Wilkins; May 1.

Sec. Lieuts. to be graded for purposes of pay and allowances as Capts. whil eemployed as Capts., Grade (B.) :—(Hon. Lieut.) H. Allsehrook, F. Adams, R. Fell, H. Haworth, F. Hembley, (Hon. Lieut.) R. Kearton, C. H. N. Nunn, C. G. A. Poole, W. R. Tuddenbam; May 1.

Sec. Lieut. C. F. B. Bassil to be Lieut.; Oct. 13, 1918 (substituted for notification in *Gazette* Jan. 3).

Sec. Lieut. E. L. M. Emtage to be Lieut.; Aug. 12, 1918 (substituted for notification in *Gazette* Jan. 3).

Sec. Lieut. A. E. Firth to be Lieut., without pay and allowances of that rank; Dec. 10, 1918.

Sec. Lieut. F. W. Corbett to be Sec. Lieut., Grade (A.), from Grade (B.); May 21.

Sec. Lieut. I. Van N. Reynecke to be Sec. Lieut., Grade (A.), from (Ad.); Nov. 28, 1918.

Sec. Lieut. A. K. Murray to be Sec. Lieut., Grade (B.), from (S.O.); July 21.

Sec. Lieut. W. Z. Grandi to be Sec. Lieut., Grade (B.), from (A.); July 30.

(Then follow the names of 33 officers transferred to Unemployed List.)

Sec. Lieut. (Hon. Lieut.) C. N. Smith relinquishes his commn, on account of ill-health caused by wounds, and is permitted to retain the rank of Lieut.; Aug. 9.

Sec. Lieut. C. Rawdon-Schofield relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Aug. 7.

The initials of Maj. J. P. Elsden are as now described, and not "J. R.," as stated in *Gazette*, April 1.

The notification in *Gazette*, April 29, concerning Sec. Lieut. E. W. Bell is cancelled.

The notification in *Gazette*, July 8, concerning Sec. Lieut. E. B. Saunders, is cancelled.

The notification in *Gazette*, Dec. 13, 1918, concerning Sec. Lieut. (Hon. Lieut.) J. D. Robinson, is cancelled.

Medical Branch.

Lieuts. to be Capts. :—C. T. Costello; Mar. 26. G. M. Mellor; May 15. H. C. Cox, G. Meadows; June 1. L. C. Broughbton-Head, H. B. Troup, H. T. Prys-Jones; June 6. J. Coulter Smith, R. Mugliston, P. E. Williams; June 10. C. Lambrinudi; June 14. A. Kirkbope; June 17. P. M. Carroll; June 18. J. P. Horsford; July 5. A. K. Soutar; July 6. G. Dunderdale, J. P. Hennessey; July 12. G. W. Harbottle, M. J. Whelton; July 15. J. Valerie; July 22. J. P. Wells; July 24. A. St. J. Hennessey; July 29. G. W. J. Bonsfield; Aug. 5.

Transferred to unemployed list.—Maj. C. F. Bainbridge; Feb. 5. Lieut. N. Homewood; Mar. 20. Capt. K. B. Aickman; Aug. 6.

Dental Branch.

Lieuts. to be Capts. :—G. Warner; May 20. R. Fyson; May 25. C. M. Shirreff; June 6. H. L. Thorn; June 10. N. H. Medburst; June 17. N. L. Smallbone; July 1. C. M. John; July 18. G. Hughes; July 22. G. F. H. Bloom; Aug. 10.

Memoranda.

(Then follow the names of 6 Overseas Cadets who are granted temp. commn. as Sec. Lieuts.)

(Then follow the names of 274 Cadets who are granted Hon. commns. as Sec. Lieuts.)

Transfd. to unemployed list :—Capt. P. P. C. Penberthy, O.B.E., from (S.O.); April 30 (substituted for notification in the *Gazette* of Aug. 8). Capt. H. P. Mayhury, O.B.E., from (S.O.); July 16.

Capt. R. H. Parkinson (Capt., R.E., T.F.) relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Maj.; Aug. 19.

The surname of Capt. W. B. Callaway is as now described, and not "Galloway" as stated in the *Gazette* of Jan. 3.

The Christian names of 531467 Herbert James Blackwell are as now described, and not as stated in the *Gazette* of July 15.

◆ ◆ ◆ ◆

R.A.F. Pigeons

An official handbook of more than ordinary interest which has recently been published, is the Air Ministry Pigeon Service Manual. During the War many cases occurred in which the crews of aircraft owed salvation from perilous situations entirely as a result of the employment of pigeons, and obviously the great value of their services must not be lost sight of in the development of civil aviation. In flying over the sea or over large expanses of uninhabited country messenger pigeons are an indispensable adjunct to wireless telegraphy.

Moreover, in contradiction to the suggestion that all pigeons used by His Majesty's Services are being disposed of, it is emphasised that aircraft of the R.A.F. will continue to carry pigeons on occasions where their use might be required, and the training of pigeons within the British Isles, also, will proceed. Therefore it is very necessary in the future equally as in the past that the maxim in regard to pigeons should be "Don't Shoot!"

The Pigeon Service Manual, in addition to being a comprehensive textbook on pigeon lore from the standpoint of aeronautical needs, contains much that will have a wider appeal. A chapter devoted to some of the meritorious performances of pigeons on active service with the Air Force at sea is particularly interesting. It is obtainable through any bookseller, and the price is 6*d*.

Air Smuggling into Sweden

From Stockholm comes a story that the mysterious affair of the aeroplane which dropped parcels containing valuables has now been cleared up. It seems that the German, Dr. Stockhausen, who picked up the parcels, states that the contents belonged to Prince William of Wied, the ex-Mpret of Albania, who had sent them to Sweden to be deposited in a Swedish bank until conditions in Germany would allow of sending them back. Dr. Stockhausen declared that there had not been the slightest intention of deceiving the Swedish Customs authorities.

To Carry 100 Passengers

It is stated that there is now being built in the Caproni works at Vissola a giant machine of an entirely new type capable of carrying 100 passengers. Further details will be awaited with interest.

SIDE-WINDS

We understand from Messrs. Ogilvie and Partners that they have been appointed to take over the investigation and assessment of aircraft claims made under Lloyds policies. This more particularly refers to the Aviation Insurance Association who issue Lloyds Aviation policies, and policies of the Eagle, Star and British Dominions and the Excess Insurance Co., Ltd. Arrangements have been made by which a prompt assessment and settlement should be effected, and it is anticipated that the services of an independent technical body will be of value to both the underwriters and to the insured. It is hoped also that these arrangements will tend to a reduction in rates.

- - -

Capt. Truelove is now on his way to Spain with one of the Avro standard 504 K machines, which has been especially painted in the Spanish national colours. This machine will give demonstrations before the King of Spain and in various parts of the country. Another 35 h.p. "Baby," to replace the one sent to Amsterdam, where she is giving a fine account of herself, is nearly completed. The "Puma" engined racing machine, which Messrs. A. V. Roe and Co. have entered for the Schneider Cup is rapidly nearing completion. She is having her wings fitted on, and these—when covered—will practically complete her in skeleton form. Another 504 L seaplane is completed in the shops, and one or two others are being overhauled after a strenuous time at various seaside resorts.

It is with great regret that we record the death, from heart failure, on Sunday, August 17, of Mr. James R. Nisbet, who had been a managing director from the beginning of the business of Bowden Wire, Ltd., and its associated companies in France, Germany, and elsewhere.

Mr. Nisbet was intimately concerned in the formation of the original Bowden Wire Syndicate, Ltd., to acquire the patents in the method of power transmission by means of a flexible wire invented by the late Mr. E. M. Bowden, and had taken a very close and personal interest in its developments. Early this year, although far from well, he paid a visit to the United States in its interests.

Mr. Nisbet, who was in his fifty-eighth year, was one of the earliest members of the Royal Automobile Club and of the Royal Scottish A. C., and served on the committee of both. He was a Vice-President and Chairman of the Auto-cycle Union, and a Vice-President of the Cycle and Motor Cycle Manufacturers' and Traders' Union.

- - -

For organisation purposes, and in order to cope with increased and more varied business, Messrs. Whiteman and Moss, Ltd., have removed their head office to 71, Finsbury Pavement, London, E.C. 2. (Telephone, London Wall, No. 2041) and their warehouse and stores to 29, Betterton Street, Endell Street, W.C. 2. They are continuing their business of suppliers of all kinds of accessories and parts for aircraft, motors, engineers, etc., and are also taking up and looking for new lines in this class of trade.

C.A.V. SPORTS: 1. Mr. C. A. Vandervell. 2. Group of competitors for the fancy dress prize. 3. Foreman's relay race. Mr. Leeson, of No. 2 team, winning. 4. Obstacle race. A snap of the competitors extracting floating apples with their teeth. 5. Boot race. Run 50 yards, sort boots out of sack, put them on, and return to start. Competitors finding their boots! 6. Mr. W. R. Clennell, the runner-up in the high jump. 7. Mr. A. Grant winning the high jump, 4 ft. 10 ins. 8. Start of the ladies' egg-and-spoon race. 9. Fire Brigade competition for Chamber of Commerce Shield: Acton second team laying out six lengths of hose, after dressing and mounting engine. Time, 1 min. 43 secs.

RESETTLEMENT

There are many officers and men of the. R.A.F. who are demobilised or are about to be demobilised.

In order to assist those who are undecided or are seeking advice as to their prospects in civil life, the Editor has arranged for an expert, with wide experience of service, industrial and educational conditions, to give advice to those who may solicit it through the medium of this Journal.

Applications, which must be in writing, should be marked *Resettlement*, and addressed to the Editor, Flight, 36, Great Queen Street, Kingsway, W.C. 2. They will be dealt with in these columns, as far as possible, in rotation.

A. C. G., Lieut., R.A.F.—Unfortunately a considerable number of ex-officers and other ranks are similarly placed. One course, and perhaps the most satisfactory in the long-run, would be to complete your training as a solicitor. If necessary, you should obtain financial help from the Ministry of Labour for this purpose. As you have not received any systematic practical training, you will find it extremely difficult to obtain employment in a responsible technical capacity. However, no harm can be done if you apply to the leading motor manufacturers; state fully your qualifications and seek an appointment on the business side.

F. F. J., Ex-Rigger (Aeroplane).—Your suggestions are very sound. There are evening courses on aeroplane design and aero engines at the Regent Street Polytechnic. You should communicate with the Principal, from whom you will receive full particulars. Your example of keeping in touch with and improving your aeronautical knowledge in your spare time, with a view to resuming your connection with aviation when developments take place, should commend itself to others.

S. G., Ex-Rigger.—You will be well advised to give up any idea of finding employment as a rigger in commercial aviation for the present, as vacancies are scarce and the number of experienced riggers available is considerable. Why not return to your pre-War employment?

* * * *

COMPANY MATTERS

J. Samuel White and Co.

The report of J. Samuel White and Co. for the year ended April 5 last states that, subject to the payment of the balance of munitions levy and excess profits duty for the years 1916 to 1919 inclusive, but after providing for depreciation, the accounts show a profit of £185,381; £58,893 was brought forward, making £244,274, out of which the following amounts have been paid:—Income tax, £34,315; expenses re-issue of capital, etc., £1,045; interim dividend on the ordinary shares declared September 20, 1918, £14,000; one year's preference dividend, £8,400, leaving £186,514. It is now proposed to pay a dividend on the ordinary shares at the rate of 4*s*. 6*d*. per share, less tax, which will absorb £44,100, leaving £142,414 to meet the balance of munitions levy and excess profits duty for 1916 to 1919 inclusive. The values of additions to buildings, plant and machinery have been written down in the accounts at the rates allowed by the authorities in previous years. The works have been fully employed during the year, chiefly upon Admiralty work. On the change over from war to peace the Government gave orders for reconditioning work, and orders for other work having been booked the directors are assured that the establishment will be fully employed during the current year.

Wolseley Motors, Ltd.

The report of Wolseley Motors, Ltd., for the year ended September 30, 1918, states that negotiations are in progress with the Inland Revenue in regard to the assessment for excess profits duty, and a provisional amount has been set aside in the accounts in respect of this liability. After providing for all trading expenses, contingencies, and depreciation, the trading for the year resulted in a net profit of £316,815. After payment of debenture interest, the purchase of stock for redemption, and other charges, there remains a balance of £178,718; £12,688 was brought forward, making £191,406. The directors propose to appropriate this as follows:—Dividend of 7 per cent. on the preference shares (already paid), £21,000; place to the credit of reserve account £150,000, and to carry forward £20,406. The whole of the company's resources were fully engaged throughout the year in the production of munitions of war.

* * * *

NEW COMPANY REGISTERED

GOLDEN EAGLE AVIATION CO., LTD., 438, Corn Exchauge, Corporation Street, Manchester.—Capital £5,000, in £1 shares. Aeroplane, hydroplane and airship manufacturers and dealers, etc. Acquiring premises at St. Ann's-on-Sea. First directors: Maj. H. S. Shield, M.C., Lieut. A. Pearson and Lieut. W. C. Ellis.

PUBLICATIONS RECEIVED

Magnetos. By A. P. Young, A.M.I.E.E. London: Iliffe and Sons, Ltd., 20, Tudor Street, E.C. 4. Price 4*s*. 6*d*.

Aircraft Compass Course and Speed Finder. London: Edward Stanford, Ltd., 12-14, Long Acre, W.C.

"*The Limit*." No. 14. August, 1919. Coventry: White and Poppe, Ltd. Price 2*d*.

"*The Edgar Allen News*." No. 1. July, 1919. Sheffield: Edgar Allen and Co., Ltd.

Conference of Research Organisations. London Department of Scientific and Industrial Research, 15, Great George Street, Westminster.

Commercial Aviation and its Relation to the Community. New York: United Aircraft Engineering Corporation.

* * * *

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published August 28, 1919.

1,164. P. R. Bradley. Method of fireproofing aircraft. (130,351.)
1,458. P. R. Bradley. Doping of aircraft. (130,354.)
1,461. W. Beardmore and Co. and G. T. Richards. Controlling mechanism for aircraft. (130,355.)
1,511. H. O. Short. Indicators of rate of ascent or descent. (130,356.)
1,625. Sir H. Fowler and P. Salmon. I.C. aircraft engines. (130,361.)
2,015. L. Bleriot. Aeroplanes. (130,372.)
2,535. E. Letorn. Strengthening plates for aircraft framework. (130,392.)
2,754. Cellon, Ltd., T. Tyrer and Co. and others. Cellulose acetate solutions. (130,402.)
2,798. F. Caproni. Landing-carriages of aeroplanes. (130,409).
2,938, 2,939 and 2,940. R. Caudron. Tanks for aircraft. (130,417, 130,418 and 130,419.)
3,126. S. A. Flower, K. O. Hale and E. E. W. Butt. Aircraft framework (130,425.)
3,175. Boulton and Paul and J. D. North. Aeroplane wings. (130,428.)
3,246 and 3,247. C. Grahame-White and H. I. Sidgwick. Control mechanism for aircraft. (130,430 and 130,431.)
19,601. Soc. des Moteurs Gnome et Rhone. Valve control gear. (130,530.)
20,290. A. J. Greenly. Power controls for aeronautical machines (130,535.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published August 21, 1919

4,864. A. Tebaldi. Aeroplanes. (123,987.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlix, l, li and lii)

NOTICE TO ADVERTISERS.

In order that "Flight" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates*:—

United Kingdom.	s.	d.	Abroad.	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 „ „ ..	14	1	6 „ „ ..	16	6
12 „ „ ..	28	2	12 „ „ ..	33	0

These rates are subject to any alteration found necessary under war conditions.

Cheques and Post Office Orders should be made payable to the Proprietors of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "Flight" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 558 (No. 36, Vol. XI.) SEPTEMBER 4, 1919 [Weekly. Price 6d. Post Free, 7d.

Flight
The Aircraft Engineer and Airships
Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.*
These rates are subject to any alteration found necessary under war conditions

CONTENTS

Editorial Comment: PAGE
An Aeronautic Scapa .. 1175
The Paris Air Service .. 1176
The Government Prizes .. 1176
French Airship Services .. 1178
The Future of the R.A.F. .. 1178
Flight—and the Men: Lt.-Col. J. T. C. Moore-Brabazon, M.P. .. 1177
Landing Across Wind .. 1179
The Jacques Schneider Cup Race .. 1180
Royal Aero Club—Official Notices .. 1187
Stunt Flying and Commercial Pilots .. 1188
Aerodromes for Civil Use .. 1190
Maintaining Constant Pressure before the Carburettors of Aero Engines .. 1192
Mentioned in Despatches .. 1196
Airisms from the Four Winds .. 1200
Personals .. 1203
Royal Air Force .. 1204
Side-Winds .. 1208

DIARY OF FORTHCOMING EVENTS.

Secretaries are invited to keep us informed as to fixtures, meetings, etc.

Sept. 10	Jacques Schneider Cup Race, Bournemouth.
Oct. 5	Aviation Meeting at Barcelona.
Nov. ..	Entrance Examination for R.A.F. College.
Dec. 19 to .. Jan. 4, 1920.	Paris Aero Show.

EDITORIAL COMMENT

An Aeronautic Scapa

IF the report, which at the time of writing lacks confirmation, that practically the whole of the German Zeppelin fleet, which, under the terms of the Peace Treaty, was to have been handed over to the Allies, has been wilfully destroyed by the Huns is established, another example of German bad faith will have been added to the already long list. If the report be true, it is highly probable the German Government had any foreknowledge, since however much it may have wrung their heartstrings to be compelled to surrender these craft to their late enemies, we must at least credit them with the desire to avoid saddling Germany with any further financial burden such as the destruction of the Zeppelin fleet would undoubtedly entail. The alleged act would seem more likely to have been planned and perpetrated by a number of airship officers, whose peculiar brand of "patriotism" got the better of their discretion. We will not say their sense of honour, for the sufficient reason that the Hun will have to undergo a very long and severe period of probation before we can ever again credit him with the possession of such a sense.

What is said to have happened is that the giant craft, in order to save the cost of hydrogen, were kept deflated and slung by cables from the roofs of their sheds. Hence the wrecking of the ships would be rendered easy, since it would only be necessary to cut the suspensory cables and allow the craft to drop, when the weight would simply crush them virtually beyond repair. There are no important secrets regarding the construction of these craft which are not fully known to the Allies, so that the loss would be simply represented by the amount of the material damage, and as that would fall upon the Germans it need not be a matter for too deep regret. As a matter of fact, if such an act of *sabotage*, reprehensible as it would be, would in all probability save some amount of jealousy and heartburning regarding the distribution of the German airship fleet, and to that extent the Allies would be rid of a source of possible embarrassment. That, however, is not a matter which in any case should be allowed to concern the German Government. In addition to the indemnity which Germany would have to pay for the non-surrender of the destroyed craft, there would arise the question of the punishment of those responsible for their destruction in defiance of the terms accepted by our late enemy. Even the Hun must be taught that "scraps of paper" when they are solemnly subscribed to by civilised nations are meant to be honoured, and that if the individual by his irresponsible acts chooses to vitiate them, he not only exposes his country to punishment for bad faith, but he himself must suffer in his own person. So far as concerns the sinking of the ships at Scapa, the Allies have the remedy in their own hands, since they hold in custody the persons of those responsible. In the matter of the reported destruction of the Zeppelins, the case is not quite parallel. The warships were sunk while we were still technically at War with Germany and in distinct breach of the conditions of the Armistice. The Zeppelins are said to have been destroyed after peace has been signed, and it would seem that in such case the punishment of the guilty would be more a matter for the German Government than for ourselves. Probably the best course to be pursued, if the report be confirmed, is for the Allies to notify the German Government that they expect the cash value of the destroyed craft to be paid over, and also that in default of the punishment of the perpetrators of so gross an act of *sabotage* a further monetary penalty will be exacted.

* * *

The Paris Air Service

To say that we congratulate the promoters of the recently opened London–Paris air service on the auspicious start they have made, would be too mild a way of putting it. There are so many things upon which we should have to congratulate the firms concerned, that the task would be beyond us. The service was inaugurated on Monday of last week, and a worse week from the point of view of the weather conditions obtaining it would be difficult to imagine. Monday was not so bad, but the record of the winds encountered during the rest of the week makes interesting reading. On Tuesday 40 miles an hour was the average force of the wind. On Wednesday it was between 35 and 40 miles an hour, but on Thursday it blew with hurricane force, 100 miles an hour being recorded. Friday was a bad day, owing to low clouds and rain, and on Saturday the wind blew at the rate of 20 miles an hour, with low clouds, which made visibility poor.

In face of these adverse conditions it might be thought that the service was either abandoned or was at least irregular. Quite the contrary, for it was carried out to schedule every day except on Wednesday, when the London to Paris machine did not start, the passengers being diverted to an alternative route because the wind was blowing in gusts at hurricane force, rain was descending with torrential violence and masses of clouds were within 100 feet of the ground. But even on this day the Paris to London journey was safely and successfully accomplished, the trip being made in 1 hr. 50 mins. Incidentally the average time occupied over the 250 miles, representing the direct distance between the two capitals, was 2¼ hours.

That a regular service, running to time-table, has been established at all is very much to the good when it is realised that it is just this regularity and dependability which is needed to give confidence in the new transport to the travelling public; but that it should have been inaugurated and maintained with such conspicuous success during so tempestuous a week as the last seven days of August, is one of the highest tributes to the safety and efficiency of the aeroplane, for which we could ask. It has been shown that the aeroplane is not the mere plaything of the elements that some would have us think. We have repeatedly heard it said that the aeroplane can have no real and assured place as a means of transport owing to the limitations imposed upon its action by conditions of weather. The business man, to whom speed of travel appeals most, must, it is very properly argued, be assured that allied to speed there is certainty. Potential speed is of no use to him if, for example, he has wired to Paris that he will arrive by air at a certain time only to find that owing to adverse weather conditions the service by which he is booked is unable to start. It is actual, not potential, speed of which he wants to be assured. For the immediate future it should be sufficient to reply to this line of argument by quoting the experiences of the first week's service between the French and British capitals. We certainly think we are justified in claiming that it has established that there is nothing in the way of weather which is likely to stop such relatively short-distance service which cannot be foretold at least 24 hours in advance. That should certainly be sufficient in most cases to determine the person who contemplates a business journey whether he will go by air, or if the conditions are likely to be so bad that he would be better advised to take train and boat. Once again we congratulate Aircraft Travel and Transport on the outstanding success of their venture and on the invaluable demonstration they have given of the reliability of the aeroplane as a vehicle of transport.

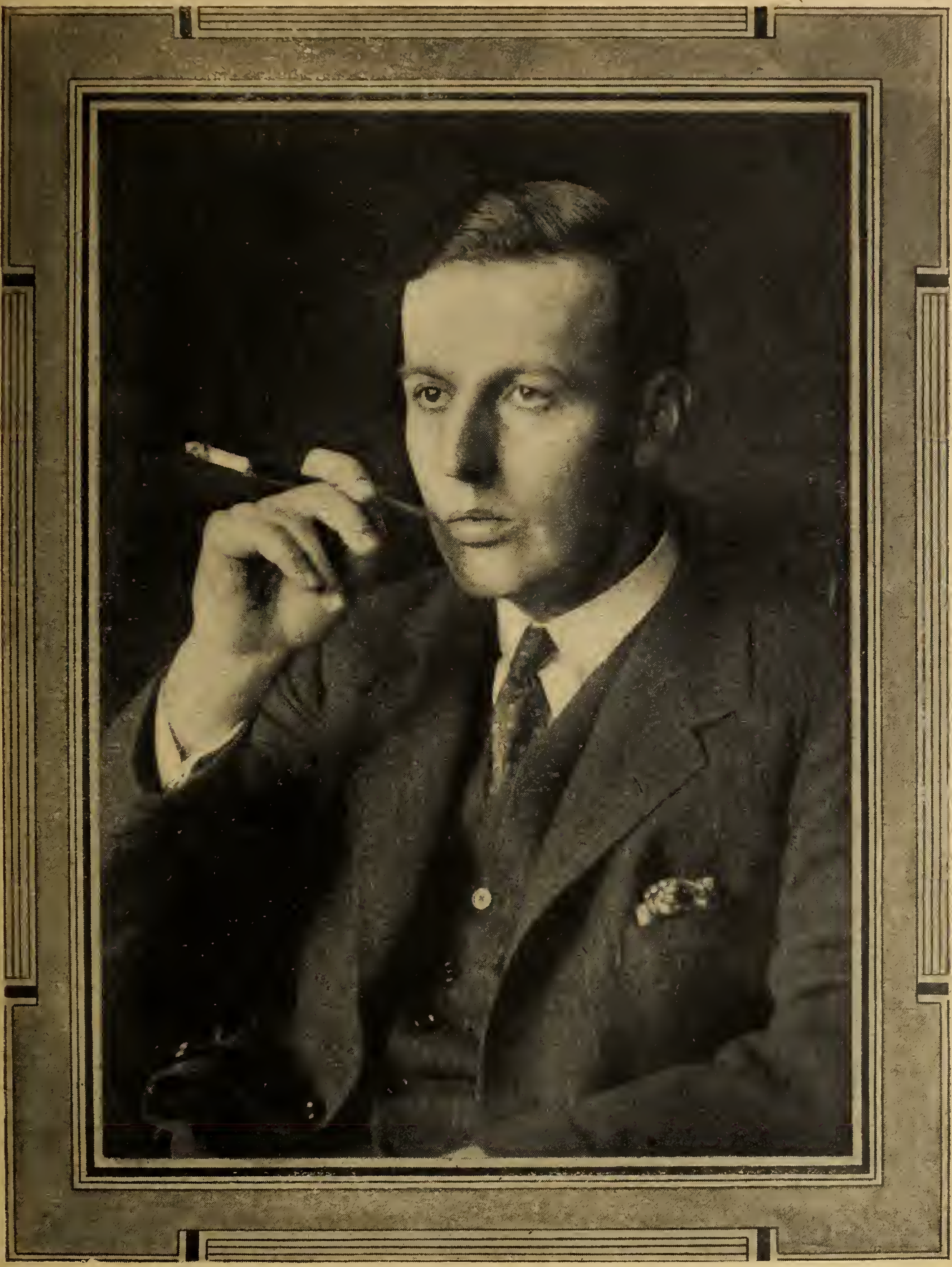
* * *

The Government Prizes

It was hardly to be expected that the regulations governing the competition for the Government prizes for commercial aircraft would escape criticism. We note that a correspondent of the *Times*, evidently a constructor, though he contents himself with the use of initials, says in so many words that the result of the competition will not be in any way beneficial to commercial aviation. If aircraft are to be used in commerce, he says, it is the business men of the country who must decide where they can use them beneficially in their organisation, and in order to do this they must know: the actual cost of aerial transport per ton mile; the degree of reliability on which they can count; and the average speed of transport of which they can be assured. The Government competition does not, he holds, assist in any way in this education of the future users of commercial aircraft.

It appears to us that the *Times* correspondent falls foul of the competition on wrong lines. It may be perfectly true that the regulations are not perfect—nothing is in this world—but we are unable to agree that in these initial days of commercial aviation it is possible to travel as fast as he would have us do. Admitting that it is very necessary that the business community should be properly and thoroughly educated along the lines he indicates, it must be pointed out before any assurances can be given on the three heads we have quoted from his letter it is essential to evolve machines which possess the necessary factor of safety, reliability and speed, which will enable the possibilities to be reduced to a common denominator. That is the intention we read into the regulations—that the competition is designed to assist in the evolution of the best types of commercial aircraft as opposed to the super-efficient war machine, in which a large margin of safety is sacrificed for the sake of attaining other qualities essential in the machine for combat, but totally unnecessary for commercial work. It seems to follow that once the true commercial types have been more or less decided—we had almost said standardised, but that is too definite a term to use at the present stage of development—the rest will follow as a matter of course. Once we have attained to the essential standard of safety and reliability it will be possible to definitely answer the three questions postulated. We shall be able to say with certainty what the cost per ton mile of aerial transport will be. We shall know also what the factor of reliability is, and the average speed of transport it is safe to assure to the business community. All these things, however, must be done in

Flight—And the Men



"Flight" Copyright

Lieut.-Col. J. T. C. MOORE-BRABAZON, M.P., a well-known member of the Committee of the Royal Aero Club, who took a leading part in organising the photographic section of the R.A.F.

stages. We must not ignore the fact that we are really only now on the threshold of commercial aviation. The aeroplane has developed enormously as a result of the War, and we believe it has developed along such lines that we have really but a short distance to travel towards the true commercial type. But after all, we do not know this with certainty yet, and it is in order, as we judge, that we may make assurance sure that the regulations for the Government competition have been drawn as they have. We are as anxious for progress as any, but we do think that with so much of the future at stake the Air Ministry has done well to take *Festina Lente* as the motto for to-day.

◆ ◆ ◆

French Airship Services

It is being freely commented upon that while the British Government is stopping the building of airships, France is embarking on the construction of four rigid airships for commercial purposes, and proposes to run an experimental service with them. When, it is stated, sufficient data have been accumulated as a result of the proposed services, the airships will be handed over to a civil transport company, together with all the information gained during the experimental stage. Government aerodromes will be placed at the disposal of the company, and an arrangement come to between the Government and the company as to subsidy, charges, and so forth.

We have a shrewd idea that this is very much what our own Government is doing, except that the experimental work has already, in our case, been done. We indicated as much last week when writing on the subject of airships and airship services. As a matter of fact we understand that certain negotiations are taking place between the Government and a very powerful group identified with shipping and transport interests for the taking over and running commercially of certain of the completed and uncompleted rigid airships recently handed over by the Admiralty to the Air Ministry. Until the results of these negotiations are known it would be futile to indulge in criticism of the Government policy towards airships and their commercial use, or to contrast the policy of France with our own.

◆ ◆ ◆

The Future of the R.A.F.

There is one aspect of the successful inauguration of the cross-Channel air services which we have not dealt with in our article on the success of the enterprise, for the reason that it stands by itself and thus merits special consideration. It is perfectly clear that these services are only the first of many which will, in the practical assurance of success we now have, spring up in many directions. These services will, as a matter of course, employ large numbers of highly skilled pilots, and even greater numbers of well-trained mechanics, expert and up-to-date in their knowledge of flying and the successful upkeep of aircraft. It stands to reason that this great *personnel* will stand to the country in the relation of a great flying reserve against the possibility of another War, particularly if the Government looks kindly upon the proposal to form a Territorial Air Force. Now it is clear that we do not want it both ways. If we have a large and highly qualified reserve of pilots and mechanics, it follows that we can for a time do with a smaller Regular force than we should need if there were no such reesrve. We have always stood for aerial preparedness, and we do not intend to depart from the attitude we have always preserved in this matter, but the need for national economy is very pressing, and having regard to the circumstances now opening up in regard to the future of commercial aviation, there is not necessarily the same need to keep on the active list of the R.A.F. an establishment of flying officers approximate in numbers to a reasonable war strength of the air service.

We imagine that there will be very few who will quarrel with the general principle thus laid down, but even though we ourselves, with qualifications, subscribe to it, there is need to approach the subject with some amount of caution. In the light of reductions which have already been made in the strength of the R.A.F. and in view of still further possible reductions, there is already talk of the possibility of a return of War Office control and the abolition of the Air Ministry as a separate entity, of course in the sacred name of economy. There seems to be very little doubt that the War Office is still sore at having lost control of the Air Service and would dearly like to get it back. That certain strings are being pulled to ensure this is fairly certain, though we do not believe that for the present at any rate the intriguers have the slightest chance of succeeding in their design.

Economy in administration is an excellent thing in its way, but it can go badly wrong in practice, and we are more than ever convinced that to revert now to the system which was proved to be bad in the War would be a fatal reversal of policy and one to be fought against tooth and nail by all who are interested in the true development of aviation, military or civil. War Office control of aviation resulted in our entering the War in a state of unpreparedness, which was tragical in comparison with the efficiency of the enemy air service. Not until production was taken over from the Army Council did we ever look like obtaining the excess of air power over the Germans which was essential to victory. The truth is that the business of the Army Council was—and is—to run the affairs of the Army, and that it failed to understand that aerial war must be made by men who understand it and who are not tied to the traditions of the Three Arms. As well run the Navy from the Horse Guards as try to preserve our aerial position from the War Office. It has been quite rightly decided—after a bitter price had been paid for past mistakes—that the Air Service is a service apart from either Navy or Army, even though it works in co-operation with both, as they do with each other. It is so and must remain so.

◆ ◆ ◆ ◆

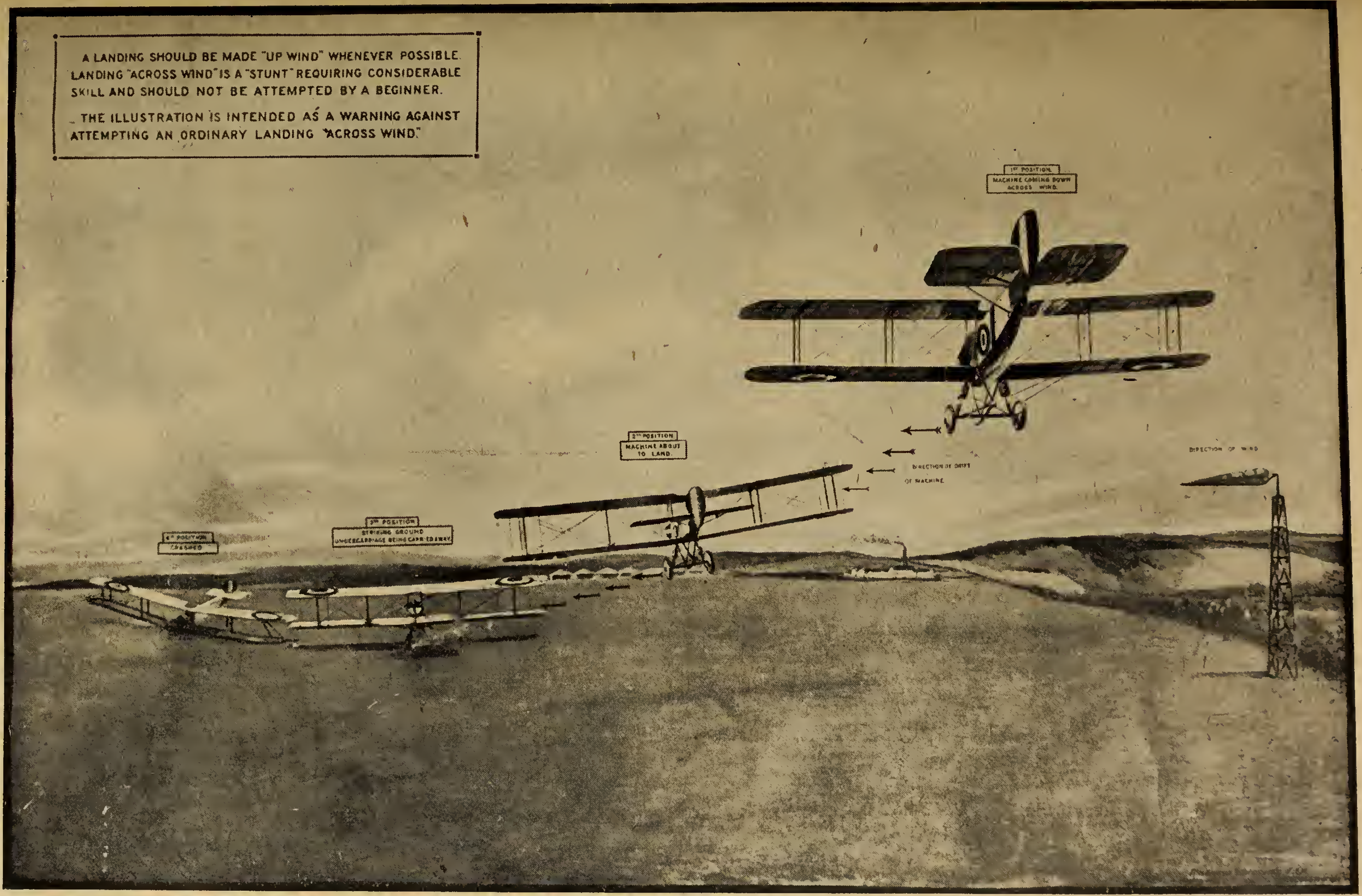
The Folkestone-Cologne Mail Service

During the week ending August 16 the R.A.F. aerial mail service from Lympne to Cologne carried no less than 7,090 lbs. of letters and postal packets.

The service is carried on by two squadrons, Nos. 18 and 120. The former is using D.H.9A machines with Liberty engines, and is working from the Cologne terminal, while the latter is equipped with the D.H. 9 type with B.H.P. engines, and works from Lympne.

The average time taken by machines of No. 18 on the journey is 3 hrs. 14 mins., while No. 120, with rather less powerful engines, average 3 hrs. 23 mins.

The intermediate stage at Maisconcelle is now cut out, and the machines fly through without a stop. Out of 45 trips commenced, only in one case was there failure to complete the journey. The average weight carried per journey was 161 lbs. We understand that, consequent upon the rapid demobilisation of our forces in Germany, the service was discontinued on Monday last.



A LANDING SHOULD BE MADE "UP WIND" WHENEVER POSSIBLE. LANDING "ACROSS WIND" IS A "STUNT" REQUIRING CONSIDERABLE SKILL AND SHOULD NOT BE ATTEMPTED BY A BEGINNER.

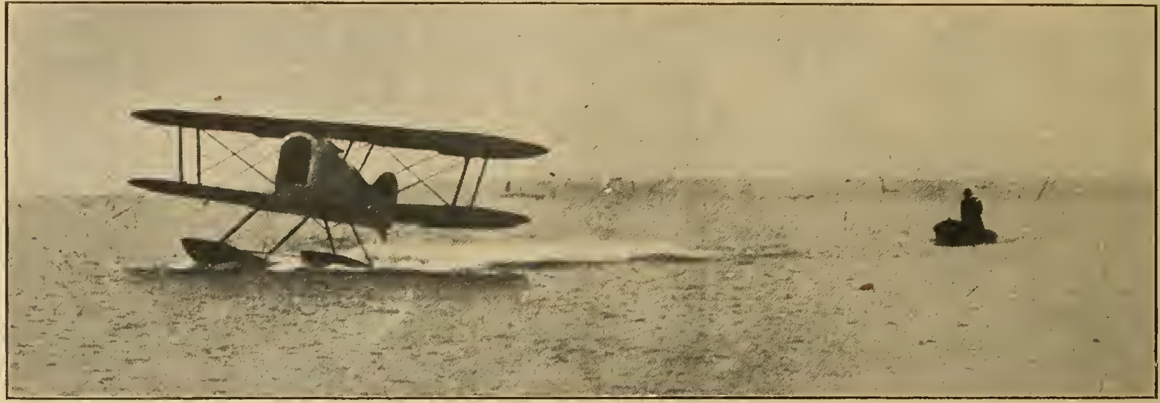
THE ILLUSTRATION IS INTENDED AS A WARNING AGAINST ATTEMPTING AN ORDINARY LANDING "ACROSS WIND."

Landing Across Wind. *(Drawing published by the Air Technical Services for use at R.A.F. Schools.)*

THE JACQUES SCHNEIDER CUP RACE

ON Wednesday of next week, September 10, the seaplane race for the Schneider Cup and Prize will be flown at Bournemouth. Owing to the short notice given, there are doubtless many constructors who would have liked to enter machines for this race, but who have been unable to get machines finished in time. The consequence is that comparatively few competitors have been entered. Italy is represented by only one machine, France by three. America has not entered any. After the great development in aircraft during the War it might have been expected that a contest like the Schneider Cup Race would have attracted a greater number of entrants, not only from abroad, but also from this country. However, it appears that as it is Britain will be the only country to enter enough machines to necessitate the holding of elimination trials, usually not the least interesting feature of the Schneider Cup Race. These elimination trials will, we understand, be held at Cowes on Wednesday of this week, when it will be decided which of the four entrants will have to withdraw from the final race at Bournemouth. As announced last week, the course is a triangle with Bournemouth as the starting and finishing point, the two other angles being at Swanage and Christchurch respectively. The actual length of the course is about 20 nautical miles, and as the race is to be flown over a distance of 200 nautical miles, competitors will have to make ten laps of the course. The machines, should, if the weather is reasonably clear, be in sight throughout the race, while a close view of them will be obtainable from either Bournemouth, Swanage or Christchurch. As in 1914 competitors must, during the first lap of the course, make two alightings on the sea at points indicated by the officials. No information is available yet as to the exact location of these two points, although this may be of great importance if the weather happens to be rough. It is, in fact, this feature of the race which will give some of the slower sturdier machines a chance in what would otherwise be purely a speed race. Again, if it were announced beforehand where the machines must alight, this would afford spectators an opportunity to watch the race from some point close to the place of alighting, which is likely to prove, in some respects, considerably more interesting than the actual air racing.

Presumably the competing machines will carry some form of identification marks or numbers, but up to the present no announcement has been made concerning these. It might have been expected that such a race as this would be taken the fullest advantage of to assist in popularising aviation, but it does not appear that as much has been made of the opportunity as might have been, by those responsible for the organisation of the race.

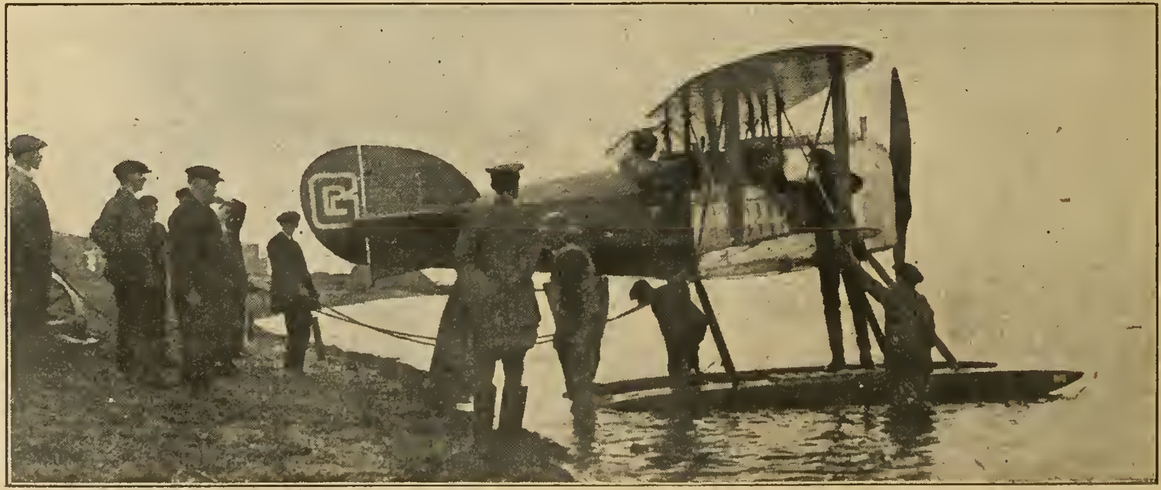


THE AVRO-PUMA SCHNEIDER CUP SEAPLANE: Coming in after a successful trial flight at Hamble, on August 29

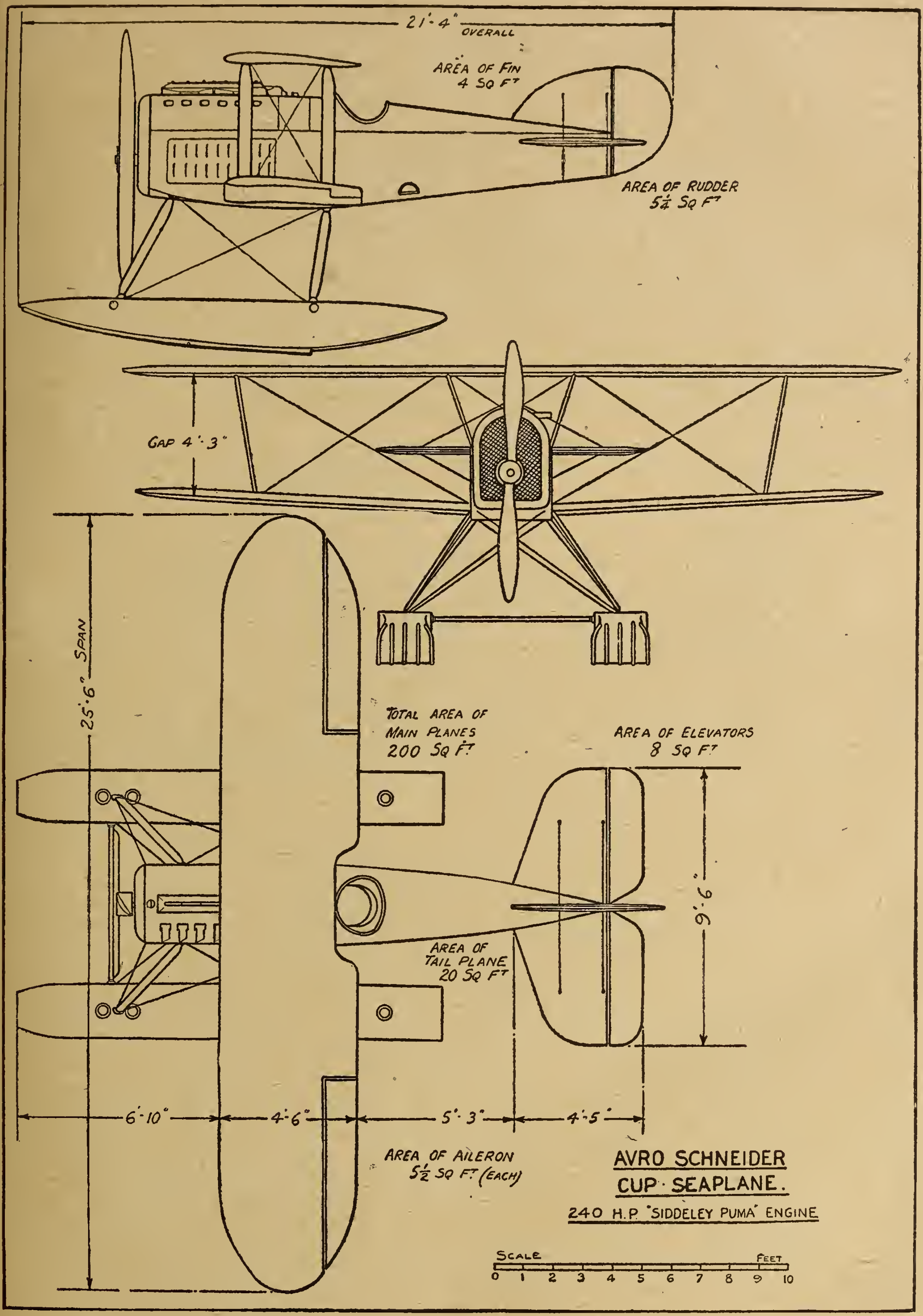
The Machines

If all the machines entered start in the race, and after eliminating one of the four British entrants, the contest will be between seven machines. The four entered by this country are: Avro tractor seaplane, 240 h.p. Siddeley "Puma" engine, pilot Capt. Hamersley, M.C.; Fairey tractor seaplane, 450 h.p. Napier "Lion" engine, pilot, Lieut.-Col. Vincent Nicholl, D.S.O.; Sopwith tractor seaplane, 450 h.p. Cosmos "Jupiter" engine, pilot, Mr. H. G. Hawker, A.F.C.; Supermarine flying-boat, 450 h.p. Napier "Lion" engine, pilot, Squad.-Comdr. B. D. Hobbs, D.S.O., D.F.C.

The machines entered by France are: Two Nieuports, both with 300 h.p. Hispano-Suiza engines, one machine



THE AVRO-PUMA SCHNEIDER SEAPLANE: Preparing the machine for a trial flight. In the cockpit is Capt. Hamersley, M.C., who will pilot the machine in the race


21'-4" OVERALL
AREA OF FIN 4 SQ FT
AREA OF RUDDER 5¼ SQ FT
GAP 4'-3"
25'-6" SPAN
TOTAL AREA OF MAIN PLANES 200 SQ FT
AREA OF ELEVATORS 8 SQ FT
9'-6"
AREA OF TAIL PLANE 20 SQ FT
6'-10"
4'-6"
5'-3"
4'-5"
AREA OF AILERON 5½ SQ FT (EACH)
AVRO SCHNEIDER CUP SEAPLANE.
240 H.P. 'SIDDELEY PUMA' ENGINE
SCALE
FEET
0 1 2 3 4 5 6 7 8 9 10

THE AVRO SCHNEIDER CUP SEAPLANE.—Plan, side and front elevations, to scale to be piloted by Malard, and the other by Casale. A Spad Herbemont, piloted by Sadi Lecointe. The Italian machine will be a Savoia flying-boat, Type S. 13, with 250 h.p. Isotta Fraschini engine, piloted by Janello.

The Avro Seaplane

As the accompanying illustrations will show, the Avro machine entered for the Schneider race is quite a small machine, its overall span being only 25 ft. 6 ins., and its length overall 21 ft. 4 ins. In general outline the Avro shows little resemblance to the other members of the Avro family; so little in fact that it would be impossible to identify it as an Avro from mere outward appearances. The detail construction, however, follows more or less standard Avro lines.

If for no other reason, the Avro would be of interest on account of the fact that it is fitted with the lowest powered engine entered in the race. The Siddeley "Puma" is rated at 240 h.p., whereas the next larger engine—the Isotta Fraschini fitted on the Italian Savoia flying-boat—is rated at 250 h.p.

This low power, however, does not necessarily mean that the machine will not be fast. Avro machines have in the past proved very efficient, and there is no reason to suppose that the present type will prove an exception. Naturally the makers are not anxious to give particulars of performance at the present time, but the small size of the machine, combined with the careful streamlining of all exposed component parts, should give her quite a good turn of speed.

The *fuselage* is of rectangular section as regards its main structure, and is surmounted by a curved top which in front encloses all but the top of the cylinders of the "Puma" engine. The six exhaust pipes project horizontally through the top covering of the body. Behind the pilot's cockpit the deck fairing is fairly deep to form a fairing for the pilot's head.

The upper *longerons*, it will be noticed, are straight and horizontal, thus forming a good datum line from which to true up the *fuselage*.

The radiator is placed in the nose of the *fuselage*, motor car fashion, and is of generous proportions. The result is that the body does not taper off towards the nose, as is the case in the Avro Baby, for instance, but has its sides parallel from the neighbourhood of the pilot's cockpit. The warm air is allowed to escape from the engine-housing through louvres in the side of the aluminium cowl.

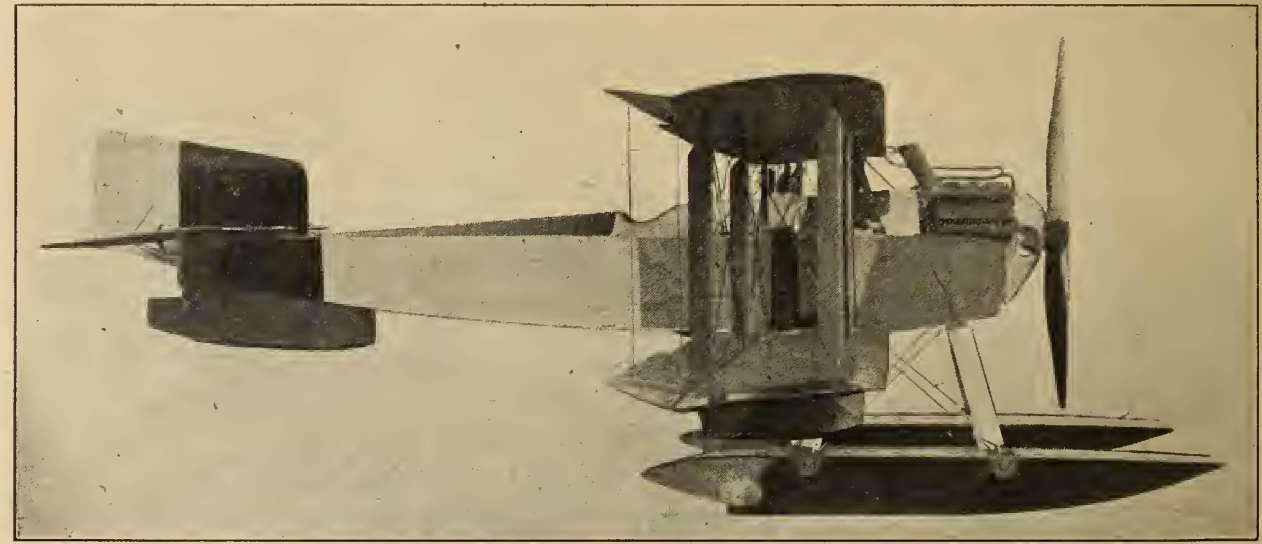
A chassis structure of streamline steel tubes carries the two floats, which are of considerable length (14 ft.), and have one small step, occurring immediately underneath the rear chassis strut attachment. No tail float is fitted, the main floats being so placed as to make this unnecessary. The floats are placed fairly far apart, their track being 7 ft., and with the short span bottom plane avoid the use of wing-tip floats.

One of the most interesting features of the Avro seaplane is the shape of the wing tips. From the plan view of the general arrangement drawings it will be seen that the tips are distinctly rounded, a fact which contrasts markedly with the usual square-tipped Avro wings. Otherwise the wings are characterised by a fairly high aspect ratio—nearly 6.

The top plane, which is in one piece, has no dihedral angle, but the shorter bottom plane is set at a very marked dihedral angle. There is only one pair of inter-plane struts on each side. Owing to the slight difference in span, the inter-plane struts are sloped so as to get the best load distribution. The centre section struts, or rather the struts supporting the centre of the top plane, are sloped outwards in the usual way to reduce the length of "free" spar in the top plane.

The tail surfaces also differ from the usual Avro tails. The fixed tail plane, which is of symmetrical section, is no longer rectangular, but is shaped as shown in the plan view. The addition of a fin, doubtlessly necessitated by the deep nose of the body and by the side area presented by the two long floats, changes the appearance of the tail, and the rudder has not the usual semi-circular balance which characterises so many other Avro machines.

Altogether the Avro seaplane, which, by the way, answers to the series number 539A, impresses one as being a very serviceable little machine, not only for the race contemplated, but also for purposes other than racing.



THE SCHNEIDER CUP RACE.—The Fairey seaplane is similar in general design to the F 3. It is fitted with a 450 h.p. Napier "Lion" engine.

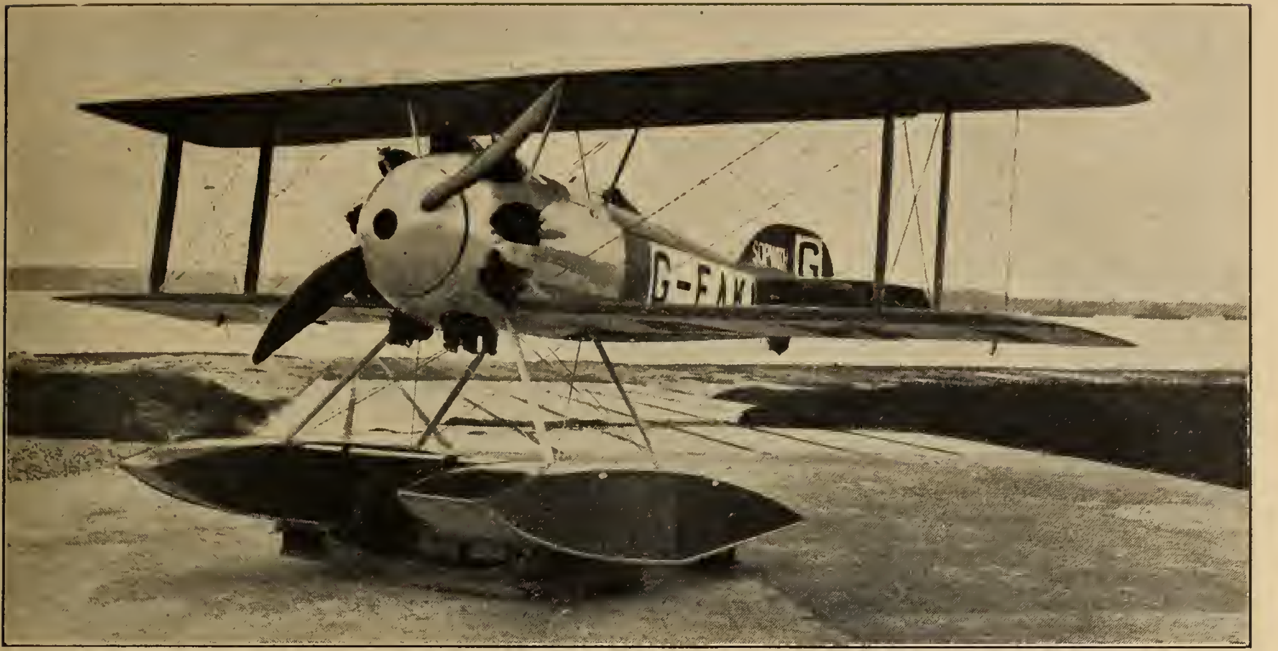
The Fairey Seaplane

Concerning the seaplane entered by the Fairey Aviation Co. little information is at present available. The machine, as shown in the accompanying photograph, has a strong family resemblance to previous Fairey machines, particularly to the type 3. As, however, the Schneider race is chiefly a speed contest, the wing surface has been reduced, while a higher-powered engine—a 450 h.p. Napier "Lion"—has been fitted.

The race is of such a comparatively short duration that the amount of fuel to be carried is very much smaller than the standard load of the type 3, and consequently the wing loading will probably not work out very much heavier than the standard. The main feature of this, as of previous Fairey seaplanes, is the variable camber wings.

The manner in which the camber is varied during flight is very simple and effective, and constitutes, we believe, a Fairey patent. The whole trailing portion of the wings hinges to the rear spar after the fashion of the usual *aileron*. It is divided some distance out, and the outer portion constitutes the *aileron* and works independently of the position of the inner portion, which is operated by a wheel in the pilot's cockpit.

For quick taking-off and for alighting, the trailing portion is pulled down so as to form an angle with the fixed part of the wing, thus virtually increasing the camber;



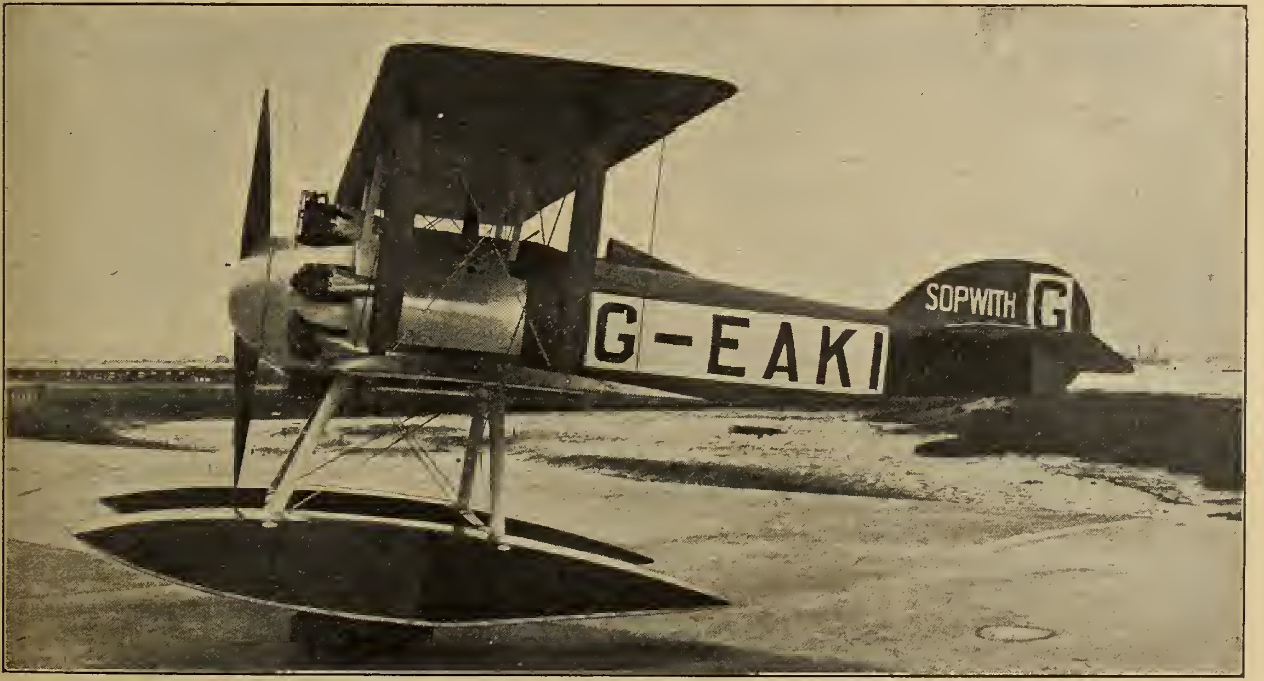
THE SOPWITH SCHNEIDER SEAPLANE: Three-quarter front view

the curve formed is not, of course, a smooth one, but has a marked break in it. For speed work the hinged trailing portion is pulled up to, or above, the line of the actual wing section, thus giving if desired a reflex curvature to the trailing portion of the section. The speed variation obtainable in this manner is very considerable, and results in a reasonably low landing-speed, even with a high loading per square foot.

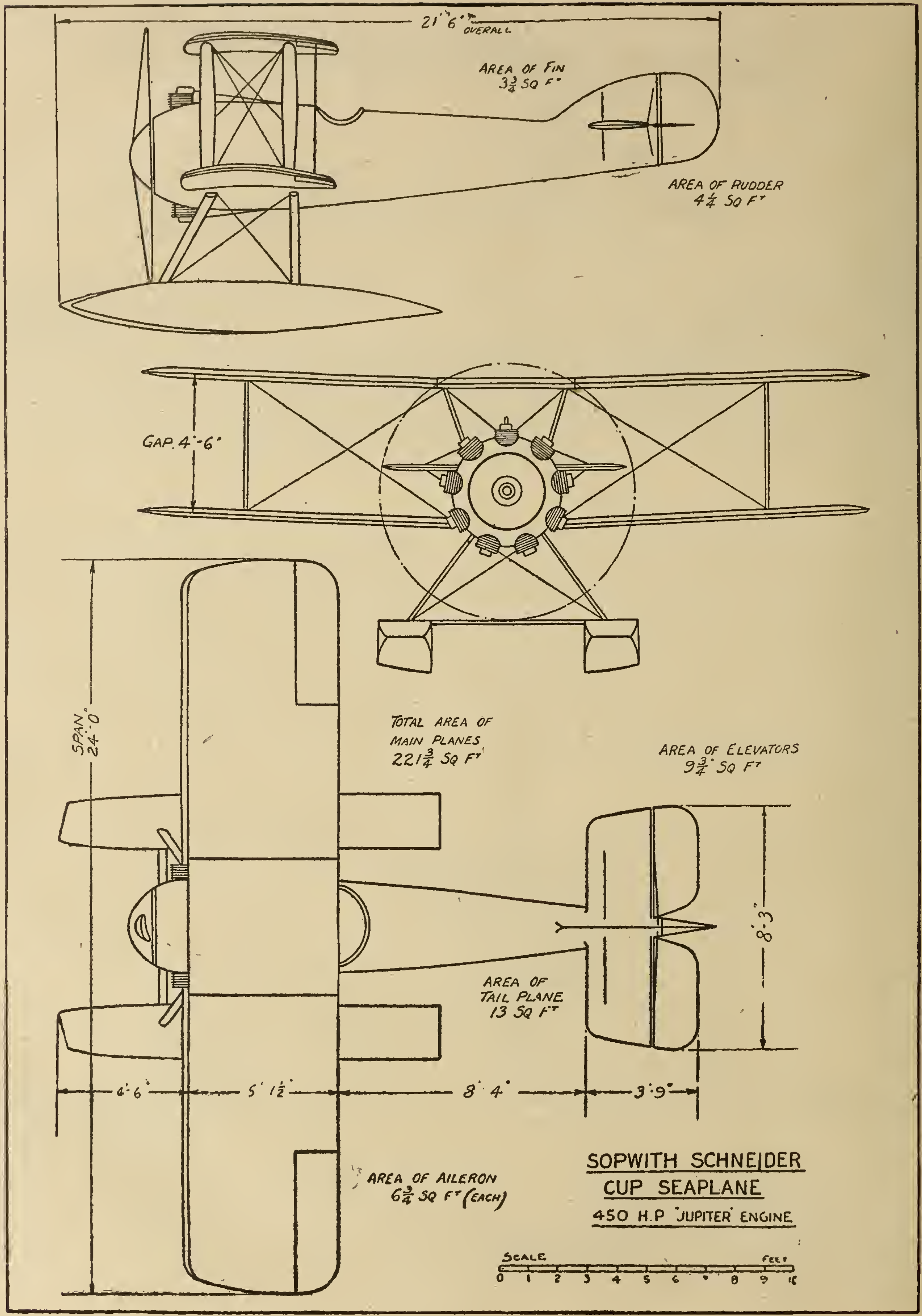
The undercarriage of the Fairey seaplane is of very strong construction, and if the day of the race happens to be a very rough one, the Fairey machine may be able to negotiate a sea which would prove difficult to smaller and more lightly-built machines.

The Sopwith Seaplane

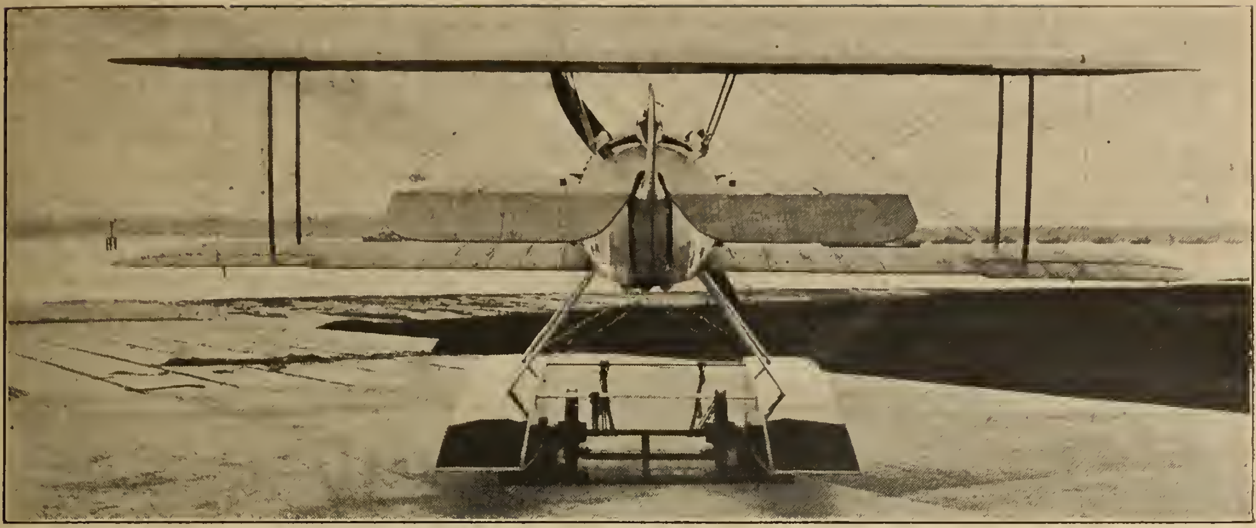
In our last issue we were able to publish a brief description and an illustration of the Sopwith machine, but we were not at liberty to give any particulars of dimensions, etc. This week, however, we are publishing complete scale drawings and photographs, from which can be formed an idea of the small size and general arrangement of the Sopwith Schneider Cup racer. The machine, which is fitted with a 450 h.p. Cosmos "Jupiter" engine, has been very carefully streamlined in order to cut down resistance. Thus, although constructionally not of the *monocoque* type, the body has the rounded shape which one usually associates with that form of construction. The *fuselage* is the usual wood girder-braced structure, but the circular shape of the engine cowl is carried gradually into the flat sides of the rear portion of the *fuselage* by the addition of longitudinal stringers. The front portion of the *fuselage* is covered with aluminium, the rear part with fabric.



THE SOPWITH SCHNEIDER SEAPLANE: Side view.



THE SOPWITH SCHNEIDER CUP SEAPLANE.—Plan, side and front elevations, to scale



THE SOPWITH SCHNEIDER SEAPLANE: Rear view. Note the thick bottom portion of the rudder, which serves as a tail float.

The 450 h.p. "Jupiter" engine is bolted to the flat nose of the *fuselage*, and is faired off with an aluminium cowl, through which the cylinder heads project. A "spinner" is fitted over the propeller-boss, and it will be noticed that each cylinder is faired off by additions to the engine cowl, taking the shape of a slice of a cone. The pilot's head is also faired off, and altogether everything has been done to cut down resistance to a minimum. The fuel tanks are carried inside the top and side fairings of the body.

The planes, which have a very slight backward stagger, are of short span, and have one pair of struts on each side, in addition to the usual centre section struts. Wing bracing is by streamline wires, and is of standard type. *Ailerons* are fitted to both upper and lower planes.

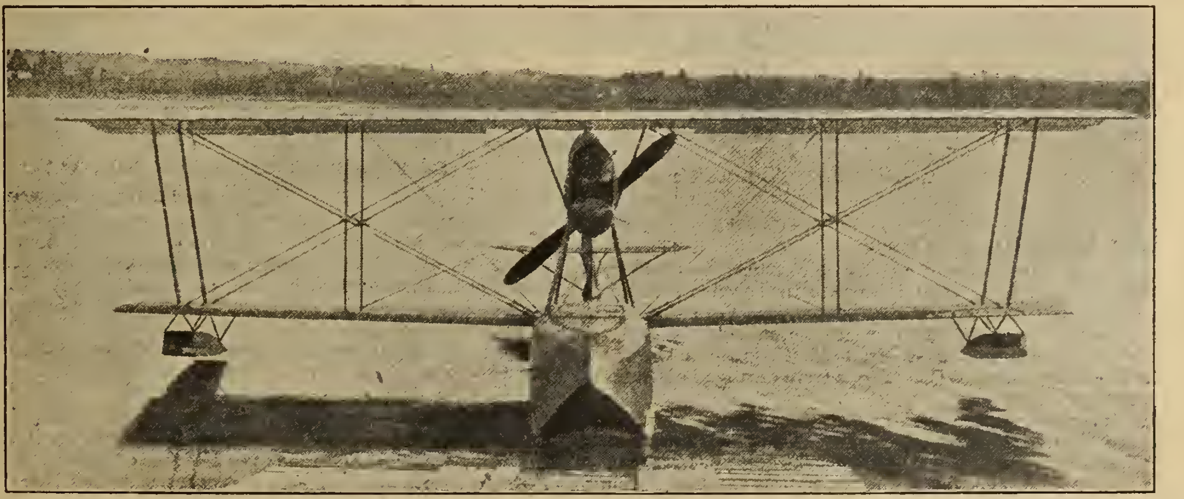
The tail planes are of the usual type, and do not call for any special comment; with the exception, perhaps, of the fin, which is somewhat unusual. The extreme front portion of the fin is built integral with the *fuselage*. The rest of the fin, although curving gradually into the top of the body, is a separate structure, bolted on after the tail plane is in place. The rudder is unusual, inasmuch as its lower portion is very thick, forming a continuation of the *fuselage*. The latter does not come to a sharp edge at the rear, but is some 6 or 8 ins. wide at the stern post. The leading edge of the rudder is made of the same width, and is covered with ply-wood. There is thus no external rudder crank lever, while the single pair of levers for the elevators is housed inside the fin. The whole gives a very neat impression, offering a minimum of resistance. The hollow lower portion of the rudder serves as a tail float.

The two floats are of the flat-bottomed type. That is to say, there is no Vee bottom, and no step in the ordinary sense of the word. It will be noticed, however, that the rear part of the float bottoms slopes upward in a straight line, and does not continue the curve of the front part. The latter is placed at a slight dihedral angle, as shown in the front elevation. The consequence is that the nose of the floats forms an angle with the transverse axis of the machine.

There can be no doubt that as regards speed, the Sopwith Schneider machine will be difficult to beat, fitted as it is with an engine of 450 h.p., and being very small. The weight, all on, is about 2,200 lbs., so that the wing loading will work out at something like 10 lbs./sq. ft. This will mean that the landing-speed will be fairly high, and if the day of the race should prove windy, with a rough sea, alighting might prove a matter of some difficulty. The loading is slightly less than 5 lbs./h.p., probably one of the lightest engine loadings ever attained in an aeroplane. A few years ago this was a fair average weight of the engine itself, and the Sopwith should be practically able to "helicopter."

The Supermarine Flying-boat

As it incorporates several new features, the flying-boat built by the Supermarine Aviation Co. is, up to the present, more or less of a "dark horse," and its makers do not wish any information published before the race. The machine is not, however, a freak built entirely for speed at any cost, and the makers are prepared to take it out in any sea that is likely to be encountered in that part of the world at this time of the year. It is a flying-boat more or less on the lines of previous Supermarine flying-boat scouts, and is fitted with



THE ITALIAN REPRESENTATIVE.—Front view of a "Savoia" flying boat, types 13, fitted with a 250-h.p. Isotta Fraschini engine.

a 450 h.p. Napier "Lion" engine. It is of interest to mention that this machine is capable of the evolutions of the small land scouts, such as looping, rolling, spinning, etc. It will be interesting to see how the seaworthy and necessarily heavier flying-boat will compare with the lighter-built float seaplanes.

The Italian Representative

As already mentioned, Italy is to be represented by one machine only, a Savoia flying-boat of the S 13 type, fitted with a 250 h.p. Isotta-Fraschini engine. As the accompanying photograph of the standard S 13 type shows, the Savoia boat is of more or less standard construction and design. The engine is mounted on struts from the boat, and drives a pusher air-screw. The wing bracing is somewhat unusual, being similar to that familiar from the French Spad biplanes. The bracing wires, instead of going to the ends of the first pair of struts, pass through the centres and on to the ends of the outer struts. The intermediate struts are hinged in the centre, and are in the form of steel tubes, while the outer struts are of wood. The following particulars of the Savoia refer to the standard Type S 13, but it is possible that for the Schneider Race the wing surface may be cut down.

Engine, Isotta-Fraschini V 6, 250 h.p. Length, over all 9·022 metres. Span, 11.8 metres. Wing area, 32·89 sq. m. Weight all on, 1,350 kg. Maximum speed, 206 km. per hour.

The French Representatives

Up to the time of writing no information is available regarding the three machines entered by France. Two of them are Nieuports with 300 h.p. Hispano-Suiza engines, the third being a Spad, probably also with a 300 h.p. H.-S. motor. So far as our present information goes, all three machines will be of more or less standard type. That is to say, they will be the usual Nieuport and Spad biplanes, fitted with floats instead of wheels.

◆ ◆ ◆ ◆

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

JACQUES SCHNEIDER INTERNATIONAL SEAPLANE RACE

This race will be held at Bournemouth on Wednesday, September 10, 1919, the machines representing France, Italy and Great Britain will compete. The course is 200 nautical miles, over a circuit of 20 miles (10 times round) in Bournemouth Bay. The start of the race will take place about 2.30 p.m.

The Royal Aero Club has obtained the loan of the T.S.Y. "Ombra" (350 tons) to accommodate the members on the day of the race. This yacht will be anchored off Bournemouth Pier, and will be the official starting and finishing point, the competitors passing 10 times during the race. Tickets, £2 each, including luncheon and tea on board.

Members are requested to make early application to the Club for tickets.

Motor launches will convey members from the Pier to the yacht between 12 noon and 2 p.m. on the day of the race.

Arrangements have also been made for a members' enclosure at the head of the Pier, Bournemouth, and tickets, admitting to the Pier and enclosure, may be obtained from the Club.

The following are the competitors :—

Great Britain—	Motor.	Pilot.
Sopwith	450 h.p. Cosmos "Jupiter."	H. G. Hawker.
Supermarine	450 h.p. Napier "Lion."	Sqdn.-Com. B. D. Hobbs, D.S.O., D.F.C.
Avro	Siddeley-Deasy "Puma."	Capt. Hamersley.
Fairey	450 h.p. Napier "Lion."	Lieut.-Col. Vincent Nicholl, D.S.O.

(Three competitors from the above are being selected by the Royal Aero Club to represent Great Britain.)

France—	Motor.	Pilot.
Nieuport	300 h.p. Hispano-Suiza.	Malard.
Nieuport	300 h.p. Hispano-Suiza.	Casale.
Spad	300 h.p. Hispano-Suiza.	Sadi Lecointe.

Italy—		
Savoia S. 13	250 h.p. Isotta-Fraschini.	Janello.

Officials on the Race

Stewards of the Meeting
(Commissaires Sportifs)

Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S. (Royal Aero Club.)
Mr. G. B. Cockburn (Royal Aero Club).
Lieut.-Col. Alec Ogilvie (Royal Aero Club).
M. Paul Rousseau (Aero Club de France).

Starters

Lieut.-Col. F. K. McClean.
Lieut.-Col. Spenser D. A. Grey, D.S.O.

Timekeepers

Mr. A. V. Ebblewhite and Mr. A. G. Reynolds.

Press Steward

Lieut. B. Stevenson.

Mark Boat Observers

Mr. Howard T. Wright.
Lieut.-Col. H. T. Tizard.
Sqdn. Ldr. T. O'B. Hubbard, M.C., R.A.F.
Major R. H. Mayo.
Major R. E. Nicoll.

British Motor Boat Club Patrol

Mr. R. H. Cobb.
Mr. T. Desnos.
Mr. B. S. Millard.
Col. C. Pierce.

Clerks of the Course

Group Capt. C. R. Samson, C.M.G., D.S.O.
Lieut.-Com. Harold E. Perrin.

Offices: **THE ROYAL AERO CLUB,**
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

A Long Island–Toronto Race

At 9 a.m., on August 25, 45 aeroplanes started from Roosevelt Field, Long Island, to race to Toronto and back, and 17 started from Toronto to go to New York and back, in a competition, for which prizes amounting to $10,000 (£2,000) have been offered by Mr. J. McE. Bowman, president of the Hotel Commodore Co. Stops were arranged at Buffalo, Syracuse and Albany.

The first three Americans to finish were Lieuts. Plumb and Maynard and Maj. Schroeder, while the first Canadian to complete the round trip was Col. Barker, V.C., flying a captured Fokker. Eleven of the Americans reached Toronto, and seven got back to New York. The bad weather accounted for the elimination of most of the machines.

Lieut. Maynard, of the American Air Service, was declared the winner, his flying time for the 1,040 miles being 7 hrs. 45¼ mins., while Lieut. George was second in 8 hrs. 40¼ mins. and Lieut. Gish third with 8 hrs. 44¼ mins. Lieut. Maynard's mount was a De H.4, with 400 h.p. Liberty motor, and his speed averaged 136 m.p.h.

Lieut. Maynard carried a letter from Mayor Hylan inviting the Prince of Wales to visit New York.

A Meeting at Barcelona

Under the auspices of the Aero Club de Cataluna an aviation meeting is to be held at Barcelona on October 5, the chief event being a race over a course of about 100 kiloms. Foreign pilots will be *hors concours* as far as the race for Spanish planes steered by Spanish pilots is concerned, but if more than three foreign machines take part a special prize will be reserved for them.

STUNT FLYING AND THE COMMERCIAL PILOT

By Lieut. F. T. COURTNEY, late R.A.F.

The question of which type of pilot is likely to be most suitable for commercial work is one of the very greatest importance to the future development of commercial aviation. There are those who maintain that the "slow, steady" pilot is the type required for commercial flying, as, they say, stunting is not only unnecessary, but should be prohibited. There are others, who, like Lieut. Courtney, hold the opinion that although deliberate stunting will not be wanted, occasions are bound to arise when nothing but a manœuvre approaching very closely to a stunt will save a crash. Both sides have, we think, a reasonably good case, and as the subject is of such extraordinary importance we would welcome a discussion on it in our columns. Lieut. Courtney has, we think, put the case for the side which he represents very ably, and it must be admitted that he is singularly qualified to speak from the stunt pilot's point of view, having had long experience of overseas service, test flying, and experimental flying. He is at home on a variety of machines, and is, we think, generally admitted to be able to handle an aeroplane of any type from the small scout to the large twin-engined machine with masterly skill.—Ed.

Whilst there are a number of people who are content to take the present risks of aviation for sporting or semi-sporting purposes, this is far from being true commercial aviation. Immense as has been the advance in matters of reliability in aeroplanes and their engines, there still remains a factor of uncertainty. Engines still fail in flight; they still fail near the ground, and so long as the resultant crashes are the fairly common occurrence they now are the ordinary man will refuse to trust the aeroplane as a business proposition. I think it will be admitted that this element of public doubt, immensely increased by every crash to a commercial aeroplane, is one of the greatest obstacles to the rapid development of commercial flying.

Clearly, therefore, it should be the first consideration of an aerial enterprise, whether of a pleasure or of a business nature, to take the greatest possible pains to avoid any form of crash to its machines, "Well, of course, that is the very first thing we always do," says the commercial firm. Is it?

It is going to be a considerable time before engines, either single or multiple, and their accessories reach the very high degree of reliability which is necessary. So that the only means left to avoid crashes is *to employ the type of pilot who will, if it is humanly possible, be certain to bring safely through any difficulties, his machine or at least its occupants.* Even should only one such emergency arise to a pilot in a year that principle is justified. And unquestionably that principle is not now universally in operation.

Some weeks ago the Prince of Wales went for a stunt flight with Col. Barker, V.C., and an evening paper published this fact with appended comments to the effect that the Prince ought to know better. "There were already enough deaths from commercial aviation without silly stunt flying receiving Royal approbation," or words to that effect. And an aeronautical paper reprinted this article with an approving headline.

Now it is a complete mystery to me that, even now, it fails to penetrate many minds, aeronautical and otherwise, that by far the greater number of serious crashes would never have taken place had the pilot had the skill, lightning judgement, presence of mind and nerve which stunting gives to a pilot who has intelligently learnt to stunt.

Stunting never was and never will be a public danger. The pilot who learns his stunting with due regard to its difficulties and to the practice required becomes an excellent and safe pilot. The pilot who stunts recklessly soon kills himself, (rarely anyone else) and ceases to affect this argument. That unpopular man who dives and "zooms" at people on the ground to "put the wind up them" is never a stunt pilot. If he were hy could effect his object, without any danger to the people, by some real stunting, instead of by the simple, unskilled, fore-and-aft movement of the joystick.

I know some people will never be convinced that stunting, especially low-down stunting, can ever be a matter of very careful, if apparently reckless, flying. The stunting pilot rarely has any sympathy accorded him. Whilst generally enjoying the spectacular side of his flying, most people regard the pilot as an irresponsible fool, with more animal courage than imagination and sense, anxious to get sensation or applause at the risk of his neck; whilst the man who stunts low down, the abhorred of wing and squadron commanders, is generally considered the last word in objectionable idiocy.

Now, in the interests of the safety of flying, it is time these ideas were entirely reversed.

Allowing for certain rare exceptions, the real stunt pilot, perhaps unconsciously, follows certain rules of safety. He has ever in his mind certain possibilities of trouble, such as engine failure, and is ready to deal with them immediately. He is continually putting his machine in extraordinary positions and righting it again. He is discovering the behaviour of a machine in those extraordinary positions, which a pilot who does not stunt never discovers. He is carrying his flying further towards perfection, which the non-stunter never does. Incidentally he is enormously improving his nerve.

How often has not the stunt pilot saved himself and his machine by some violent sideslip to shorten his distance, or by a vertical bank at a low height where the non-stunter does that fatal flat turn, or by some manœuvre which he would not dare to attempt had he not done it many times before in the course of his "silly" stunting? How often has he not, promptly and easily, brought his machine out of some difficulty with which the non-stunter (generally, curiously enough, called a "safe" pilot) would be powerless to deal. The fact that he has done these stunts on his small machine makes little difference. Once a pilot masters the principles and details of stunting, he can apply them to a large machine to the fullesr extent of its strength and manœuvrability.

One of the greatest and most dangerous fallacies of commercial aviation is the idea that the scout-pilot is of little use for passenger carrying, which is supposed to be a work of the heavy machine pilot. The pilot who can really fly a small machine finds the large types child's play. The reverse is by no means the case, which proves that the scout pilot is the better flier. As illustrating my point, it is a fact that during the war a large number of bombing machine pilots were those turned down as unable to fly the lighter machines. If a man cannot fly, easily and well, a small light machine, there is something missing in his flying skill, and it is not good enough for public safety that he should be considered a commercial pilot.

In order to ensure that a pilot should be able to extricate his human cargo from any difficulties he must clearly be able to use to the very limit the manœuvring powers of an aeroplane. He must be able to do this promptly, accurately, and almost unthinkingly.

If he cannot stunt it is clear that he cannot fulfil those requirements. Therefore, the passenger-carrying pilot should, when off duty, be expected to indulge in plenty of hard stunting. Considering that most crashes are due to engine failure low down, then the lower a pilot can manage to stunt the better will he be qualified to avoid crashes, and the more acrobatic are his stunts, the less difficulty will he find in more ordinary situations. *Also*, and that is where the commercial firm must avoid being economical at the public expense, this stunting involves a certain amount of personal risk and a very good quality of pilot, and the price must be paid.

A widespread idea, which is the exact reverse of the truth, is that the peace pilot requires less skill than the war pilot, and that there is a great surplus of pilots for commercial work. It is true that the peace pilot will have less occasion to use his skill than the war pilot, but his skill will have a higher proportional value. There was always a use for the moderate pilot in war, but for commerce he is not good enough, not for some time, at any rate. The skilled pilot requires, besides his skill, other qualities which go to form a combination which is none too common amongst the great number of war pilots. I do not even say that every stunt pilot is a suitable commercial pilot, but I do say that every commercial pilot should be able to stunt.

I know many first-class pilots refused commercial jobs. Knowing their skill, they ask for a respectable salary. I actually heard a prospective employer of pilots say: "But I have offers from pilots to fly for us for £250 a year; look at this letter." There it was, as usual; the good old heavy machine pilot, safe whilst his engines ran well and everything was all right, but dead certain for a bad crash the moment anything went seriously wrong.

For instance, one engine giving out anywhere near the ground, very heavy bumps in bad weather, or any forced landing on a heavy machine. He knew his value and asked for a low salary. Often when a first-class pilot asks for a reasonably-paid job he is told that the heavy machine pilot is wanted. One of the best pilots I know of was refused a job because he had not flown twin-engine machines. This I consider absurd.

The whole argument boils down to this: that intelligent stunting, far from being idiotic, represents the perfecting of a pilot's skill in handling an aeroplane; a pilot can be called first-class only when his flying is reasonably near to perfection; and *only* a first-class pilot is good enough for the safety of passengers and the consequent progress of commercial flying.

THE LONDON-PARIS SERVICES

In spite of tempestuous weather, the aeroplane service between London and Paris, organised by Messrs. Aircraft Transport & Travel, was maintained each day last week. On Saturday, from Paris, a relief machine had to be run, leaving 10 minutes after the scheduled machine, in order to cope with the demand. Each machine carried passengers and parcels—the latter including an urgent consignment of millinery from a Paris costumier to a leading West-end shop. Both "expressess" ran through to time, one landing at Hounslow at 3.10 p.m. and the other at 3.20 p.m. It was also necessary to fly two machines from Paris on Monday.

The first lady passenger was Lady Muriel Paget, who on August 27, flew from Paris to London on the Airco 4A.

Monday.—London 12.30, Paris 2.45; Paris 12.30, London 2.45. Wind in Channel; clouds, rain, haze.

Tuesday.—London 1.15, Paris 3.30; Paris 1.30, London 3.20. Forty miles an hour wind in Channel; low clouds, rain.

Wednesday.—London 12.43, Paris 3.10; Paris 12.30, London 3.20. Thirty-five to forty miles an hour wind; very gusty, clouds only 800 ft. high.

Thursday.—Paris 12.30, London 2.20. Hundred miles an hour hurricane in Channel; continuous heavy rain. The passengers and goods on the 12.30 service London-Paris had to be diverted to an alternative route, because the wind at Hounslow was in gusts of terrific strength, with rain in torrents, and masses of cloud only 100 ft. from the ground.

Friday.—London 12.30, Paris 3; Paris 12.30, London 3. Weather: Rain at times; low clouds.

Saturday.—London 12.30, Paris 3; Paris 12.30, London 3.10. Weather: Twenty miles an hour wind; clouds in patches.

It is hoped that before long arrangements between the British and French Post Office will be concluded to permit the carriage of express letters by air. The fee will probably be 2*s.* 6*d.*, this would include the Post Office charges for express collection and delivery by motor-cycle and special messenger. By the speeding up of land connections it is expected that a letter posted, say, in London during the morning, will reach its recipient in Paris during the early afternoon.

On Tuesday last the Handley Page Transport Co. commenced their service, the machine leaving Hounslow at noon, being piloted by Lieut.-Col. Douglas, M.C., D.F.C., and carrying 7 passengers and 300 lbs. of freight. This service leaves London on Tuesdays, Thursdays and Saturdays, and Paris on Mondays, Wednesdays and Fridays.

The Government and Airships

The Air Ministry announces that in view of the decision of the Government to curtail their airship programme, it has been decided to place certain airships, airship stations, stores, etc., on terms to be agreed, at the disposal of interested parties, with a view to the commercial development of this type of aircraft.

It is proposed as an initial step to hold a conference in connection with this matter on September 8, at 3 p.m., in the Lower Hall, Australia House, at which the Under-Secretary of State for Air will preside.

Bona-fide applications from individuals or firms should be made to the Air Ministry (C.G.C.A.) for permits to be present.

New R.A.F. Titles Brought into Use

It is notified by the Air Ministry that an Order has been promulgated directing that the new titles for officers of the Royal Air Force are to be brought into use in the Force forthwith.

The new titles, which were published on August 4 last, apply to all officers of the R.A.F., whether permanent or temporary, attached to or seconded for service with the R.A.F.

Relinquishment of R.A.F. Stations

It is announced by the Air Ministry that the following Royal Air Force stations are to be relinquished:—

Fishguard (seaplane station).
Tresco, Scilly Isles (seaplane station).
Lincoln, West Common (aerodrome).
Aldeburgh, Suffolk (aerodrome).
Elmswell, Suffolk (aerodrome).

It is also announced that the Royal Air Force landing ground at South Denes (Yarmouth) has been relinquished.

Royal Air Force Decorations

The Air Ministry makes the following announcement:—

His Majesty the King has been graciously pleased to approve the ribbons, as described below, being substituted for those at present in use:—

Distinguished Flying Cross.—One inch and a quarter in width; violet and white alternate diagonal stripes, each of one-eight of an inch in width, running at an angle of 45°.

Air Force Cross.—One inch and a quarter in width; red and white alternate diagonal stripes, each of one-eighth of an inch in width, running at an angle of 45°.

Distinguished Flying Medal.—The same as that for the D.F.C. except that the diagonal stripes are one-sixteenth of an inch in width.

Air Force Medal.—The same as that for the A.F.C. except that the diagonal stripes are one-sixteenth of an inch in width.

The ribbons will be worn one half-inch in depth, the diagonal stripes running downwards from the centre of the tunic towards the left, and will be so arranged that:—

(1) Distinguished Flying Cross or Air Cross Ribbon will show at the top corner nearest to the left arm, and at the bottom corner nearest to the centre of the tunic, triangles of equal dimensions of violet or red, as the case may be.

(2) Distinguished Flying Medal and the Air Force Medal ribbon will show at the top corner nearest to the left arm a triangle of white and at the bottom corner nearest to the centre of the tunic a triangle of equal dimensions of violet or red, as the case may be.

(3) The order of precedence will be the same as at present.

The new ribbons should be worn as soon as practicable by all officers and airmen awarded these decorations. The ribbons are now available, and a free issue will be made to those awarded these decorations.

In the case of demobilised officers and airmen, application for the ribbon should be made to:—

(1) Officers—The Secretary, Air Ministry, Kingsway, W.C. 2.

(2) Airmen—The Officer i/c Records, Royal Air Force, Blandford, Dorset.

Over the North Sea in a Gale

On the afternoon of August 28 the F 5 (Porte) flying boat, fitted with two 350 h.p. Rolls-Royce engines, which, by permission of the Air Ministry has been exhibited by the Gosport Aircraft Co. at Amsterdam, flew back to England in the gale, which did so much damage in the Channel and North Sea. Lieut.-Col. R. Hope-Vere, A.F.C., was the pilot and there were four other persons on board, including Mr. M. H. Volk, General Manager of the Gosport Aircraft Co.; in addition, about 400 lbs. of luggage was carried. The journey occupied just under three hours.

An indication of the weather conditions is the fact that, although the air speed was 72 knots, the machine, when turned into the wind, was nearly brought up standing and, further, the boat had to be steered an average of 35 points south of the true course.

A perfect landing was made at Felixstowe, but the sea was so rough that it was necessary to cruise around for an hour and-a-half before a motor boat could get alongside to take the party off.

To Fly to Tokyo

The Italian poet-aviator, Gabriele d'Annunzio, is making arrangements to fly from Paris to Tokyo on a S.V.A. biplane. He will be accompanied by the Italian pilots Ancilotto, Locatelli, Ferrarin and Bilisco.

The steamship *Nippon* left Italy last week for Tokyo, carrying spare parts of aeroplanes and aeronautical instruments, which will be unloaded at various points on the route to be followed. The ports of call include Salonika and Baghdad.

AERODROMES FOR CIVIL USE

The following lists of aerodromes open to civil aviation are issued as an addition to the lists recently published. It will be seen that in the majority of cases the aerodromes referred to below can only be considered as possible emergency landing grounds. Attention is again drawn to the fact that these lists are purely provisional and subject to alteration or amendment from time to time:—

List C (2).—*Stations temporarily retained for Service Purposes.*

It should be assumed that no facilities normally exist at these stations for dealing with civil aircraft. The aerodromes, however, may be considered as emergency landing grounds.

Aerodrome.	Nearest railway station and distance in miles.	Nearest town and distance in miles.
Beverley	Beverley (1), N.E.R.	Beverley (1)
Boscombe Down	Amesbury (1½) L.S.W.R.	Salisbury (8)
Brooklands	Weybridge (2), L.S.W.R.	Weybridge (2)
Catfirth (s)	Thurso, in Scotland, by boat	Lerwick (9), Shetland Isles
Chattis Hill	Stockbridge (2), L.S.W.R.	Stockbridge (2)
Collinstown	Portmarnock (5), G.N.R.I.	Dublin (6)
Coventry	Coventry (2), L.N.W.R.	Coventry (1)
Crail	Crail (½), N.R.R.	Crail (½)
Cramlington	Cramlington (1), N.E.R.	Newcastle-on-Tyne (7)
Doncaster	Doncaster (1), G.N.R.	Doncaster (1)
Driffield	Driffield (2), G.N.R. and G.E.R.	Driffield (2)
Easton-on-the-Hill	Stamford (3), M.R. and G.N.R.	Peterborough (12)
East Retford	East Retford (3), G.N.R.	Gainsborough (10)
Feltwell	Lakenheath (1½), G.E.R.	Brandon (5½)
Gormanston	Gormanston (1), G.N.R.I.	Drogheda (6)
Gullane	Gullane (1), N.B.R.	North Berwick (4)
Harling Road	Harling Road (¼), G.E.R.	Thetford (6)
Harpswell	Kirton Lindsey (5), G.C.R.	Gainsborough (8)
Helperby	Brafferton (1), N.E.R.	Ripon (8)
Hooton Park	Hooton (2½), L.N.W.R. and G.W.R.	Chester (8)
Killingholme (S)	Habrough (6), G.C.R. (siding on site)	Grimbsy (9)
Lake Down	Amesbury (5), L.S.W.R.	Salisbury (7)
Leighterton	Tetbury (6), G.W.R.	Stroud (10)
Lincoln	Lincoln (1), G.N.R. and G.E.R.	Lincoln (1)
London Colney	Radlett (2), M.R.	St. Albans (4)
Lopcombe Corner	Grateley (4), L.S.W.R.	Salisbury (9)
Minchinhampton	Chalford (1), G.W.R.	Stroud (6)
Narbgrough	Narborough (2½), G.E.R.	Swaffham (5)
Newhaven (s)	Bishopstone (¼), L.B.S.C.R.	Newhaven (2)
Northolt	Northolt Junction (½), G.W.R. and G.C.R.	Uxbridge (1)
Norwich	Norwich Thorpe (1), G.E.R.	Norwich (2)
Penston	Macmeray (1), N.B.R.	Haddington (5)
Port Meadow, Oxford	Oxford (2), G.W.R.	Oxford (1)
Rendcombe	Foss Cross (2½), M.R. and L.S.W.R.	Cirencester (6)
Rochford	Rochford (1), G.E.R.	Southend (5)
Seaton Carew	Seaton Carew (1), N.E.R.	West Hartlepool (6)
Sedgeford	Sedgeford (1), G.E.R.	Hunstanton (5)
Shawbury	Hadnall (3), L.N.W.R.	Shrewsbury (10)
Shoreham	Shoreham (1), L.B.S.C.R.	Shoreham-by-Sea (1)
Shrewsbury	Shrewsbury (1½), G.W.R.	Shrewsbury (1)
Tadcaster	Thorrer (2), N.E.R.	Tadcaster (4)
Ternhill	Ternhill (2), G.W.R.	Market Drayton (5)
Thetford	Thetford (2), G.E.R.	Thetford (2)
Throwley	Charing (4), S.E.C.R.	Faversham (6)
Upper Heyford	Lower Heyford (2), G.W.R.	Bicester (6)
Waddington	Waddington (1½), G.N.R.	Lincoln (5)
Westgate (s)	Westgate (¾), S.E.C.R.	Westgate-on-Sea (¼)
Whitley Abbey	Coventry (2), L.N.W.R.	Coventry (2)
Witney	Witney (2), G.W.R.	Oxford (12)
Wittering	Stamford (3), G.N.R. and M.R.	Peterborough (10)
Yatesbury	Calne(5), G.W.R.	Marlborough (9)

List D (*a*) *Aerodromes licensed for all but larger types o, Aircraft.*

Aerodrome.	Nearest railway station.	Nearest town.
Yeovil	Yeovil (1½), G.W.R., L.S.W.R.	Yeovil (½), Somerset

List D (*b*).—*Aerodromes Licensed as suitable for " Avro* 504 *K. and similar Types of Aircraft " only, except in a very few instances accommodation does not exist. The Licenses have also been issued for limited periods only.*

Aerodrome.	Nearest railway station.	Nearest town.
Aberystwyth	Aberystwyth (½), G.W.R.	Aberystwyth (½), Cardigan
Chesterfield	Chesterfield (2), M.R.	Chesterfield (2) Derby
Conway	Conway (1), L.N.W.R.	Conway (1), Carnarvon
Derby	Normanton (1½), M.R.	Derby
Herne Bay	Herne Bay (1), S.E.C.R.	Herne Bay (½) Kent
Nottingham	Nottingham (2), M.R., G.N.R., G.C.R.	Nottingham
Situated on Sands not available at high Tide.		
Hunstanton	Hunstanton (¼), G.E.R.	Hunstanton (¼) Norfolk
Llanelly	Llanelly (1), G.W.R.	Llanelly (¼), Carmarthen
Ramsey, I.O.M.	Ramsey (¼), I.O.M.	Ramsey (¼), I.O.M.
Rothesay, Etherick Bay	By boat to mainland	Rothesay (4), Isle of Bute
Southport	Southport (1), L.Y.R.	Southport (½), Lancs.
Swansea	Swansea (1), G.W.R.	Swansea (½), Glamorgan
Weston-super-Mare	Weston-super-Mare (½), G.W.R.	Weston-super-Mare (½), Somerset

List E.—Stations no longer in use by the R.A.F.

These stations have been passed to the Government Surplus Property Disposal Board. They will be relinquished as soon as the Government property thereon has been disposed of. In many cases the aerodromes are now under cultivation, but it is probable that the sites still form the best emergency landing grounds in the immediate neighbourhood.

Aerodrome.	Nearest railway station and distance in miles.	Nearest town and distance in miles.
Aldeburgh	Aldeburgh (2), G.E.R.	Aldeburgh (2)
Ashington	Longhirst (1), N.E.R.	Morpeth (5)
Athlone	Athlone (2), M.G.W.R.	Athlone (2)
Atwick	Hornsea (3), G.N.R.	Driffield (1)
Ayr	Ayr (1), G. & S.W.R.	Ayr (1)
Bacton (c)	North Walsham (4), G.E.R.	Norwich
Beaulieu	Brockenhurst (6), L.S.W.R.	Southampton (10)
Bekesbourne	Bekesbourne (1), S.E.C.R.	Canterbury (4)
Bembridge	Bembridge (½), I. of W. Rly.	Ryde (6)
Bembridge (s)	Bembridge (¼), I. of W. Rly.	Ryde (6)
Burgh Castle	Great Yarmouth (2), G.E.R.	Great Yarmouth (2)
Butley	Belton (3), G.E.R.	Woodbridge (5)
Catterick	Catterick Bridge (1½), N.E.R.	Richmond (6)
Chickewell	Weymouth (1), G.W.R. and L.S.W.R.	Weymouth (1)
Chingford	Ponders End (½), G.E.R.	Chingford (2)
Copmanthorpe	Copmanthorpe (¼), N.E.R. and G.N.R.	York (5)
Covehithe (c)	Southwold (5), G.E.R.	Southwold (5)
Edzell	Edzell (2), Cal. Rly.	Montrose (9)

Elmswell	Elmswell (2), G.E.R.	Bury St. Edmunds (10)
Elsham	Elsham (3), G.C.R.	Barton-on-Humber (6)
Fairlop	Fairlop (1), G.E.R.	Romford (4), Essex
Goldhanger	Maldon (3), G.E.R.	Maldon (3)
Goring-by-Sea (c)	Goring-by-Sea (½), L.B.S.C.R.	Worthing (2)
Greenland Top	Stallingborough (1½), G.N.R.	Grimsby (7)
Hadleigh	Ipswich (9), G.E.R.	Ipswich (9)
Hainault Farm	Goodmayes (1¾), G.E.R.	London (8)
Hamble (s)	Netley (3), L.S.W.R.	Southampton (5)
Holt	Holt (4), M. & G.N.J.R.	Norwich (11)
Joyce Green	Dartford (2), S.E.C.R.	Dartford (2)
Kirton Lindsey	Kirton Lindsey (1½), G.C.R.	Gainsborough (12)
Leadenham	Leadenham (1), G.W.R.	Grantham (12)
Lilbourne	Cliftonmill (1½), L.N.W.R.	Rugby (3)
Machrihanish (c)	Campbeltown(2), on Campbeltown and Machrihanish Light Rly. from Campbeltown by steamer	Campbeltown (2)
Manywell Heights	Bradford (5), G.N.R.	Bradford (5)
Marden	Marden (1), S.E.C.R.	Tonbridge (6)
Mattishall (c)	East Dereham (5), G.E.R.	East Dereham (5)
New Haggerston (c)	New Haggerston (2½), N.E.R.	Berwick-on-Tweed (7)
New Holland	New Holland (¼), G.N.R. and G.C.R.	New Holland (¼)
Newmarket	Newmarket (1), G.E.R.	Newmarket (1)
Newlyn (s)	Penzance (2), G.W.R.	Penzance (2)
Omagh	Omagh (2), G.N.R.I.	Omagh (2)
Owthorne	Withernsea (½), G.W.R.	Hull (16)
Padstow (c)	Padstow (2), G.W.R.	Bodmin (12)
Penshurst	Penshurst (1), S.E.C.R.	Tunbridge Wells
Peterhead (s)	Peterhead (1), G.N. of S. Rly.	Peterhead (1)
Portholme	Huntingdon (1), G.N.R.	Huntingdon(1)
Prawle Point	Kingsbridge (7), G.W.R.	Plymouth (22)
Redcar	Redcar (1½), N.E.R.	Middlesbrough (6)
Ripon Racecourse	Ripon (2), G.N.R.	Ripon (2)
Rustington	Angmering (1), L.B. & S.C.R.	Littlehampton (2)
Scale Hall	Lancaster (1), L.N.W.R.	Lancaster (1)
Seahouses	North Sunderland (1), N.E.R.	Alnwick (12)
Southbourne	Southbourne Halt (½), Emsworth (2), L.B. & S.C.R.	Chichester (6)
Stenness (s)	To Thurso by boat	Kirkwall (10), Orkney Islands
Stow Maries	Cold Norton (2), G.E.R.	Maldon (5)
Strathbeg (s)	Lomax (6), G.N. & S.R.	Peterhead (8)
Tydd St. Mary (c)	Tydd (2), M.R. & G.W.R.	Long Sutton (3)
Tynemouth	Tynemouth (1), N.E.R.	Newcastle-on-Tyne (8)
Turnberry	Turnberry (½), G.S.W.R.	Ayr (14)
Upwood (Bury)	Ramsey (2), G.E.R. and G.N.R.	Wyton (6)
Usworth	East Boloon (1), N.E.R.	Sunderland (6)
Walmer	Walmer (1¼), S.E.C.R.	Walmer (¼)
West Ayton	Forge Valley (½), N.E.R.	Scarborough (5)
Westward Ho !	Northam via Bideford (1), L.S.W.R.	Westward Ho (1)
Whiteburn	Grants House (4), N.B.R.	Duns (8)
Wye	Wye (1), S.E.C.R.	Ashford (4)
Wyton	Huntingdon (5), G.N.R.	Huntingdon (5)

REFERENCES.—(s) = Seaplane station. (c) = Known to be under cultivation or otherwise unsuitable for landing.

◆ ◆

Aircraft Work in Russia

IN the attack on Yemtsa on August 29, aircraft co-operated dropping bombs on barracks in the village and on armoured trains. On the following day our aeroplanes bombed Plesetskaya heavily.

An American Squadron to Assist Poles

IN their fight against the Bolsheviks, the Polish Army should find welcome aid from the squadron of American aviators which is being formed in Paris. It is stated that Maj. Fauntleroy and Capt. Cooper have received official authorisation from Gen. Rosvedowski, head of the Polish Military Mission, to organise the squadron which it is proposed to call the Kosciusko Squadron, after the Polish national hero, and is expected to leave for Poland about September 15.

The Air Raid on Kabul

SOME details of the aeroplane raid on Kabul a few months ago have now been published. It appears that the raid was carried out by Capt. Halley in the Handley-Page machine in which Gen. McEwen flew to India last January, and Lieut. Villiers was the observer. Having flown from Risalpur, about 400 miles away, passing over Jellalabad, the machine flew straight across to Kabul, going up to 8,000 ft. to cross one ridge, and reaching Kabul early in the morning. It was over the city for ten minutes, the whole flight lasting six hours.

Air Attacks on Raisuli

A SPANISH airman bombed the fondak of Wadi Ras on August 23, and again on August 24, says *The Times* correspondent at Tangier. He adds that on August 23 two of Raisuli's regular soldiers were killed, but the tribesmen report that on the next day they had time to take to the dug-outs constructed some time ago at Raisuli's orders, and there were no casualties. They report that five bombs were dropped on the first day and 11 on the second. The tribesmen describe the aeroplane as armoured, and they state that they were unable to shoot it down, although it was flying at a low elevation. They are undoubtedly impressed by this new type of machine.

Civil Aviation in France

FROM information received by the *Petit Parisien*, it appears that a vast system of aeroplane routes is soon to be opened up which will cover the whole of France.

Shortly a French company will start a service competing with the English companies between Paris and London, and assuring a daily aeroplane service. A service between Paris and Lille is already established, and one between Bordeaux and Nice is to be started before long. Several firms are experimenting with a view to producing a machine specially suitable for touring purposes.

Aviation, adds the *Petit Parisien*, is to play a principal *rôle*, especially in the colonies. Several of them will possess a regular aeroplane service. The first system will be established in Morocco. A project is being considered for establishing aeroplane communication between the auriferous regions of French Guiana and the coast.

International Air Traffic

AN International Conference of Aerial Traffic Companies has been held at The Hague, states the *Morning Post* correspondent at Amsterdam, at which it was decided to institute a combination of interests under the title of "The International Air Traffic Association."

A Franco-Spanish Service

A FRENCH aviation company of Toulouse has been authorised to begin an air service over Spanish territory from Portbou, on the Franco-Spanish frontier, to Cadiz, with compulsory stops at Barcelona and Malaga and facilities for establishing other intermediate aerodromes.

A Handley-Page Service in Brazil

WITH characteristic enterprise the Handley-Page company has secured the first complete aerial concession from the Brazilian Government. We understand the concession is to carry mails and passengers between Buenos Aires and Pernambuco (2,725 miles), and the intervening towns. The final plans are now nearing completion, and it is hoped to begin the service very soon.

At first flying will be by day only, and the trip will take four days. It is hoped later to run a night service as well as a day one.

An Italian Aeroplane for Holland

THE Director-General of the Italian Aviation Department has presented to the Dutch Military Aviation Service an aeroplane of wholly Italian construction as a token of the sympathy and cordial relations existing between Italy and Holland. The Dutch Government has accepted the gift with thanks.

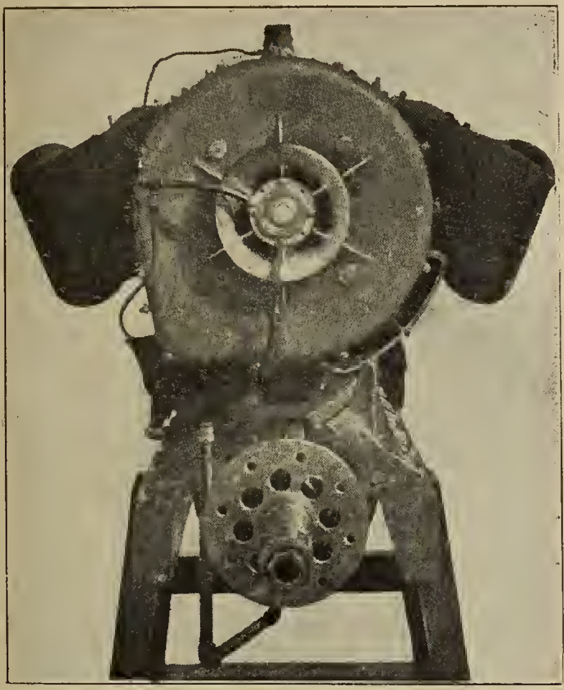
MAINTAINING CONSTANT PRESSURE BEFORE THE CARBURETTORS OF AERO ENGINES REGARDLESS OF THE ALTITUDE

By LESLIE V. SPENCER, M.E. (formerly Editor of Technical Publications, Experimental Department, Aeroplane Engineering Division, Bureau of Aircraft Production at the McCook Field, Dayton)

(Concluded from page 1090)

The Moss Turbo-Supercharger

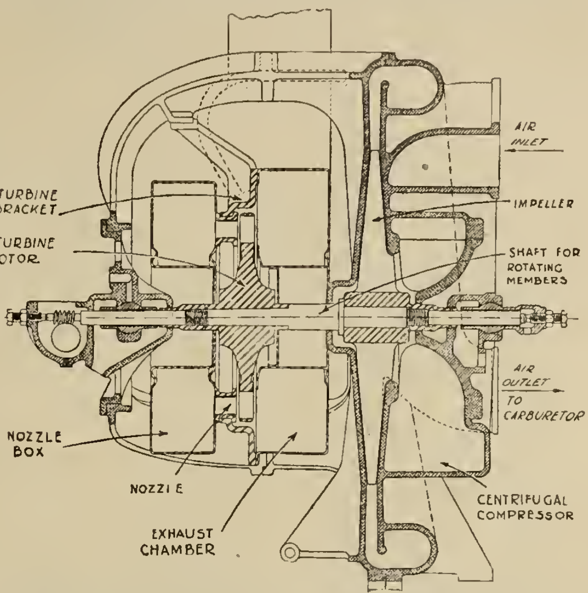
It has previously been brought out that the Sherbondy and Moss turbo-superchargers have few mechanical details in common, although both designs adhere to the same principles of operation. This is to be expected, in that both engineers worked entirely independently of one another. Therefore, neither device has a monopoly of all the good features; each has certain advantages that the other lacks, and in the final analysis it might be said that both are about on an equal footing as regards efficiency, when everything is taken into account.



The supercharger developed by Dr. Moss of the General Electric Co.

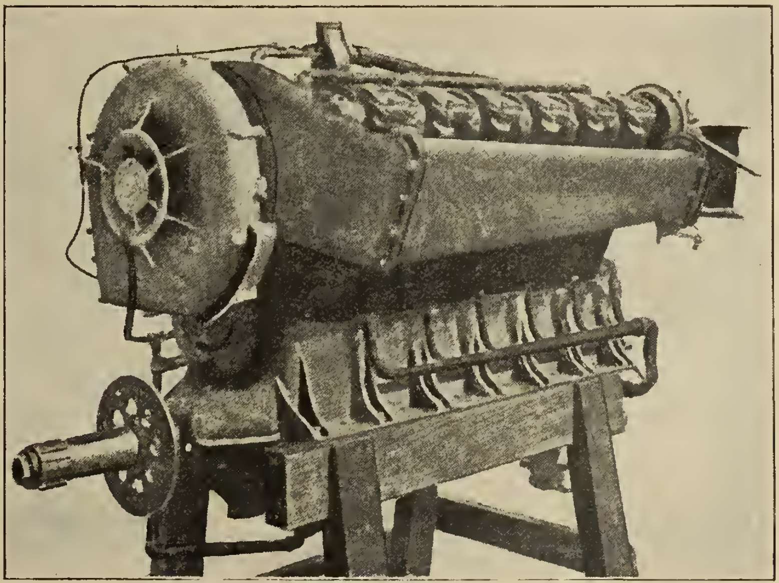
Dr. Moss, in his development work, had back of him his experience and that of the General Electric Co., Lynn, Mass., with which he is connected, whereas Mr. Sherbondy performed his work independently. He was, however, assisted by the Fergus Motors of America, Newark, N.J., which concern did much of the accurate construction work under his direction, and by the De Laval Steam Turbine Co., Trenton, N.J., where preliminary steam tests of the Sherbondy outfit were made prior to any operative trials on the Liberty engine. On the other hand, all Moss experimental work was carried on by the General Electric, including steam testing.

Like Mr. Sherbondy, Dr. Moss was specially fitted to conduct experimental and research work on exhaust gas turbines and direct-connected air compressors through wide experience with gas turbines in general. The General Electric Co. has carried on experimentation for a number of years under Dr. Moss's direction along this line, but the difficult nature of the gas turbine problem is brought out forcibly by the fact that to date this concern has not been able to perfect its turbine and compressor units to the point where it cares to put them on the market as a commercial proposition. It will be appreciated, therefore, that Dr. Moss was not striking out blindly along a new engineering path in designing a small turbo-compressor unit, but the new part was the producing of such a unit for the highly special service which it is called upon to perform in an aviation engine in connection with the Rateau system of supercharging.

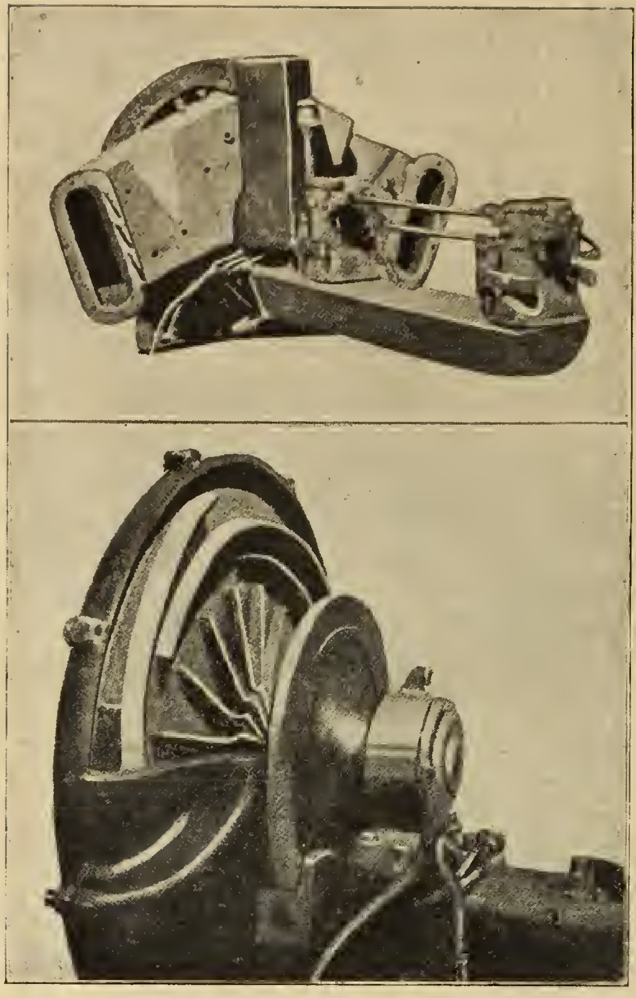


Cross-section of an exhaust turbine-driven supercharger designed by Prof. Rateau in France

As the illustrations show, the Moss turbo-supercharger incorporates the turbine rotor and the centrifugal compressor air impeller on the same shaft, and is arranged so as to leave the Liberty engine carburettors in the centre of the V, connected to the air discharge of the compressor by an induction pipe of generous proportions which is rectangular in section. The engine exhausts are on the outside, and the



The Moss supercharger installed on a Liberty Twelve



The Moss supercharger : Above is shown the nozzle box and induction system, and below the turbine wheel and water-cooled rear bearing

gases are sent to the nozzle box of the turbine by means of substantial specially-designed exhaust headers which connect at their front ends to the flanges on either side of the nozzle box.

The very large size of the exhaust headers and the nozzle box is evident from the illustrations. By this design the exhaust gases are offered as unrestricted a passage in as direct a path as possible to the turbine buckets, so that the discharged gases from the engine should possess a large percentage of their outlet energy on reaching the point of expansion. This free passage feature should also have an effect upon the cooling of the device.

Unlike the Sherbondy machine, which has a circular nozzle plate, with nozzles all around the turbine wheel, the Moss nozzles are arranged in a semi-cicular plate set into the front side of the nozzle box, as shown in the illustration. This should be a factor in keeping down the temperature of the rotor, since the intense exhaust gas heat is not being directed to the entire rotor all the time, but to only about one-half of its circumference.

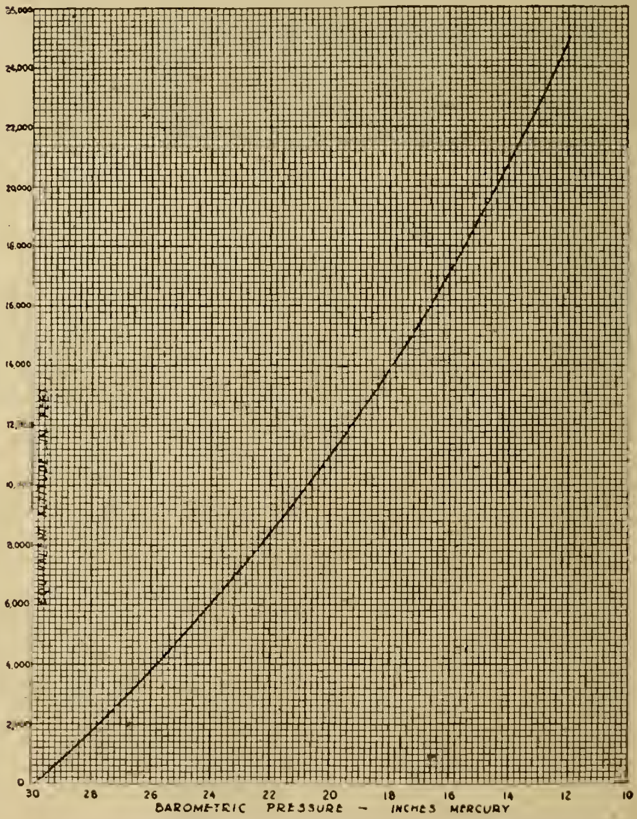
In further comparison between this machine and the Sherbondy final design, it is also to be noted that due to the turbine and compressor being practically separate so far as their housings are concerned, the Moss device is of greater fore and aft width than the Sherbondy. This was no doubt partially due to a desire to permit as much air circulation between the two parts as possible for cooling reasons. The construction has the disadvantage, however, that the machine cannot be installed on the Liberty engine with the propeller in its normal position. To accommodate the depth of the Moss machine there has to be a special propeller flange and hub construction in order to bring the screw forward a small distance. In building his machine this way, it is evident that the designer considered the advantage of greater cooling sufficient to outweigh any disadvantage due to the necessity for alternating the propeller position to make room.

Instead of the air being drawn into the compressor through an opening in the front centre, as with the Sherbondy machine, the Moss air intake is an integrally cast mouth that leads from the side of the housing to the compressor centre at the rear and just ahead of the turbine, where the air is caught up by the blades of the impeller. This part is therefore in the reversed position from that of the Sherbondy impellers, the entrance side of the blades being toward the zear instead of to the front.

A feature of the Moss machine is the water-cooled rear bearing which shows clearly in one of the illustrations. This is nothing more or less than a special water jacket that surrounds the bearing proper, and through which water is circulated from the regular water circulation system of the engine. The machine also is provided with self-aligning bearings to take care of any slight inaccuracy of the position of the rotative parts due to the high speeds and high temperatures encountered in operation. There is also a thrust bearing to handle the thrust created by the action of the exhaust gas on the turbine blades.

In confirmation of the precautions taken in the design and the special features incorporated against overheating, the Moss apparatus has never given any appreciable overheating trouble in any operative tests yet conducted. The nozzles, which are subjected to the most severe heating conditions, have shown a slight red colour after considerable running, but none of the other parts has become hot enough to reach a visible red. Undoubtedly the successful results obtained in this respect are due largely to the provision for free air circulation around the turbine and equally free method of exhaust. In the writer's opinion Dr. Moss has been entirely justified in claiming slightly more room at the front of his machine than is allowed by the normal position of the propeller of the Liberty engine, for this permits the design of the apparatus in such a way as to get about as good cooling effect as is possible in the necessarily limited space available. The matter of the heat dissipation is of premier importance in any development work of this nature.

In order to prevent the nozzle box and exhaust manifolds from getting out of shape due to the temperature and the pressure of the gas within, these chambers are internally braced by means of cross stays which are welded to the casings. This was found necessary due to the fact that the nozzle box



Bureau of Standards curve between pressure and altitude at a temperature of 50° F.

must not be allowed to distort to any extent, and in order to maintain a good joint between the nozzle box and the manifold on either side the manifold must be made quite rigid without being heavy. The cross stays have proved a most satisfactory expedient.

Limitations and Future Possibilities of Supercharging

Of course, one of the first considerations in connection with the adding of any equipment or accessory to an aeroplane is whether or not the increased complication and additional weight which it entails are justified in the advantage gained. The turbo-supercharging system without question adds greatly to the complication of the power-plant of the plane, increases the number of things that can get out of order, and contributes some 200 to 300 lb. to the total weight of the ship. Unless automatically controlled, it also means one more unit for the pilot to handle, when he already has about as many things to control as one human being can possibly take care of.

Further, due to the very high operating temperatures of the devices that have so far been designed (the temperatures range anywhere from 1,250 to 1,400 degs. Fahr.), there is an added fire risk where a supercharger is used, which is a factor of no small importance. To minimise the danger from this source, it is impracticable to have the combustible parts of the *fuselage*—wood and fabric parts—very near the supercharger. This would ordinarily mean a wider *fuselage* than would otherwise be necessary.

Another thing that enters into the problem is the matter of the propeller. If the screw is designed to operate efficiently in conjunction with the plane at or near the ground level, this same propeller will not be able to hold the engine down to proper speeds when in the less dense atmosphere at altitudes, if there is some form of supercharging apparatus maintaining the engine's power at approximately the same value as at ground level. It would be impossible to design a fixed-pitch propeller to operate efficiently with the supercharged engine; therefore, when the supercharger is developed to the point where it is entirely practical for high altitude planes, we must also have adjustable pitch propellers so that as the height is increased the pitch of the screw can be changed to get the greatest advantage out of the supercharger boost. This, then, gets down to the fact that the supercharging apparatus must not only be charged with the added weight which it adds itself, but it must also be considered as weighing whatever additional the variable pitch propeller figures as compared with the fixed-pitch type. Not only that, but there has not as yet been a successful type of variable pitch air screw developed, which means that this experimental work should be carried on along with the development of the supercharging system itself. The variable pitch propeller spells still more weight, further complication of the aeroplane, and last, but not least, another control lever for the pilot to worry about.

Again, the supercharging system must be practically airtight on both the induction side and the exhaust side. The apparatus cannot operate satisfactorily if there is any pressure leakage either where the induction pipe joins the air discharge of the compressor, or where the carburettor or carburettors attach to the intake pipe. At 20,000 ft., as an example, the pressure outside the induction pipe is about 7.5 lbs. per sq. in., whereas within the induction pipe the pressure is about twice this amount. The reason for tight joints is therefore obvious. In order to have as little pressure drop on the exhaust side between the point of engine exhaust and the point where the pressure is utilised to drive the turbine rotor, it is also apparent that there must be no leakage around the joints of the cylinder exhaust passages to the exhaust manifold, or at the juncture of the manifold to the turbine nozzle box. Both of these conditions of tight joints are difficult of fulfilment under field service conditions, as will readily be appreciated, but by the use of special forms of gaskets and the application of red lead to the flange connections this difficulty has been largely overcome in the experimental work so far done. In making these connections on the exhaust side, it also has to be borne in mind that due to the high pressure and temperatures in maximum operation of the apparatus allowance must be made for expansion of the manifolds and gas casing, for otherwise these parts would soon warp and crack. Therefore, although tight joints are essential, there must also be a certain degree of flexibility to the exhaust assembly. Possibly some form of expansion joint might be devised which would allow for movement, while at the same time maintaining pressure-tight connections between cylinders and exhaust headers, and headers and turbine.

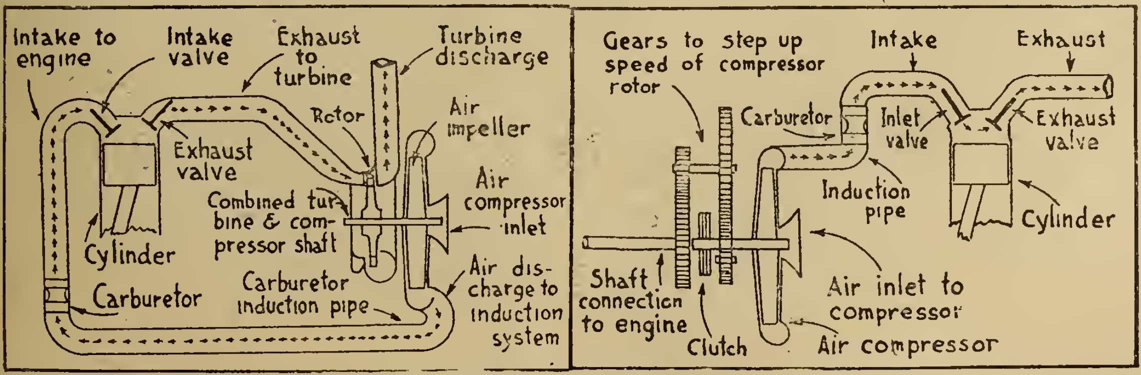
Use of a turbo-supercharger—or any supercharging apparatus, for that matter—of necessity means greater petrol consumption. This at first thought might seem to be a serious objection, in that it would mean a lesser flight range for the supercharged plane. However, when it is considered that such a plane would, due to the constant power delivery regardless of the altitude, be capable of greater speed, and hence would cover more distance in a given time than the ordinary plane, the increased fuel consumption would be more than compensated for by the greater distance covered with each gallon of fuel.

Tests have shown that a Liberty engine on which a supercharger is installed uses anywhere from 10 to 15 per cent. more fuel per horse-power-hour than does a standard Liberty engine, which on the average has a fuel consumption of about 0.504 lb. per horse-power per hour.

Although the writer has no data on which to base such an opinion, it seems altogether likely that there would be some added trouble with the exhaust valves of a supercharged engine on account of the extremely high temperature and pressures. This would no doubt mean the use of special material for these valves, otherwise they would be prone to excessive pitting, wearing and burning, which would sooner or later affect the engine's power.

Up to a certain point, the fact that the compressed air would be heated above normal would have a tendency to promote efficient vaporisation of the fuel. If the air attained too high a temperature, however, it would be detrimental to the mixture. The criterion of the amount of superheating of the air would be the temperature necessary to complete vaporisation of the fuel. For the reason that in operation the temperature of the air sent to the carburettor by the compressor is often above that required for complete fuel vaporisation, it has been found necessary in Europe to instal some form of air-cooling device between the compressor and the carburettor to bring the air back to the efficient temperature. These air radiators have been either of the water-cooling type or merely atmospheric air coolers. The necessity for this auxiliary device has not been proven, however. It may not make enough difference in the practical operation of the supercharger to warrant its installation.

It takes anywhere from 5 to 10 per cent. of the engine's delivered horse-power to drive the supercharger. Roughly, the engine without super-compression delivers only 60 per cent. as much power at 15,000 ft. as it does at ground level; at 20,000 ft., it can furnish but about 50 per cent. as much as at the ground. Therefore, figuring the supercharger means a horse-power recovery of 30 per cent. at 15,000 ft., and a recuperation of 40 per cent. at 20,000 ft. This serves to illustrate that the supercharging device is of increasing



Diagrams showing the principles of supercharging systems, driven respectively by exhaust turbine and engine gearing

advantage as the altitude is increased, providing it performs its functions of maintaining constant power delivery. It does not seem likely, however, that the Rateau principle can be utilised to advantage for operation at altitudes over 20,000 ft. At this height, the apparatus is rotating about as fast as possible within the safe limits of the available steels, and the operating temperatures are also about as high as known materials will withstand.

However, it seems that, when all is said and done, even though the supercharger were capable of operating efficiently only to 15,000 ft., it would be worth putting on an engine.

But, in the final analysis, supercharging is not intended for planes that are to be used for moderate altitude flying. It is of greatest advantage to the ship which is to be used for fast service at extreme levels. Flying steadily and on a straight course in the rarefied atmosphere of some four miles above the earth, the ship whose engine is able to develop the same power under these conditions that it delivers at the ground is destined to be the fast transportation plane of the future. With less resistance to its forward motion in this rarer atmosphere, yet with its power unaffected by this atmospheric condition, the future supercharged plane presents possibilities for speed that are unattainable as yet with any type of plane. With constant power, a propeller that will handle that power in the less dense atmosphere and with this advantage of lower resistance to forward motion, 200 miles an hour is almost within reach.

The long-range gun projects its missile up into the rarer atmosphere where the resistance to its travel is reduced. By this means its terrific speed is made the most of in covering seemingly impossible distances. So with the supercharged aeroplane of the future. Operating in a medium of less resistance, it can secure all the advantage of this rarer medium without its disadvantages.

The possibilities of development along this line, principally for long distance travel, are tremendous.

THIRD ANNUAL R.A.E. SPORTS

ON Saturday, August 16, the third annual sports of the Royal Aircraft Establishment Athletic Club were held on the R.A.E. sports ground in ideal weather, before 3,000 or more people. A splendid programme was gone through, and among those present were :—Mr. and Mrs. Sydney Smith (S.R.A.E.), Vice Air-Marshal Ellington, Maj. Brooke-Popham, Col. Blackburn, Maj. Keiyes, Maj. Bishop, Maj. and Miss Grinsted, Mr, Broman, Capt. Maxwell, Capt. and Mrs. Short, Capt. and Mrs. Russell-Jones, Lieut. Ginyill, Rev. Basil Phillips, Rev. Jackson, Lieut. and Mrs. Harrison, Miss Thornton (Administrator), Miss Fletcher (Assistant Administrator, W.R.A.F.), Maj. Turner, Capt. Saunders, Miss Hendrick, and Mr. and Mrs. Salmon.

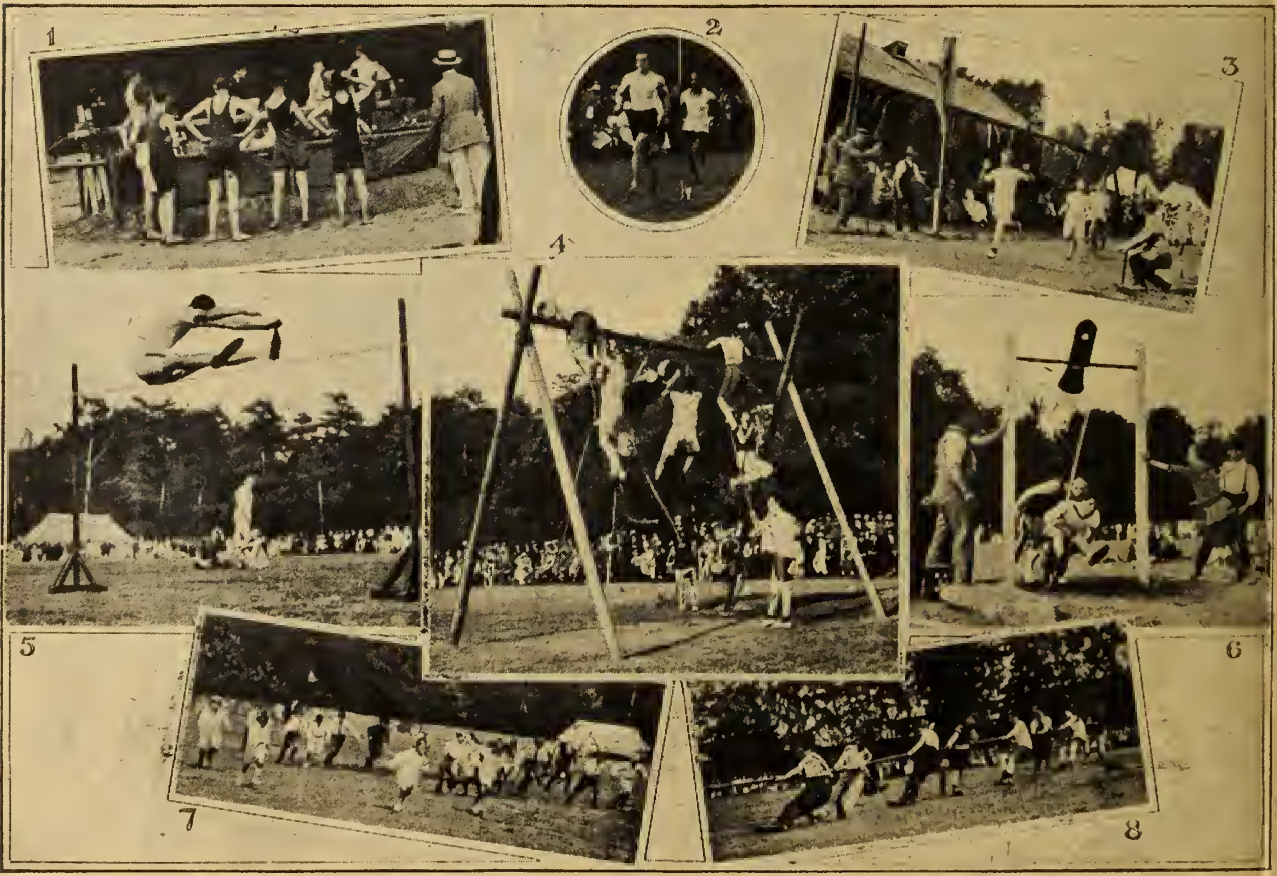
A great feature, was the fine running of E. B. West, who won the Bullivant Cup outright, then left the closed events (which showed the true spirit of a sportsman) and went for the 100 yards open handicap, and 220 open, winning both, in 9 4-5 secs. and 22 9-10 secs. respectively.

The various events for lads under 18 showed that the R.A.E.A.C. have some nice runners coming on. The best performance was by F. Hague. Though only 17 years of age, he finished second in the 880 yards handicap and third in the mile. The many other events were keenly interesting, many decisions being obtained by inches on the tape. A great deal of excitement was caused in the open mile, in which an Indian soldier took part for exhibition, although he took things quite easy at the start and finished first.

Another cup was won outright by H. E. Reeves in the 7-mile Marathon, and R Department won the Tug-of-War for the third time.

During the afternoon a display of physical drill was given by the W.R.A.F. of the Southern Aircraft Repair Depôt. This was one of the best events of the afternoon, and reflects great credit on Sergt.-Maj. Keene, R.A.F., who was assisted by Sergt. Wilbourne and Corpl. Rawlin, R.A.F. The officials are to be congratulated on the way in which the sports were organised. The prizes were kindly presented by Mrs. Sydney Smith, amid cheers.

A fancy dress dance was held in the R.A.E. Canteen in the evening, which ended another memorable day to the R.A.E.



ROYAL AIRCRAFT ESTABLISHMENT SPORTS: 1. Final of the boys' pillow fight. Winners F.I.E. 2. Finish of the open mile event. 3. Finish of the 220 yards handicap. 4. The final of the open obstacle race. Won by A. Beagley. 5. The high jump. 6. Tilting the bucket. 7. Start of the 50 yards handicap for boys under 10. 8. Final of the tug-of-war.

MENTIONED IN DISPATCHES

IT was announced by the Air Ministry on August 29 that the following officers and other ranks of the Royal Air Force (including *personnel*, Women's Royal Air Force) have been brought to the notice of the Secretary of State in respect of the valuable services they have rendered in connection with the War, and a note to this effect will accordingly be made in the Official Records :—

Maj. C. R. Abbott, M.B.E. ; Lieut. (A./Maj.) F. B. Adams (Wilts R.) ; Lieut. (A./Capt.) H. A. Adams (A.P.D.) ; Capt. (A./Maj.) W. B. Adams ; Lieut. (A./Capt.) P. E. D. Addis (Som. L.I.) ; Lieut. G. J. E. Agnew ; Capt. F. R. Alford, M.C. (Can. M.G.C.) ; Sec. Lieut. G. K. Alling ; Lieut. (A./Capt.) C. E. Amoore ; Sec. Lieut. B. D. Anderson ; H./Lt. and A./Capt. G. F. Antell (Can. Ord. C.) ; Lieut. A. Appleby, (R. Fus.) ; Lieut. (Hon. Capt.) A. G. T. Applin ; Lieut. (A./Capt.) C. F. Apthorp ; Maj.-Gen. H. T. Arbuthnot, C.B. (R. Arty.) ; Capt. (A./Maj.) C. L. Archbold ; Lieut. E. L. Ardley (K.R.R.C.) ; Lieut. H. D. Arkell ; Lieut. J. A. Armstrong ; Lieut. G. D. Ashby (R.G.A., S.R.) ; Lieut. N. H. Astley ; Adminstr. Miss M. A. Atkin ; Sec. Lieut. J. A. Atkinston ; Capt. J. C. Atkinson ; Sec. Lieut. F. T. L. Avis.

Maj. (A./Lieut.-Col.) P. Babington, M.C., A.F.C. (Hants. R., T.F.) ; Sec. Lieut. L. Badger, M.M. (R.E.) ; Chapln. (Civ.) Rev. W. A. Badger ; Capt. E. P. L. Baker (S. Staffs. R.) ; Sec. Lieut. H. Baker ; Lieut. (A./Capt.) P. D. Baker (R.A., T.F.) ; Capt. C. W. Baldwin (Dur. L.I.) ; Lieut. (A./Capt.) M. Ballard ; Capt. C. Banyard ; Lieut. J. H. Baring-Gould (N. Dev. Hrs.) ; Lieut. A. H. Barnard ; Lieut. (A./Capt.) A. W. Barnett ; Deputy Adminstr. Mrs. N. A. M. Barnett ; Lieut. J. C. Barrett ; Sec. Lieut. (A./Lieut.) D. Barron (R. Hdrs.) ; Lieut. (Hon. Capt.) L. E. Barry (R.A.S.C.) ; Lieut. E. V. Bashford ; Sec. Lieut. H. Bates ; Lieut. A. H. Beach (Can. Inf.) ; Capt. E. A. Beaulah (Lincs. R.) ; Capt. B. F. Bedford ; Sec. Lieut. (A./Lieut.) C. E. Beeson, Lieut. (Hon. Maj.) W. R. Bernard (R.N.) ; Lieut. A. E. Biggs ; Capt. A. A. Bisset (R.A.M.C.) ; Asst. Adminstr. Miss I. Black ; Lieut. (A./Capt.) P. G. Black ; Maj. P. Blair, R.F.A. ; Capt. M. B. Blake (Canada) ; Maj. (A./Lieut.-Col.) G. Blatherwick ; Capt. E. C. Blight ; Lieut.-Col. R. G. Blomfield, D.S.O. (Washington) ; Lieut. B. W. Blower (Shrops. L.I.) ; Capt. A. R. Boeree (Suff. R.) ; Capt. A. Bolton, M.C. (R. Sc. Fus.) ; Maj. R. J. Bone, D.S.O. ; Capt. J. E. Bonniksen ; Maj. (A./Lieut.-Col.) H. B. Bonning ; Sec. Lieut. C. L. Booth ; Lieut. J. R. S. Borman (Bord. R.) ; Capt. H. G. Bowen ; Maj. A. C. E. S. Bowlby (S. Staffs. R.) ; L. H. K. Boysen ; Sec. Lieut. (A./Capt.) C. W. Braddy ; Lieut. J. W. Brash (R.A.M.C.), S. R.) Capt. S. Brew ; Lieut.-Col. W. Briggs (Washington) ; Lieut. H. Bristow (E. Surr. R.) ; Capt. W. C. Broadhead ; Sec. Lieut. W. J. Brooker (R.E.) ; Lieut. (A./Capt.) G. E. Brookes ; Lieut. (Hon. Capt.) A. E. Brooks (R. Dgns.) ; Sec. Lieut. (A./Lieut.) E. W. Brooks ; Lieut. (H. and A./Capt.) A. Broomer (3/R.L.R.) ; Capt. E. B. Broughton (R. Fus.) ; Sec. Lieut. G. A. Brown (E. Surr. R.) ; Lieut. H. A. Brown ; Lieut. J. M. Brown (H.A.C.) ; Maj. V. S. Brown ; Lieut. W. A. Brown (North'd. Fus.) ; Lieut. C. P. Browne ; Maj. R. W. Bruce (Can. Ind.) ; Lieut. W. R. Bucknell (R. Hrs.) ; Maj. (A./Lieut.-Col.) K. L. Buist (H.L.I.) ; Lieut. E. J. A. Burke ; Capt. E. E. N. Burney, M.C. (R. Berks) ; Maj. W. Burningham-White ; Lieut. A. E. Bush ; Lieut. L. A. Bushe (24th Can. Inf.) ; Lieut. W. N. Bussell (Middx. R.) ; Lieut. R. W. P. Butler (Rif. Bde.) ; Maj. (A./Lieut.-Col.) C. A. J. Butler, O.B.E. (Scot. Hse. Yeo.).

Capt. R. Cadman (N. Staff. R.) ; Sec. Lieut. (A./Capt.) A. R. Caldicott ; Lieut. A. C. Campbell-Orde ; Capt. P. P. Capelli (R.A.S.C.) ; Lieut. T. Capps (3rd Res. Husrs.) ; Sec. Lieut. (A./Capt.) L. E. Carter, D.C.M. ; Lieut. (A./Capt.) E. M. Cashmore ; Lieut. (A./Capt.) H. Chalkley (R.E.) ; Maj. J. L. Chalmers, M.C. ; Maj. H. F. Champion, A.F.C. (S. Afr. Fces. and R. Bde.) ; Capt. A. H. Chapman ; Lieut. (A./Maj.) F. T. Chapman (Lond. R.) ; Lieut. J. W. Chapman (K.O.S.B.) ; Sec. Lieut. O. Charlton ; Capt. A. E. Charlwood (R. Suss. R.) ; Capt. B. P. Chase ; Sec. Lieut. R. St. G. Chester-Master ; Lieut. (Hon. Capt.) G. Chetwynd-Stapylton ; Capt. (A./Maj.) E. Childers, D.S.C. ; Capt. D. W. Clappen ; Capt. (A./Maj.) A. G. Clark ; Capt. H. L. U. Clark ; Lieut. M. J. Clark (Aus. Forces) ; Lieut. (A./Capt.) B. A. Clay (Hussars) ; Capt. (A./Maj.) A. Clayton ; Sec. Lieut. F. Clayton ; Maj. E. C. Clements ; Lieut. E. A. Coghlan (Aus. L. Hse.) ; Hon. Capt. B. S. Cohen ; Capt. E. D. Cole (14th Lond. R.) ; Capt. S. N. Cole ; Capt. (A./Maj.) J. P. Coleman, A.F.C. ; Lieut. J. A. B. Colin ; Chapln. Capt. G. H. Collier ; Sec. Lieut. (H. and A./Lieut.) A. Colling (Manc. R.) ; Maj. G. C. Colmore ; Lieut. R. B. Collins (4th Norf. R.) ; Lieut. (Hon. Capt.) C. S. Coltson, D.S.C. ; Lieut. O. F. Conoley (R.F.A., T.F.) ; Deputy Admstr. Miss Mabel Louise Lillian Cooke ; Lieut. (A./Capt.) H. Cooke-Smith (Lond. R.) ; Capt. (A./Lieut.-Col.) F. Cookson (R.E.) ; Capt. W. J. Coombes ; Maj. A. R. C. Cooper (Rif. Bde.) ; Sec. Lieut. (A./Lieut.) A. T. Cooper ; Maj. A. Corbett-Wilson ; Asst. Admstr. (A./Admstr.) ; Mrs. Winifred Margaret Corbett ; Lieut. R. P. Coulter ; Capt. J. A. Cowling ; Capt. (A./Maj.) C. J. W. Crichton (Yorks R.) ; Capt. J. Crichton ; Capt. L. G. Le B. Croke ; Capt. L. Crooks ; Capt. R. H. Cronyn (Canada) ; Lieut. R. R. Crosby (H.A.C.) ; Lieut. C. J. C. Croydon (Canada) ; Lieut. J. J. A. Crozier (Lond. R.) ; A./Matron-in-Chief Miss Joanna Margaret Cruickshank (Q.A.I.M.N.S.I.) ; Asst. Admstr. Miss Helen Muriel Culley ; Lieut. G. L. Cunningham ; Capt. (A./Maj.) W. B. Cushion (Manch. R.).

Capt. W. R. C. Da Costa (Can. Art.) ; Lieut. (A./Capt.) H. G. Dadley, D.C.M. ; Lieut. J. G. Dainty (Leic. R.) ; Capt. J. E. H. Dakin ; Lieut. W. C. Dale (North'd. Fus.) ; Lieut. G. S. Dalgleish (R.A.S.C.) ; Sec. Lieut. (A./Lieut.) F. Dallow ; Maj. E. Dalziel ; Sec. Lieut. (A./Capt.) E. P. Dampier ; Lieut. (A./Capt.) F. Dance (Midx. R.) ; Lieut. W. Dancy (R.G.A., S.R.) ; Sec. Lieut, H. J. Dann ; Capt. H. D. A. Dart ; Capt. M. G. Dashwood ; Lieut. (A./Capt.) W. H. Date ; Deputy Admnstr. Miss E. I. David ; Capt. A. P. Davidson ; Sec. Lieut. A. E. W. Davis ; Maj. L. Dawes (Midx. R.) ; Capt. A. J. Dawson (Bord. R.) ; Sec. Lieut. (A./Lieut.) W. R. Day ; Lieut. (A./Capt.) W. H. Dean (E. Lancs.) ; Capt. G. I. N. Deane (Tyne Eng.) ; Maj. G. Dennison ; Lieut. (A./Capt.) J. D. de Pencier (Can. F.A.) ; Lieut. (A./Capt.) O. W. de Putron (D.L.I.) ; Lieut. (Hon. Capt.) F. Dickinson (Leic. R.) ; Lieut. (A./Capt. F. C. E. Dimmick ; Capt. G. M. B. Dobson ; Capt. A. W. Dods (R.F.A.) ; Capt. (A./Maj.) F. P. Don (Scottish Hse.) ; Asst. Admstr. Miss O. P. Downes ; Capt. H. J. N. Drope (Canada) ; Lieut. (A./Capt.) H. W. G. Drummond (1/B.C. R.) ; Capt. J. M. Drysdale ; Sec. Lieut. (H. and A./Capt.) T. R. Duff (A. and S. Highrs.) ; Capt. R. Duncan, M.C. (Can. M.R.) ; Capt. (A./Maj.) S. W. Dunckley ; Lieut. (A./Maj.) C. W. Dyer (Midx. R.).

Maj. Sir J. Eardley-Wilmot, Bt. (Rif. Bde.) ; Asst. Commdt. (Cl. 2) Miss O. Earlam ; Capt. H. M. Earnshaw (R. War. R.) ; Lieut. (A./Capt.) H. W. Eaton (Roy. Scots) ; Sec. Lieut. F. G. Edgington ; Lieut. (A./Capt.) E. N. T. Edwardes (R.F.A.) ; Capt. H. M. Edwards ; Sec. Lieut. (A./Lieut.) R. W. Edwards ; Lieut. (Hon. Capt.) H. M. Eldridge, M.C. (Northants R.) ; Capt. R. A. G. Elliott (R.A.M.C.) : Maj. T. K. Elmsley ; Lieut. (Hon. Capt.) R. Elphick (Lond. R.) ; Lieut. (A./Capt.) E. Emley (Roy. D.C.) ; Capt. J. Erskine (Gord. Highrs.) ; Capt. (A./Maj.) G. F. Evans (R.E.S.R.) ; Lieut. (A./Capt.) J. H. Evans (R.A.S.C.) ; Capt. C. R. Evershed ; Lieut. F. J. C. Exton ; Lieut. H. W. Eyton-Jones.

Lieut. M. O. Fairhurst ; Lieut. C. D. Fairweather (Canada) ; Lieut. F. J. Farlow ; Lieut. A. V. Farrier (D.C.L.I.) ; Sec. Lieut. C. Fenn ; Lieut. W. B. Ferrier ; Capt. A. Ferris (R.I. Rifles) ; Sec. Lieut. H. H. Ffrench (Can. Signal Serv.) ; Lieut. (A./Capt.) A. L. Fiddament ; Maj. L. Findlater, M.C. (Manc. R.) ; Lieut. J. S. Flanagan (Natl. Vol.) ; Capt. (A./Maj.) C. R. Fleming-Williams ; Lieut. F. L. Fletcher (Manc. R.) ; Maj. S. Flower ; Deb. Adminstr. Mrs. E. B. Fosbrooke ; Lieut. W. W. Foster ; Sec. Lieut. D. A. Fowler (R.E.) ; Capt. H. T. Foxen ; Lieut. W. N. Fraser (Rif. Bde.) ; Lieut. H. A. Francis ; Lieut. J. Francis ; Asst. Commdt. (2) Mrs. C. S. French ; Lieut. (A./Capt.) S. T. Fripp ; Hon. Capt. (A./Capt.) G. W. Frost (N. and D.R.) ; Capt. F. H. Furness-Williams (R.F.A.).

Lieut. R. Gambier-Parry (R.W. Fus.) ; Lieut. P. R. Garner ; Capt. A. Garrad (Som. L.I.) ; Capt. T. R. Garrigan ; Maj. P. Garton ; Capt A. D. Gaye (Bed. R.) ; Lieut. (A./Maj.) A. H. A. Gem, M.C. (7th N. and D.R.) ; Capt. A. H. George (6th Ches. R.) ; Lieut. F. O. Gibbon ; Lieut. (A./Capt.) A. R. B. Gill ; Capt. S. W. Godin ; Lieut. (A./Capt.) A. H. Goldie (Bed. R.) ; Capt. W. E. Gooday (U.S.A.) ; Sec. Lieut. L. E. Goodman ; Capt. J. A. Gordon ; Capt. and Q.M. J. Gordon (R.G.A.) ; Lieut. M. S. C. Gordon (Can. I.) ; Lieut. G. A. Gowler ; Capt. E. R. Grange, D.S.C. ; Lieut. A. G. W. Grantham (Dors. R.) ; Lieut. D. S. Gray, Capt. J. E. A. Greatorex ; Sec. Lieut. (A./Capt.) H. J. L. Greatwich ; Capt. F. M. Green ; Capt. T. Greening ; Capt. H. B. Griffith (Canada) ; Sec. Lieut. G. V. Grundy ; Lieut. C. Guthrie ; Lieut. R. B. Guy.

Sec. Lieut. (A./Capt.) H. Hackney ; Lieut. C. N. Haines (R.F.A.) ; Lieut. J. H. Halliwell (Liverpool R.) ; Capt. (A./Maj.) M. C. P. Hamer ; Maj. (A./Lieut.-Col.) B. H. N. H. Hamilton, D.S.O. ; Lieut. (A./Capt.) R. F. Hamlyn (Lond. R.) ; Lieut. (A./Capt.) G. A. D. Hancock ; Capt. W. A. Hancock ; Capt. F. M. Hannay ; Lieut. R. W. W. Hardie ; Capt. F. M. Harding ; Sec. Lieut. W. A. Hardwick (E. Yorks R.) ; Capt. P. S. Hargreaves ; Capt. H. R. Harker, M.C. ; Capt. (A./Maj.) J. R. Harland ; Lieut. E. Harling (L. N. Lanc.) ; Capt. H. D. Harman, M.C. (Glos. R.) ; Lieut. G. Harris ; Capt. H. G. Harris ; Lieut. G. D. Harrison ; Lieut. P. N. Hart (R. Highrs.) ; Sec. Lieut. (Hon. Capt. and A./Maj.) C. Harvey (12th Lon. R.) ; Capt. H. W. R. Haselhurst (North'd. Fus.) ; Maj. (A./Lieut.-Col.) C. K. Haskins, D.S.C. (R.N.) ; Lieut. C. F. P. Haslegrave ; Capt. (A./Maj.). P. H. Hatfield (Medical) ; Capt. (H. and A./Maj.) A. E. Hatton (Can. Engrs.) ; Capt, (A./Maj.) C. Hayes (K.O.Y.L.I.) ; Capt. W. G. E. Hayman (R.A.S.C.) ; Lieut. (A./Capt.) M. C. Hayter (Ind. Cav.) ; Maj. G. Hazelton ; Capt. R. J. Hearn (R.A.M.C.) ; Capt. (A./Maj.) M. Henderson, D.S.O. (Sea. Highrs.) ; Sec. Lieut. (Hon. Capt.) J. Hewitt (Durban L.I., S. Afr.) ; Capt. F. W. Hill ; Capt. G. T. R. Hill, M.C. ; Lieut. S. Hill ; Lieut.-Col. F. R. G. Hoare, C.B.E. (Canada) ; Capt. F. Hobson ; Maj. V. Hodson (Can. Milta.) (Canada) ; Lieut. (A./Capt.) W. Hoffert (11th Manch. R.) ; Lieut.-Col. R. W. Hogarth ; Maj. E. Hogg ; Gapt. G. L. Holmes ; Lieut. G. B. Holmes ; Capt. (A./Maj.) R. H. Hood ; Capt. E. H. Hooper ; Lieut. (A./Maj.) F. H. Hooper (R.F.A.) ; Capt. F. J. Hooper ; Lieut. (A./Capt.) H. Hooper (R.E.) ; Capt. (A./Maj.) L. S. Hooper (R.A.M.C.) ; Lieut. (A./Maj.) W. H. Holroyd ; Sec. Lieut. (A./Maj.) W. F. M. Hopkins (Glouc. Yeo.) ; Capt. W. E. Horan ; Capt. A. F. Hordern (S. Staffs R.) ; Maj. T. B. Hornblower (Suss. R.) ; Lieut. F. J. Horrell (New Zealand Mtd. Rif.) ; Maj. E. D. Horsfall, M.C. (9th R. Bde) ; Capt. C. Horsfield ; Capt. P. G. Horswell ; Lieut. (A./Capt.) C. H. Howell ; Lieut. (A./Capt.) W. H. Howell (Essex R.) ; Maj. J. R. Howett ; Capt. F. Hudson ; Capt. W. Huggan ; Capt. W. Huggan ; Capt. E. Y. Hughes (R.F.A., T.F.) ; Admnstr. Mrs. A. Hughes-Gibb ; Capt. H. R. B. Hull (R.N.) (Med.) ; Capt. H. T. Humfress (R.E.) ; Lieut.-Col. J. W. L. Hunt ; Lieut. J. Hutcheson (R. Ir. R.) ; Capt. H. G. Hutchinson (R.M.L.I.) ; Lieut. A. P. Hutton.

Capt. A. E. Illingworth (6th North'd. Fus.) ; Depy. Adminst. Miss. E. Ingram ; Capt. (A./Maj.) J. Inwood (Canada) ; Maj. A. W. Iredell ; Capt. W. B. Ives (3rd W. Yorks.).

Lieut. B. Y. Jackson ; Capt. H. F. Jackson ; Lieut. (A./Capt.) J. B. Jackson (N. and D. R.) ; Maj. J. L. Jackson, M.C. (Conn. R.) (Canada) ; Maj. G. Jacques ; Sec. Lieut. (A./Lient.) A. H. James ; Capt. A. P. James ; Sec. Lieut. W. E. James ; Lieut. (A./Capt.) J. W. Jennings (28th Lond. R.) ; Lieut. J. H. Jephson (Suss. R.G.A., T.F.) ; Lieut. (A./Maj.) F. Jewell ; Sec. Lieut. W. H. Jinman ; Capt. A. R. Johnston ; Capt. F. R. Johnson, D.S.C. ; Lieut. (A./Capt.) R. E. Johnson (K.R.R.C.) ; Lieut. C. H. Jones (Lond. R.) ; Lieut. (A./Capt.) H. Jones ; Lieut. (A./Capt.) J. W. Jone (R.E., T.F.) ; Lieut. S. N. Jones (R. War. R.) ; Lieut. (A./Capt.) W. Jonex (Worc. R.).

Sec. Lieut. (A./Capt.) H. H. Kalber ; Lieut. (A./Capt.) R. C. Kean (5th S. Lancs.) ; Capt. R. H. B. Ker (B.C. Regt.) (Canada) ; Sec. Lieut. C. E. Kichenside ; Lieut. G. M. Knocker (R.A.) ; Capt. R. H. Knowles (Med.).

Maj. S. A. Laird ; Capt. the Rev. P. C. C. Lamb, B.A. (I. Yeo.), C.F. ; Capt. (A./Maj.) W. Lambert (R. Fus.) ; Sec. Lieut. H. D. Lane ; Lieut. (A./Capt.) H. F. D. Lane ; Maj. R. C. Lane (Middx. R.) ; Capt. G. S. Lardner (O. and B. L.I.) ; Capt. C. F. Latimer ; Capt. J. D. Latta, M.C. ; Capt. (A./Maj.) R. D. Law (W. Yorks.) ; Lieut. (A./Capt.) G. A. Lawlor ; Lieut. T. A. E. Layborn ; Hon. Capt. F. C. Lea ; Capt. N. Lea ; Lieut. (A./Capt.) R. Leake (Lond. R.) ; Maj. L. W. Learmount, D.S.O., M.C. ; Maj. P. A. O. Leask (R. Ir. Rif.) ; Sec. Lieut. (A./Lieut.) J. G. Le Brun ; Maj. J. H. Ledeboer ; Capt. H. A. H. Leetham ; Lieut. (A./Maj.) W. A. Legg (R.E.) ; Capt. H. D. Lehmann ; Maj. T. G. Leith, M.B.E. ; Lieut. J. M. J. Le Mee (Newfound. R.) ; Lieut. P. I. Lewis (R. Fus.) ; Maj. (A./Lieut.-Col.) J. H. Lidderdale ; Lieut. S. Lindsey (Rif. Bde.) ; Sec. Lieut. W. Liniker ; Sec. Lieut. (H./Capt. A./Maj.) C. A. E. Lloyd (North'd Fus.) ; Sec. Lient. (A./Lieut.) R. Locke ; Capt. A. J. Long ; Lieut. (A./Capt.) G. W. Longstaff ; Capt. (A./Maj.) A. M. Low, D.Sc. ; Maj. (A./Lieut.-Col.) S. R. Lowcock ; Sec. Lieut. H. F. Luck ; Capt. C. R. Lymn.

Adminstr. Miss Margaret McArthur ; Sec. Lieut. (A./Maj.) O. C. McCaw (Middx. R.) ; Lieut. N. S. McConnell (R.A.S.C.) ; Lieut. C. A. McCreath ; Capt. A. D. Macdonald ; Lieut. (A./Capt.) F. T. McElwee ; Capt. F. S. McGill ; Lieut.-Col. O. H. K. Maguire, D.S.O., Australia ; Adminst. Miss Anne May MacIntosh ; Capt. L. D. D. McKean ; Maj. (A./Lieut.-Col.) D. Mackenzie ; Maj. A./Col.) E. G. MacKenzie (Ry. Fus.) ; Capt. R. M. B. MacKenzie ; Capt. G. McKerrow ; Lieut. (A./Capt.) N. McLeod ; Lieut. W. A. McMichael (16th R. Scots) ; Lieut. (A./Capt.) H. L. McNaughton (R. S. Fus.) ; Maj. O. C. MacPherson (Canada) ; Lieut. (A./Capt.) L. G. Mace ; Lieut. (A./Capt.) T. Mack ; Sec. Lieut. (Hon. Lieut.) W. Mainstone (R.I.F.) ; Lieut. A. G. Makings ; Capt. H. G. R. Malet ; Asst. Adminst. Miss Elizabeth Atherstone Mallabone ; Lieut. R. A. Manby (8th Welsh R.) ; Lieut. (A./Capt.) O. W. A. Manning (19th R. Fus.) ; Capt. L. T. G. Mansell ; Capt. F. H. Mardall (Manc. R.) ; Lieut. (Hon. Capt.) C. H. Markham (North'd Fus.) ; Lieut. (A./Capt.) E. H. Marsden (R.F.A.) ; Deputy Adminst. Mrs. Adelaide Marshall ; Lieut. G. Martyn ; Lieut. W. D. Matheson, M.C., Canada ; Lieut. V. D. Mathews (7th D.L.I.) : Maj. H. K. Maxwell ; Lieut. (A./Capt.) H. A. Maynard ; Maj. H. R. Mayo, O.B.E. ; Sec. Lieut. J. S. Middleton ; Hon. Lieut.-Col. R. G. Millar ; Lieut. (A./Capt.) T. E. Mills ; Capt. (A./Maj.) G. C. Milnes, M.C. (R. Lanc. R.) ; Capt. J. M. Mitchell, M.B.E. (Canada) ; Lieut. J. T. Mitchell ; Maj. (A./Lieut.-Col.) H. A. Moore, C.B.E., M.C. ; Lieut. R. F. W. Moore ; Capt. T. P. Y. Moore ; Lieut. (A./Maj.) F. K. Moncur (4th Sea. Hdrs.) ; Adminstr. Miss Hortense Henriette Montefiore ; Lieut. (A./Capt.) E. L. P. Morgan ; Adminstr. Miss Mattie Mildred

Morgan; Capt. N. B. Morphy (E. Surr. R.); Lieut. J. P. D. Mostyn (R. Suss. R.); Asst. Adminstr. Miss Jessie Kathleen Mountford-Smith; Capt. A. F. Muir; Capt. (A./Maj.) W. H. Mulville; Lieut. (Hon. Capt.) A. H. Munday; Capt. D. Munro; Lieut. P. J. Murphy (I. Gds.); Maj. G. P. Myers (Leins. R.), Capt. J. F. Myles.

Lieut. J. C. Nairn; Asst. Adminstr. Miss Dorothy Grace Negus; Capt. C. H. Nelson; Sec. Lieut. (A./Capt.) H. L. Nelson; Hon. Lieut. H. Newns; Lieut. (A./Capt.) W. J. O. Newton; Maj. R. E. Nicoll; Lieut. (A./Capt.) L. B. Nicholls (R.A.S.C.); Deputy Adminstr. Miss Bertha Nichols; Lieut. R. Nisbet (R.F.A.); Sec. Lieut. J. P. Nolan (R.D. Fus.); Sec. Lieut. J. Noonan, D.S.M.; Maj. G. H. Norman (R.G.A.); Lieut. F. A. Norton; Lieut. C. E. North; Lieut.-Col. A. T. L. Nye.

Capt. S. C. O'Grady, M.C.; Sec. Lieut. K. W. J. Oldridge; Sec. Lieut. (A./Capt.) G. Oliver (Hants. R.); Maj. T. L. Oliver; Lieut. G. P. Olley, M.M.; Lieut. H. M. O'Loughlin (Can. Inf.); Capt. M. A. J. Orde; Capt. R. A. B. Orlebar (9th R. Lancs. R.); Capt. A. C. Osmon; Capt. J. J. O'Sullivan; Lieut.-Col. H. W. S. Outram; Sec. Lieut. J. A. Owen; Capt. (A./Maj.) R. D. Oxland (Lond. Yeo.).

Maj. G. H. Padley (8th Lincs.); Lieut. (H./Capt. and Qrmr.) H. Pallett 14th Ches. R.); Capt. G. K. Palmer; Lieut. E. L. Pape; Sec. Lieut. R. J. P. Parer (Aus. F.C.); Capt. (A./Maj.) A. H. Parker, M.C.; Sec. Lieut. C. B. Parker (Canada); Capt. E. Parker (E. Lanc. R.); Lieut. J. D. Parkes; Capt. (A./Lieut.-Col.) G. W. Parkinson (R.E.); Lieut. (A./Capt.) I. W. Parnell; Capt. G. M. Part; Lieut. (Hon. Capt.) F. Paterson; Lieut. A. B. Paton; Capt. (A./Maj.) R. K. Paton (Liverpl. R.); Lieut. A. Patterson (R.G.A., T.F.); Admnstr. Mrs. J. C. Patterson; Lieut. (A./Capt.) A. L. Paxton; Capt. (A./Maj.) H. J. Payn (R.E., S.R.); Lieut. F. A. Payne (R.E.); Sec. Lieut. (A./Capt.) F. C. Payne (Lab. Corps); Lieut. (Hon. Maj.) H. K. Payne; Lieut. (A./Capt.) A. L. Pearce (R. Welsh Fus.); Capt. A. N. Pennel; Lieut. (A./Maj.) R. A. Pennington (R. Fus.); Lieut. F. C. Penny (Aus. I.F.); Sec. Lieut. C. B. Pensotti; Lieut. J. B. Perring (S. Afr. Fces.); A./Capt. R. B. Pigott; Lieut. (A./Capt.) J. E. Pike (D.L.I.); Lieut. W. W. Pitt (N. and D.R., T.F.); Lieut. (A./Capt.) P. L. Plant (R. Ir. Fus.); Lieut. S. B. Plummer (P.P.C.L.I.); Maj. E. M. Pollard (W. Yorks); Capt. A. W. W. Pope (K.S.L.I. and Lpl. R.); Lieut. (H. and A./Capt.) L. V. Popkiss (Life Gds.); Sec. Lieut. A. G. C. Potts; Lieut. C. M. Powell; Sec. Lieut. (A./Lieut.) L. A. T. Power; Maj. W. G. W. Prall; Lieut. (A./Capt.) D. Price; Maj. H. Pritchard.

Capt. G. E. Quincey.

Sec. Lieut. (A./Lieut.) N. C. Raffin; Lieut. (A./Capt.) S. G. K. Rapley; Lieut. H. E. Rathkins; Capt. A. E. Reed; Sec. Lieut. V. Rees; Sec. Lieut. J. V. Reeve; Capt. J. R. Reilly (Can. Inf.) (Canada); Lieut.-Col. A. E. J. Reiss, O.B.E.; Maj. (A./Lieut.-Col.) J. D. K. Restler; Capt. G. A. Revington; Sec. Lieut. C. Reynolds; Capt. (A./Maj.) A. D. S. Rice (R.G.A., T.F.); Lieut. (A./Capt.) E. A. Richards; Dep. Amnstr. Mrs. N. Richards; Maj. (A./Lieut.-Col.) A. V. J. Richardson; Sec. Lieut. (A./Capt.) F. R. Richardson; Capt. (A./Maj.) G. S. Ridgway; Maj. E. E. Robb; Sec. Lieut. J. Roberts (Hussars); Maj. E. G. Ll. Roberts; Sec. Lieut. (Hon. Lieut.) F. A. de V. Robertson (I.A.R.O.); Capt. (A./Maj.) J. L. Robertson; Lieut. H. W. Robinson; Lieut. C. P. V. Roche; Capt. F. E. Rogers; Capt. F. Rooks; Capt. (A./Maj.) E. J. D. Routh (K.R.R.C.); Lieut. (A./Capt.) E. H. Russell; Lieut. F. S. Russell, D.S.C., D.F.C.; Maj. F. J. Rutland, D.S.C.; Lieut. (A./Maj.) J. S. Ruttle, M.B.E., E. Kent R.; Capt. C. Ryder.

Lieut. C. G. Salmond; Maj. D. B. Sanders, Lieut. (A./Capt.) F. E. Sargood; Lieut. (A./Capt.) F. H. St. C. Sargant, D.F.C.; Capt. H. F. Seagram, Lieut. W. H. Scanlan; Admnstr. Miss M. Scholefield; Capt. G. A. Scott (Essex R.); Deputy Admnstr. Miss M. F. E. Scott; Lieut. F. Scoty-Hall; Sec. Lieut. J. C. Shakeshaft (16th Lancers); Lieut. D. Shanks (Suss. R.); Lieut. (A./Capt.) W. H. Sharpe; Lieut. W. W. Sharpe; Lieut. C. G. Shaumer (Lond. R.); Capt. (A./Lieut.-Col.) C. A. Shaw, D.S.O. (9th Lancers); Capt. W. Shearer; Lieut. (A./Capt.) E. D. Shearn (Hants R.); Capt. G. G. Shepherd; Capt. (A./Maj.) D. J. Sheridan (R. Ir. Fus.); Sec. Lieut. J. D. Shotter; Capt. (A./Lieut.-Col.) P. Sidney (North'd Fus.); Admnstr. Mrs. H. Simeon; Capt. (A./Maj.) E. W. Simpson (A. and S. Highrs.); Capt. (A./Maj.) M. A. Simpson; Deputy Admnstr. Miss E. R. Sinclair; Capt. B. H. Sisson (R.G.A., S.R.); Maj. N. Sladden; Capt. P. A. Smee; Lieut. F. S. Smith, A.M.; Capt. (A./Maj.) H. E. Smith; Lieut. K. MacP. Smith; Lieut.-Col. J. R. W. Smyth-Pigott, D.S.O.; Capt. F. Smythe; Maj. A. E. Snape; Lieut. (A./Capt.) H. V. Snook (R.E.); Capt. J. W. Somers; Sec. Lieut. (A./Lieut.) H. R. Soutter (S. Staffs.); Maj. E. H. Sparling; Capt. F. W. Sparrow; Hon. Capt. and Qrmr. F. Spearing, D.C.M. (R. Fus.); Lieut. (Hon. Capt.) G. G. Speight; Capt. M. T. Spence; Asst, Admnstr. Miss F. H. Spinney; Lieut. G. J. Squires (R.E.); Lieut. L. R. Staddon; Sec. Lieut. E. Staples; Lieut. (A./Capt.) E. S. Steddy (E. Kent. R.); Capt. (A./Maj.) H. Stedman (R.A.M.C.); Capt. A. E. Steele; Lieut. T. F. Steele (A. and S. Highrs.); Capt. H. E. Steinberg; Sec. Lieut. (A./Maj.) R. B. Stephenson (R.E.); Sec. Lieut. (A./Capt.) T. Stevenson; Capt. F. V. Stillingfleet (R.E.); Capt. R. M. Stirling; Lieut. S. S. Stone (W. Yorks R.); Lieut. A. J. Stopford (Aus. Arty.); Capt. L. Y. Stott; Lieut. B. Strange (R. Bucks Yeo.); Sec. Lieut. H. P. Strong; Lieut. G. T. Stroud (R.E.); Lieut. (A./Capt.) H. G. Stuart, M.C.; Lieut. A. E. Stubbs; Sec. Lieut. (A./Lieut.) E. A. Sullivan (Canada); Capt. J. A. C. Sumner; Capt. A. E. Sutton (Can. Med. Ser.) (Canada); Sec. Lieut. (A./Lieut.) E. F. Sutton.

Capt. R. St. C. Talboys; Sec. Lieut. C. L. Taylor (R.A.S.C.); Capt. C. A. W. Taylor; Sec. Lieut. (A./Lieut.) E. Taylor; Capt. F. D. Taylor; Lieut. G. E. Taylor; Admnstr. Miss P. A. Taylor; Lieut. (A./Maj.) W. H. Taylor (R.F.A.); Lieut. T. L. Tebbit; Sec. Lieut. (A./Capt.) S. Tew; Maj. A. V. Thompson; Sec. Lieut. W. R. Thompson (R. Lancs. R.); Lieut. (A./Capt.) G. R. Thorne (R.A.S.C.); Capt. (A./Maj.) F. D. Till; Capt. R. H. Timmis; Lieut. (A./Capt.) F. Tingle (R. Scots); Sec. Lieut. (A./Maj.) A. J. Tommer; Lieut. S. V. Towers; Capt. M. H. Toy (Can. F.A.) (Canada); Lieut. (A./Capt.) W. H. Trinder (R.W. Surr. R.); Capt. (A./Maj.) H. M. S. Turner, M.B.E. (R.A.M.C., T.F.); Maj. L. W. F. Turner (Dorset Yeo.); Lieut. (A./Capt.) C. G. Turpin; Maj. The Hon. L. J. E. Twistleton-Wykeham-Fiennes (O. and B. L.I.); Lieut. (A./Capt.) T. K. Twist, M.C. (Dur. L.I.); Maj. J. H. S. Tyssen M.C. (N. Som. Yeo.).

Capt. C. T. Cachell, M.C. (Mon. R.); Capt. (A./Maj.) E. R. Vaisey (Essex, R.); Sec. Lieut. (A./Lieut.) S. S. Vanderhook (Glouc. R.); Lieut. C. H. Vernon (2/7th Hants. R.); Lieut. (A./Capt.) H. C. Vickery (W. Yorks. R.); Capt. S. F. Vincent, A.F.C.; Sec. Lieut. K. B. Voss.

Capt. R. M. Waddington (W. Yorks. R.); Capt. N. W. Wadham (Rif. Bde.); Lieut. H. W. Wadsworth (London R.); Sec. Lieut. C. Waine; Capt. E. N. E. Waldron (I.A.R.O.); Lieut. (A./Capt.) A. R. Walker; Capt. E. G. Walker; Capt. J. B. Walker; Lieut. (Hon. Capt.) S. E. Wall (Northants R.); Lieut. W. Wallace (R.F.A.); Capt. E. B. Waller; Capt. (A./Maj.) J. T. Waller, M.C. (Leic. R.); Maj. P. A. Waller; Lieut. C. H. Wallis; Lieut. L. P. Wallis; Lieut. (A./Capt.) G. V. Walsh (24th Can. Inf.); Capt. J. L. Walshe; Sec. Lieut. (Hon. Capt.) E. H. Walter (Rif. Bde.); Capt. A. B. Walters (Lond. R.); Lieut. F. Walters; Lieut. (A./Capt.) R. M. Ward; Lieut. (Hon. Capt.) T. A. Warne-Brown, D.S.C.; Lieut. A. F. Warner; Capt. (A./Maj.) E. J. Watkins (Canada); Maj. G. J. Watney; Capt. (A./Maj.) H. S. Watson (Tyne E. Engrs. and R.E.); Hon. Capt. (A./Maj.) J. C. Watson; Lieut. (A./Capt.) W. H. Watson (Can. M.G.C.) (Canada); Lieut.-Col. W. O. Watt, O.B.E.; Capt. F. J. Watts (Essex R.); Lieut. R. W. Weatherby; Lieut. (A./Capt.) A. Webb (5th Dgn. Gds.); Sec. Lieut. (A./Capt.) W. G. Webber; Capt. L. M. Wedderburn (R.A.M.C.); Capt. B. Weil (R.A.S.C.); Lieut. (A./Capt.) R. G. Weller (R. Fus.); Lieut. E. H. Wells; Maj. J. K. Wells; Lieut. (A./Capt.) A. M. West (S. Staff. R.); Capt. (A./Maj.) G. Whale; Lieut. (A./Capt.) C. C. Wheeler; Sec. Lieut. (Hon. Lieut. and A./Capt.) T. M. Wheeler (Lanc. Fus.); Asst. Admnst. Miss M. Whidborne; Capt. (A./Maj.) R. Whiddington; Capt. J. R. H. Whiston (8th N. and D.R.); Sec. Lieut. W. W. Whitehead; Lieut. (A./Capt.) R. P. M. Whitham, M.C. (8th N'ld. Fus.); Lieut. (A./Capt.) B. T. Whittaker; Sec. Lieut. E. Whittlesea; Capt. A. F. Wickenden; Sec. Lieut. V. H. Wicks; Lieut. (A./Capt.) H. F. Wilkinson; Lieut. (A./Capt.) F. D. Williams (Canada); Capt. J. Williams (D.C.L.I.); Lieut. K. L. Williams (I.A.R.O.); Capt. (A./Maj.) O. C. Williams; Capt. W. T. S. Williams, D.S.C.; Lieut.-Col. (A./Brig.-Gen.) F. G. Willock, D.S.O. (R.F.A.); Lieut. C. W. Wilson (Dur. L.I.); Capt. D. W. Wilson; Lieut. E. Wilson, M.C. (Middx. R.); Capt. D. Wilson (Castle Bromwich); Lieut. (A./Capt.) J. J. Wilson (E. Yorks. R.); Sec. Lieut. J. J. Wilson (Lond. R.); Capt. M. W. Wilson; Lieut. S. Wilson; Capt. A. Wombwell (Linc. R.); Capt. H. L. Wood; Sec. Lieut. J. W. Wood; Lieut. (A./Capt.) L. Wood (R.G.A., S.R.); Lieut. E. F. Worthington; Lieut. W. S. Wright (Leic. R.); Sec. Lieut. W. Wyatt; Maj. H. N. Wylie; Maj. R. V. Wynn (R. of O., 9th Lrs.).

Lieut. L. E. Yeomans; Sec. Lieut. J. Young; Capt. S. G. Young.

Since the lists of names appearing in this publication were placed in the hands of the printers, the actg. ranks indicated have been relinquished in the great majority of cases.

Warrant Officers, Non-Commissioned Officers and Men (*including Personnel, Women's Royal Air Force*) :—

204528 Ch. Mech. H. P. Abbot; 44853 Cpl. A. C. Adams; 6,749 Sgt. E. J. Adams; 204570 Cpl. Mech. J. C. T. Addis; 73887 Cpl. Clk. O. M. Alfred; 313310 Mas. Clk. A. A. Allen; 220293 A. M. 2 (A./Cpl.) J. Allen; Can. 70625 F./Clk. E. J. Allman; 65825 A./Sgt. W. Almond; 16796 F./Sgt. W. Anderson, M.S.M.; 207560 Sgt. W. D. Anderson; 6499 Sgt.-Maj. J. O. Annan; 17603 Member Miss J. Ansell; 49440 Sgt. F. Anstey; 73011 Sgt.-Maj. G. Apps; 405710 Sgt. A. H. Arch; 5773 Sgt. S. C. Archer; 208032 Mas. Mech. T. Armit; 4991 Ch. Mas. Mech. S. Armstrong; 3137 A./Sgt. R. H. Arnett; 44370 F./Clk. H. H. Atkinson; 8059 Ch. Sec. Ldr. Miss A. Austen.

402311 Cpl. A. J. Bacon; 4773 Member Miss E. Bailey; 300338 Cpl. W. Bailey; 7637 Member Miss E. Baker; 226707 Sgt.-Mech. A. J. Baldwin; 68041 Cpl. E. R. Ball; 204324 Ch. Mech. P. E. Ball; 247242 Ch. Mech. (A./S.M.) F. Bamber; 408390 F. Sgt. T. Banks; 209420 Ch. Mech. W. C. Barclay; R.N.150263 Ch. S. Berth Steward H. Barker; 37914 A./Sgt. L. Barker; 4774 Mas. Mech. L. Barker; 227614 Cpl. Mech. B. W. Barlow; 133516 Sgt. E. W. Barnes; 69299 Sgt. R. Barr; 210275 Sgt. Clk. F. C. Bartells; 4253 S.M.I. C. E. Barton; 204801 Sgt. E. A. Barton; 22734 A./Sgt. T. F. Barton; 119782 A.C.I. J. T. Barty; 225329 L.A.C. G. Bastick; 219815 F./Sgt. E. Bate; 10106 Ch. Mech. R. J. Bates; 1960 F./Sgt. H. Beaverstock; 126754 L.A.C. C. Bayley, M.M. (late R. Fus.); 16920 Sgt. W. E. Baylis; 65644 F./Sgt. W. Beasley, M.M.; 209965 Sgt. Mech. H. R. Beaumont; 2256 Ch. Sec. Ldr. Mrs. L. J. Bedwell; 4304 S.M. 2 G. Beer; 24749 Sgt. (A./F. Sgt.) J. J. Belham; 72777 A. F./Clk. E. G. Bell; 21274 A./F.-Sgt. C. W. Bellairs; 5998 Member Miss E. C. Benuett; 3378 Member Miss V. Bennett; 4576 Ch. Sec. Ldr. D. Benson; 212766 Sgt. T. Bentley, 12823 Ch. Mas. Mec. W. H. Berg; 2478 Member Miss Z. M. Berrill; 9063 F./Sgt. F. W. P. Best; 73408 A./Ch. Mec. W. P. Best; 27133 Sgt. H. W. Bickerstaffe; 9073 F./Sgt. V. C. Bignell; 314115 Sgt. J. T. Binding; 19357 F./Sgt. A. V. Binsted; 25762 S.M. I. J. E. Bird; 75448 S.M. 2 O. Birley; 224843 F./Sgt. A. W. Bish; 187323 Cpl. C. Bishop; 287 F./Sgt. E. L. Bishop; 25729 F./Sgt. W. J. Black; 1176 Member Miss M. Blackford; 1922 Sec. Ldr. Miss H. Blake; 16879 L.A.C. B. Bloss; 206047 Cpl.-Mech. (W./T.) B. Bocking; 60742 L.A.C. (A./Cpl.) H. A. Boison; 216302 A./F.-Sgt. J. N. Bonnar; 300242 Sgt.-Maj. H. Bonnard; 735 Ch. Mas. Mech. A. J. Booker; 205763 Ch. Mech. G. Booth; 203616 Sgt. Mech. Obs. T. N. Bore, D.S.M.; 18418 F./Clk. O. E. Boreland; 603 Member Miss K. Bostock; 217082 Sgt. R. C. Botting; 69039 L.A.C. P. R. Bowden; 136743 Clk. 2 E. A. Bowdery; 12073 F./Sgt. A. Bowers; 207503 Sgt. H. R. Bowles; 13646 Ch. Sec. Ldr. Miss D. V. Boyle; 214416 F./Clk. L. R. Bradford; 4619 Member Miss G. M. Bretherick; 17785 Sgt. H. R. Brett; 65145 Sgt. W. H. Brett; 2590 Ch. Mech. B. R. Brewis; 13014 S.M. 1 F. G. Brigden; 19602 Member Miss E. M. Briggs; 20924 Member Mrs. M. B. Brisley; 13326 Senr. Ldr. O. M. Bromley; 56557 L.A.C. F. B. Brooks; 52708 A.M. 1 A. H. Brown; 81259 Sgt. A. S. Brown; 4864 Ch. Mas. Mech. E. A. Brown; 14366 F./Sgt. E. E. Brown; 89855 Sgt. Mech E. O. Brown; 27719 F./Sgt. G. A. Brown; 33744 A./Sgt. H. Brown; 19 A./Ch. Sec. Ldr. Miss H. M. Brown; 314131 Sgt. J. M. Brown; 86470 Cpl. W. Brown; 2466 F./Sgt. W. Brown; 234319 Clk. 2 G. W. Browne; 57348 Cpl. W. Browne; 203629 Cpl. Mech. J. Bruce; 217934 Sgt. Clk. W. Bryon; 51910 L.A.C. M. T. Buck; 10040 Ch. Sec. Ldr. Miss E. Buckley; 40424 F./Sgt. J. A. Bullivant; 314134 Sgt. M. Bunn; 108806 Sgt.-Major S. P. Bunn; 16848 Sgt. G. W. Burch; 423 S.M. 2 F. A. Burton, R.N.; 29508 Sgt. Mech. F. E. Burton; 207602 Ch. Mech. F. T. Byford; 71777 Ch. Mech. A. J. Byles; 217530 A./Sgt. F. C. Bynoth; 11951 Ch. Sec. Ldr. Mrs. P. Byron.

R.N. 2317043 Ch. Mech. E. H. Caine; 10322 Ch. Sect. Ldr. Miss A. D. Cairns; 25503 Member N. B. Campbell; 205585 Cpl. E. C. Carder; 45611 Sgt.-Maj. F. W. Carline; 243 A./Sgt.-Maj. N. Carlyle; 209778 Ch. Mech. A. G. Carr; 16984 Sect. Ldr. M. Carr; 12472 Ch. Sec. Ldr. M. A. Carstairs; 71346 Sgt. A. B. Carter; 39595 S.M. 1 G. S. Carter; 30694 Sgt. A. H. Cashmore; 17140 Sgt. Clk. F. A. Cassere; A. 2582 Q.M.S. T. G. Cemery; 51093 Sgt. F. E. Chapman; 6935 Sgt.-Maj. T. H. Cheeseman; 219734 A./Cpl. J. Chisnall; 205306 Sgt.-Mech. M. Chunn; 12925 Cpl. A. H. Clark; 37483 Sgt. C. O. B. Clark; 209448 Cpl.-Mech. P. E. Clark; 220624 A./Sgt. P. L. Clark; 207675 Sgt./Clk. A. Clarke; 203863 Sgt.-Mech. W. Clarke; 18237 Sgt. C. E. Claughton; 61371 Sgt. J. P. Cleland; 204461 T.M. 1 H. S. Clements; 56900 A.C. 1 A. B. Clowsen; 1676 F.-Sgt. W. A. H. Coates; 9359 Sgt. T. F. Cole; 34890 F.-Sgt. A. B. Coleman; 192345 A.C. 2 J. R. Colley; 13017 A.M. 1 J. Collins; 3109 Member Miss I. K. Collins; 34437 F.-Sgt. A. T. Collis; 206443 Sgt.-Mech. H. A. Coombes; 66272 Sgt. E. V. G. Coombs; 37310 A.M. 1 C. R. Cooper 15945 Sgt.-Maj. J. Cooper; 3129 Member Miss O. Copeland; 62055 A./Cpl. G. B. Cordwell; 211032 Cpl. A. Cornish; 4109153 Cpl. F. Cornwall; 210339 Cpl. S. H. Couldwell; Can.-72626 Sgt. E. C. Cowie; 3449 Ch. Sect. Ldr. Miss H. G. Cox; 2196 Ch. Mech. W. S. Coy; 205657 Cpl.-Mech. A. B. Crawford; 37508 F.-Sgt. J. Crawley; 4270 Member Miss H. M. Crevald; 44071 Sgt.-Maj. J. W. Crooks; 126108 Sgt. A. Crosby; 187421 Cpl. F. J. Cross; 160052 A./Sgt. J. J. Crowley; 21269 F.-Sgt. W. H. T. Cunnington; 81689 Cpl. F. Curtis; 73478 A.M. 1 J. Cusack.

25086 F. Sgt. W. Dalgetty; 225829 Sgt. Clk. A. M. Dallen; 28470 F. Sgt. R. H. Dann; 935 A. Ch. Sec. Ldr. Miss Violet M. Dann; 3128 Ch. Sec. Ldr. Miss A. M. Darby; 187180 Sgt. R. W. C. Dare (late 4th Devons); 21088 F. Sgt. H. Darlington; 23697 Sgt. S. A. Davey; 18171 Mbr. Miss B. Davidson; 207466 A. Cpl. G. Davidson; 10971 F. Sgt. R. F. Davidson; 210313 Sgt. Mech. G. Davie; 14777 F./Clk. E. Davies; 26361 Cpl. R. Davies; 45854 A./S.M. S. Davis; 209992 F./Sgt. W. G. C. Davis; 19152 Sgt. A. H. Dawson; 200550 A./Sgt. F. Dawson; 407101 Sgt. F. B. Deacon; 28521 Cpl. (A./Sgt.) J. J. Dear; 18250 Mbr. Miss D. McL. de la Touche; 2877 Ch. Sec. Ldr. Miss D. R. Derrick; 48722 A.C. 1 H. G. Dewey; 6085 Ch. Sec. Ldr. Mrs. E. Dibben; 81606 L.A.C. R. Dickenson; 218108 A./Sgt. W. H. Dickison; 230867 Clk. 1 T. J. Dingley; 87764 S.M. H. Dinsdale; 75962 Cpl. W. G.

Dockray (106th Sqn.); 9996 Ch. Sec. Ldr. Miss E. Dolton; 1020 Ch. Mas. Mech. R. Donaldson; 18839 Ch. Sec. Ldr. Miss H. F. Dorricott; 10132 Ch. Mas. Mech. H. J. Draper; 409075 A./Cpl. U. Drayton; 212458 Sgt. Mech. R. Duckett; 3992 Sgt. J. Dudley; 80079 Sgt. E. Duffill; 10 Ch. Sec. Ldr. Miss D. M. Dufour; 9985 F./Sgt. A. H. Dunn; 27219 Ch. Sec. Ldr. I. Dunn; 26152 S.M. 1 G. A. Durnford; 228533 A./Cpl. F. W. Durrant.

217928 Sgt. L. G. Easter; 45239 L.A.C. (A./Cpl.) C. J. Eastwood; 52436 Sgt. H. E. Ebden; 62156 L.A.C. C. W. Edwards; 24646 S.M. 1 W. S. Edwards; 9123 F./Sgt. A. W. Elcombe; 213440 Sgt. Mech. R. Elder; 203121 Cpl. Mech. W. E. Eldridge; 20329 A./Cpl. J. C. Eliott; 967 S.M. 1 J. S. Ellard; 23836 Cpl. W. B. Elliott; 12023 Ch. Sec. Ldr. Miss M. E. Ellis; 15896 Mbr. Miss M. G. Elton; 229274 A.C. 1 C. M. Emsley; 1078 Ch. Sec. Ldr. Miss E. M. Eustace; 24241 Ch. Sec. Ldr. Mrs. D. Evans; 205936 Ch. Mech. A. M. Everard; 200159 Ch. Mech. E. S. Evison; 19373 Mbr. Miss F. I. Eyles.

3737 Cpl. W. S. Fairhall; 148868 A./Cpl. W. H. Farley; 205446 Ch. Mech. S. W. Farmer; 313987 Cpl. J. Farquharson; 1081 Ch. Sec. Ldr. Miss E. V. Faulkner; 68115 F./Sgt. J. A. B. Fay; 41205 A./F./Sgt. A. Feltham; 98715 Sgt. W. M. G. Fenton; 218454 Cpl. Mech. A. Ferguson; 18456 Ch. Mech. W. Ferguson; 16313 F./Sgt. W. F. Figgins; 401163 F./Sgt. G. F. Finn; 45009 F./Sgt. E. P. Firth; 61727 L.A.C. G. E. Flack; 35991 Sgt. F. C. Fletcher; 24418 Ch. Mas. Mech. T. Foley; 7041 A./Cpl. F. W. Ford; 219392 Sgt. Clk. J. H. Ford; 231840 Cpl. W. C. Ford; 25579 F./Sgt. W. H. Foster; 401046 F./Sgt. C. C. Fothergill; 218200 Sgt. Clk. H. C. Fountain; 11803 Ch. Sec. Ldr. Miss P. Fowler; 50147 A.C. 1 G. J. Fox; 207124 Sgt.-Maj. 2 H. L. Fox; 166114 W.O. 2 A. Franklin; 48655 F./Sgt. J. R. Fraser; 187370 Cpl. H. F. Frisby; 211814 Cpl. R. H. C. Fullbrook; 204979 F./Sgt. A. G. Furber; 23381 Sgt. Clk. R. P. Futter.

16692 F./Sgt. C. Gaff; 402233 S.M. I. R. Galley; 3202 Ch. Mas. Mech. A. Garbett; 2248 F./Sgt. A. T. Garbett; 11408 F./Sgt. H. Gardner; 75723 L.A.C. U. Gardner; 4439 Sgt. F. Garner; 227632 A.M. 2 J. G. Gatehouse; 9307 Ch. Mech. W. C. Gatehouse; 211596 F./Sgt. F. Gates; 212510 Sgt. Clk. H. W. Gaydon; 81424 Cpl. E. Gellard; 206345 Ch. Mech. (E.) W. R. Gent; 289869 Sgt.-Maj. J. T. Gibbon; 141569 Sgt. C. Gibson; 3096 Sgt.-Maj. 1 W. C. Gilby; 29662 F./Sgt. H. Gladdis; 237598 A. M.2 W. J. S. Glass; 210267 Sgt. Mech. R. Glover; 777 Sgt.-Maj. 1 C. W. Goodchild; 223675 F./Sgt. R. R. L. Gosling; 2196 Ch. Mech. W. S. Goy; 687 F./Sgt. S. H. Graham; 88284 R.S.M. J. Grailey; 36984 F./Sgt. E. W. Grant; 6105 Mbr. Miss M. U. Grant; 75517 A./Cpl. D. W. Gray; 207444 Sgt. Mech. F. Gray; 9134 A./F./Sgt. H. Gray; 11437 A./Sgt.-Maj. A. Green; 214431 A./Sgt. J. B. Green; 207809 F./Sgt. D. G. Greenaway; 208125 Sgt. Mech. G. W. Gregg; 187726 A./Sgt. J. N. Grey; 62387 A./Sgt. M. H. Gross; 1549 F./Sgt. C. Gunther.

9199 Cpl. H. Haddington; 379 6 F./Sgt. C. F. Haigh; 781 F./Sgt. L. R. J. Halcro; 233447 Sgt. F. Hales; 216158 Sgt. Clk. B. J. Hales; 63769 F./Sgt. T. Halford; 5028 F./Sgt. E. J. Hall; 26316 A./Cpl. J. Hall; 40081 A./Sgt. S. Halsall; 20792 Sgt.-Maj. 1 A. J. Ham; 37841 F./Sgt. J. Hamberger; 200846 F./Sgt. H. Hambleton; 3742 Sgt.-Maj. 2 W. E. Hamilton; 204661 Sgt. Mech. J. G. Hammett; 92058 Clk. 1 W. F. Hancock; 2117 Ch. Sec. Ldr. Miss F. Hannam; 6818 Sgt. A. J. Hannis; 114222 W.O. 2 E. A. Harbert; 6330 F./Sgt. E. Harrington; 8801 F./Sgt. A. H. Harris; 88448 Sgt. E. A. Harris; 205286 Sgt. F. E. Harris; 21048 L.A.C. A. Harrison; 4772 Mbr. Miss E. N. Harrison; 402562 Sgt. T. C. Harrison; 283 Ch. Mas. Mech. J. Hart; 275027 F./Sgt. J. H. Hartley; 244307 A.C. 2 J. F. Hartwell; 3548 Mas. Mech. A. W. Hawkes; 10741 Sgt. R. Hawkesford; 313117 Sgt. H. Hawksey; 13010 Ch. Sec. Ldr. Miss C. M. Haworth; 20610 F./Sgt. H. Hay; 102343 A.C. 1 J. T. Hayter; 211599 F./Sgt. T. H. Hayward; 6859 F./Sgt. H. H. Heales; 12048 Ch. Sec. Ldr. Miss I. A. Hearn; 11446 F./Sgt. E. C. Hearse; 187475 W.O. 2 C. Heath; 1177 A. Ch. Sec. Ldr. Miss D. A. Helsdon; 25012 W.O. 1 E. G. Henderson, M.C.; 18477 F./Sgt. T. H. Henderson; 24735 F./Clk. G. A. Hepworth; 67904 F./Clk. J. Herald; 4542 Sgt.-Maj. 2 F. W. Hester; 25617 L.A.C. A. S. Hickox; 28539 F./Sgt. R. G. Hicks; 658 Ch. Mas. Mech. H. Higgs; 68036 F./Sgt. C. R. Hill; 98849 Sgt.-Maj. 1 H. Hill; 9411 Ch. Sec. Ldr. Miss M. G. Hill; 2956 Sgt.-Maj. 1 W. Hill; 1274 Ch. Mas. Mech. R. V. Hinds; 150576 Cpl. H. S. Hipwell; 164281 Cpl. H. G. Hiscott; 206727 Cpl. A. L. Hobart; 52 Mas. Mech. C. A. Hobby; 213618 Sgt. Mech. H. S. Hodges; 21275 Mbr. Miss W. E. Hodder; 180 Sgt. A. F. J. Holder; 206180 Cpl. Clk. H. H. Hollick; 44369 Sgt. E. A. Holloway; 44695 Sgt. V. M. Holloway; 17570 Mbr. Miss A. S. Holmes; 9725 Sgt.-Maj. L. H. Holmes; 80075 L.A.C. W. B. Holmes; 194814 F./Sgt. J. Holt; 9556 Sgt.-Maj. 2 P. J. Holt; 9602 F./Sgt. H. Hopgood; 18385 F./Sgt. H. H. Horton; 409113 A./Sgt. F. Hough; 7591 C. Mech. C. E. Howard; 218450 F./Sgt. H. Howard; 314252 Sgt. W. Howard; 41514 A./Sgt. S. Howarth; 268879 Clk. 3 (A./Cpl.) D. P. Howell; 1734 Sgt.-Maj. 1 R. A. Howes; 9 Mbr. Miss M. O. Howie; 203978 L.A.C. C. Hoy; 129881 A./Sgt. W. Hughes; 75545 L.A.C. W. Humberston; 236330 Sgt. F. Humby. Can. 150078 Cpl. L. A. Hume; 232394 A.C. 1 J. Hunter; Can. 150891 A./Cpl. H. G. Hurd.

216655 Sgt. G. H. Ingram; 50407 A./Cpl. W. A. Innes; 72188 A./Cpl. R. H. Irvine; 28843 Sgt.-Maj. 1. F. J. Isaacs.

44484 Sgt. R. G. Jackson; 76442 Cpl. (A./Sgt.) T. W. Jackson; 186297 A./Sgt. R. G. Jameson; 10367 Ch. Mech. H. Jamieson; 148 Sgt.-Maj. H. Jenkins; 213031 A.M. 1 H. Jennings; 56994 Sgt.-Maj. 1 W. E. Jennings; 210882 Sgt.-Mech. J. R. C. Jerram; 87632 Sgt.-Maj. 1 E. Johnson; 401646 F./Sgt. F. V. Johnson; 203468 Ch. Mech. (E.) T. J. Johnson; 203391 Ch. Mech. E. Johnston; 458 F./Sgt. J. E. Jones; 67242 Sgt. Clk. J. E. Jones.

3370 F. Sgt. E. Kay; 3468 Ch. Sec. Ldr. Miss J. S. Keay; 18031 Sgt.-Maj. 1 H. M. Kebby; 134994 Pte. 1 G. G. Keeling; 101732 A.C.1 H. H. Kellaway; 24155 Sgt.-Maj. 1 B. A. Kelly; Can. 71920 Sgt. D. M. Kelly; 119130 A.C. 1 F. Kelly (H.A.C.); 64847 Sgt. R. Kelly; 604 Member Miss F. E. L. Kemp; 87741 Sgt.-Maj. 1 G. Kendon; 55 F./Sgt. H. T. Kendrick; 61451 F. Sgt. C. R. Kent; Can. 73015 Sgt.-Maj. 1. F. W. Kerr; 2 7411A./Cpl. I. V. Kerridge; 2741 F./Sgt. F. C. Kimber; 215951 Cpl. C. R. Kindell; 2826 Member Miss D. King; 18151 Sec. Ldr. Miss E. M. King; 209253 F./Sgt. G. L. Knowles; 83824 Cpl. (A./Sgt.) G. R. Knowles; 70955 A.M. 1 E. Kynch.

236959 Clk. 2. G. D. Lamb; 798 Sgt.-Maj. 1 F. Lamden; 200269 Sgt. Mech. A. E. Lancaster; 805595 A. F. Sgt. A. Lane; 37449 F./Sgt. J. Lazard; 9644 Member Miss B. Lea; 216956 Sgt. Clk. J. A. Leach; 49831 F./Sgt. W. Leach (R.A.); 2263 Ch. Sec. Ldr. Miss T. W. Leafe; 187476 Cpl. Clk. F. T. Lee; 8099 Sgt.-Maj. 1 H. Lee; 345037 F./Sgt. H. H. Lee, 205822 Ch. Mech. J. T. Lee; 217953 Cpl. W. G. Lee; 2654 Sgt. S. J. Leech; 33328 F./Sgt. R. W. Leeming; 5311 F./Sgt. A. J. Lennard; 218416 F./Sgt. G. Lethbridge; 313162 Sgt.-Maj. 1. W Leveson; 200866 Ch. Mech. E. Lewis; 12249 F Sgt. G. B. Lewis; 203033 Ch. Mech. H. Lewis; 210601 Cpl. Mech. P. H. Lewis; 8413 Sgt.-Maj. 2 W. E. Lewis; 231167 Clk. 2 G. H. Lidiard; 205933 A.M. 1 (W.T.) J. S. Lindsay; 24260 Sgt. Mech. R. Lingham; 18678 F./Sgt. F. Liquorish; 2081 Sgt. A. C. Little; 88538 L.A.C. D. Little; 21338 Sgt.-Maj. 1 I. Lloyd; 37381 L.A.C. W. L. Lomax; 7693 Sgt. R. C. Long; 12451 Member Miss E. Longe; 25658 A.M. 1 J. Lonsdale; 18241 Member Miss A. Loosmore; 200262 Ch. Mech. B. J. Lovett.

231437 A.C. 1 D. J. McArthur; 98803 Sgt.-Maj. S. C. McCully; 206119 Sgt. J. McDonald; 10569 Ch. Sec. Ldr. Miss J. D. McGhie; Can. 70651 A./Sgt. A. A. McGibbon; 98384 Sgt. Clk. P. McGorum: 11801 A./Ch. Sec. Ldr. Miss E. V. McKenzie; 187170 Sgt.-Maj. 2 W. McKim; 205900 A./Sgt. A. C. McLeod; Can. 72936 Cpl. L. M. McLeod; Can. 71671 Cpl. C. W. McPherson; 200264 Ch. Mech. E. J. McQueen; 14392 Ch. Sec. Ldr. Miss A. McTaggart; 12058 F./Sgt. W. D. Macallister; 24519 F./Clk. L. C. Machin; 205768 Cpl. (A./Sgt.) R. H. Mackenzie; 228939 L.A.C. J. M. Mackie; 69847 Sgt. M. Macmillan; 114310 A. C. 1 E. S. Maddocks; 99116 Cpl. (A./Sgt.) J. Magee; 21027 F./Clk. W. Magee; 30534 F./Sgt. H. Magnall; 22460 A./Mas. Clk. W. Manners; 98804 Sgt.-Maj. 1 E. F. Manning; 313171 Ch. Mech. T. F. Mantle; 19002 F./Sgt. H. E. Manton; 28402 Sgt. W. G. Marriott; 222313 F./Sgt. C. A. Marshall; 2142 Member Miss A. A. Mason; 207609 Sgt. F. Mason; 17777 A./Sgt. G. N. Mathews; 2420 Ch. Sec. Ldr. Miss N. G. Maude; 70602 Ch. Mech. H. Maudsley; 5053 F./Sgt. H. N. May; 204995 Sgt. Mech. L. V. Mays; 581233 Cpl. A. J. Mead; 27962 Sgt.-Maj. 2 S. J. Meadows; 27873 Sgt.-Maj. 1 C. Mealing; 6697 Member Miss M. Mercer; 12242 Ch. Sec. Ldr. Miss E. A. Merrill; 50795 Sgt.-Clk. J. A. Messer; 1589 Ch. Mech. R. Milby; 8050 Sgt. Clk. R. Miller; 210980 Cpl. Clk. W. H. Millgate; 19033 Ch. Sec. Ldr. Mrs. A. B. Millierwood; 125782 Sgt. S. H. G. Millington; 56287 L.A.C. T. F. Millington; 61301 F./Sgt. A. J. Mills; 11880 F./Clk. J. E. Mills; 206179 Cpl.-Mech. F. B. Missen; 208287 Ch. Mech. P. D. Moller; 8261 Sgt.-Maj. 1 W. Molloy; 29123 Sgt. W. Montgomery; 42671 Sgt. G. H. Moody; 55878 A./Sgt.-Maj. D. Mooney; 10345 A./Cpl. H. T. Moore (7th Stores Depôt); 14140 Sgt.-Maj. 1 W. R. Moores; 18998 F./Sgt. A. C. Morbey; 204575 Sgt. Mech. A. J. Morris; 7020 Sgt. B. D. Morris; 25817 F./Sgt. C. C. Morris; 36519 F./Sgt. E. J. Morris; 17070 F./Clk. R. Morthen; 70560 Mas. Mech. J. B. Mortimer; 227779 Sgt. A. Moss; 401578 Sgt. G. Moult; 28445 F./Sgt. L. Mount; 148401 Sgt.-Maj. 1 C. F. Mountifield; 409165 A./Mas. Clk. W. Mullaney; 10713 Sgt.-Maj. 2 H. S. Mumford; 108155 A.C. 1 W. Murphy; 29067 A.M. 1 F. McB. Murphy; 61469 F./Sgt. L. J. Murray; 11587 F./Sgt. C. B. Murrell; 29816 A./Sgt. F. Musk.

88051 Sgt.-Maj. J. Newman; 10296 Sgt. A. H. R. Nias; 29110 F./Sgt. F. C. Nice; 10921 F./Sgt. J. Nicholls; 37938 F./Sgt. L. E. Nicholls; 129653 F./Sgt. F. Nightingirl; 8341 Sgt.-Maj. 1 J. Nottingham.

5096 Ch. Mas. Mech. E. C. Oades; 227651 A./Sgt. G. Ogden; 2562 Ch. Mas. Mech. J. E. Onions; 57940 A./Sgt. A. H. Ormen; 71387 A.M. 1 A. G. Osborn; 186754 F./Sgt. A. A. Owen.

42281 Sgt. A. R. Padwick; 187677 S.M. 2 G. S. Palmer, D.S.M.; 113821 A.C. I. J. Palmer; 16574 F./Sgt. F. D. Palser; 48066 Sgt. G. D. Parker; 126319 S.M. 2 H. C. Parker; 3297 Sgt. Mech. R. Parker; 20537 F./Sgt. P. Parkinson; 220023 Cpl. H. Parr; 7090 F./Sgt. C. Parrott; 60240 Cpl. (A./Sgt.) T. H. Parry; 203189 F./Sgt. J. W. Partridge; 72728 Cpl. (A./Sgt.) H. Pascall; 11296 F./Sgt. H. E. Patching; 79666 L.A.C. (A./Cpl.) C. Patrick; Can. 71494 Cpl. H. Patterson; 401026 F./Sgt. F. W. Pavey; 84651 Cpl. S. Pawsey; Can. 70631 F./Sgt. A. F. Paxton; 66271 F./Sgt. A. R. Pearce; 5377 F./Sgt. W. Pearman; 220177 Cpl. G. S. R. Pederick; 206818 Cpl. G. R. Peers; 200613 Ch. Mech. H. A. Percival; 210693 F./Sgt. A. J. Perry; 82263 F./Sgt. S. W. Pett; 3749 Sgt. H. F. H. Phelps; 205641 A./Sgt.-Maj.) C. E. Phillips; 205841 S.M. C. E. Phillips; 724 F./Sgt. F. J. Phillips; 38532 F./Sgt. H. A. Phillips; 36046 F./Sgt. C. H. G. Philpot; 1203 Member Miss A. Pickering; 106864 A./S.M. S. E. Pike; 11597 S.M. 1 W. J. Pinder; 7655 Ch. Sec. Ldr. Miss B. Plowman; 8060 A./F./Sgt. S. Poole; 6409 Ch. Sec. Ldr. Miss F. M. Potter; 48455 F./Sgt. C. J. Pottier; 8995 F./Sgt. C. Powling; 202017 Sgt. Clk. W. Pratt; 185599 F./Clk. J. E. Prax; 2143 Staff Ldr. Miss A. Price; 43987 F./Clk. G. A. Pritchard; 130029 Cpl. Clk. H. E. Pritchard; 45129 Sgt. J. F. Proctor; 2672 F./Sgt. C. A. Prowse; 2417 F./Sgt. (A./S.M.) C. Pryor; 207115 Sgt. Mech. G. M. Pullen.

18580 F./Sgt. J. M. Ralston; 54757 A.M. 1 (A./Cpl.) C. Ramsden; 6250 Sgt. S. Ranby; 166039 S.M. 2 L. A. Rancom; 16701 Sgt. A. J. Rands; 22239 S.M. 2 V. B. Ranford; 8662 Member Miss S. M. Rangel; 146090 A.C. 1 (A./Cpl.) F. Ransome; 4698 F./Clk. W. F. Ray; 2456 S.M. G. H. Raynor; 1482 F./Sgt. L. M. Reader; 42029 Sgt. A. E. Reed; 12500 Ch. Sect. Ldr. Miss E. Reed; 2289 S.M. T. Reid; 227552 Cpl. Mech. E. E.Renaut; 205417 F./Sgt. W. Rennie; 217016 Sgt. Clk. M. G. Reynolds; 7762 F./Sgt. W. J. Richards; 401665 Ch. Mech. A. J. Richardson; 46438 R.S.M. F. Richardson; 32815 Sgt. J. Richardson; 72102 A./Cpl.J. A. Riddell; 230998 Clk. 1 R. Ridley; 405740 A.M. 1 R. Ripley; 200079 Ch. Mech. (E.) R. W. Ripley; 64549 A./Sgt. H. Roberts; 187396 F./Clk. J. Robertson; 123421 Cpl. G. F. Robey; 102 S.M. A. C. Robins; 150598 A./Cpl. L. Roche; 68415 A./Sgt. R. Roser; 5304 S.M. M. B. Ross; 136968 A.C. 2 P. C. Ross; 204445 Sgt. F. A. Rossier; 8267 Ch. Sec. Ldr. Miss E. L. Rouncefield; 204449 Sgt. B. A. Rowe; 10753 Member Miss M. D. Rowe; 230 F./Sgt. O. R. Rowe; 1356 Sgt. (A./F./Sgt.) S. A. J. Rowland; 314358 Sgt. J. L. Rowlinson; 4618 Member Miss A. L. Ruler; 18698 F./Sgt. A. J. Russell; 37140 F./Sgt. Clk. J. H. Ryder; R.N. 224527 Ch. Mech. (R./L.) J. Rye.

3032 Ch. Sec. Ldr. Miss M. Sainsbury; 1943 Ch. Sec. Ldr. Miss M. Sales; 41946 A./Sgt. H. C. Sandford; 98123 A./Sgt. G. R. Sandiford; 6653 F./Sgt. W. R. Saunders; 17780 Ch. Sec. Ldr. Miss E. Saunders-Jones; 3303 Sgt. J. R. Scott; 138233 A.C. 2 W. J. Scott; 34875 Sgt. F. C. Scratchley; 201741 Ch. Mech. (E.) N. A. Scull; 9655 Sgt. H. E. Searle; 217765 F./Sgt. M. R. Selby; 13666 Sgt. Mech. B. Sellars; 224041 Sgt. Mech. F. H. D. Sewell; 12163 S.M. R. W. Sharp; 10452 F./Sgt. F. B. Shaw; 207134 Cpl. Clk. J. E. Shaw; 204142 F./Sgt. A. W. Shearman; 234878 A.M. 1 L. A. Shepperson 11382 Sgt. H. J. Sibun; 301555 Cpl. A. J. Sims; 3061 Sec. Ldr. Miss A. D. Sinclair; 1916 Ch. Sec. Ldr. Miss M. Skelton; 401978 F./Clk. W. T. E. Skelton; 11082 D./Sgt. G. Slater; 217746 A.C. 1. J. T. Slatter; 13420 F./Clk. R. P. Slaughter; 35265 Sgt. G. W. Smailes; 185034 A./S.M. C. C. Smith; 4873 S.M. 1 C. H. Smith; 56566 Sgt. G. H. Smith; 10390 L.A.C. (A./Cpl.) L. D. Smith; 143429 A.M. 3 T. Smith; 202690 Sgt.-Mech. W. J. Smith; 202618 Sgt.-Mech. J. R. Smurthwaite; 13743 F./Sgt. A. C. Snowden; 21 A./Ch. Sec. Ldr. Miss W. R. Sowter; 10274 Cpl. J. Spencer; 224387 F./Sgt. R. W. Squires; 9310 A./Sgt. A. C. Squirrell; 1995 Ch. Mech. R. A. Stacey; 2242 S.M. 1 (Tec.) J. Stallard; 209141 Sgt.-Mech. A. A. Stanbridge; 19205 Sgt. F. Starkey; 79229 Sgt. H. Stebbings; 14117 F./Sgt. H. Stephenson; 206716 Sgt.-Mech. A. Stevens; 75405 L.A.C. F. D. Stewart; 223141 A./Cpl. Mech. L. C. Stewart; 17318 Ch. Mech. W. F. Stewart; 29209 Ch. Mech. W. H. Storr; 138 Mas. Mech. R. Street; 13974 F./Sgt. C. W. J. Streetly; 214871 Sgt. P. E. Stubbs; 40841 A./Sgt. J. C. Suter; 293339 A./Clk. 2 W. H. Swan; 105283 L.A.C. J. V. Sykes; 72704 Sgt. F. Sylvester; 6515 F./Sgt. J. W. Sylvester; 18200 F./Sgt. R. Syme; 6198 S.M. 1 F. W. Symons.

93483 F./Sgt. W. H. Tarrant; 8864 A.M. 1 H. Tatton; 300237 A./Sgt. A. J. Taylor; 313274 Ch. Mech. H. Taylor; 313928 Cpl. Mech. H. Taylor; 8949 Ch. Mech. H. R. K. Taylor; 10063 Mbr. Miss L. A. Taylor; 187229 F./Clk. L. R. Taylor; 48741 Sgt.-Maj. R. A. Taylor; 11925 F /(Sgt. G. Templeman; 17676 Sgt.-Maj./H. Theobald; 221849 F./Sgt. D. R. Thom; 9244 F./Clk. G. E. Thomas; J.2207 Ch. Mech. (R./L.) H. Thomas; 209142 Ch. Mech. R. H. Thomas; 5444 F./Sgt. W. Thomason, M.M.; 70611 F./Clk. A. J. Thompson; 206239 F./Sgt. A. S. Thompson; 401974 L.A.C. (A./Cpl.) C. Thompson; 187172 A./Sgt. T. P. Thompson; 1418 F./Sgt. W. Thompson; 21055 F./Clk. J. A. Thomson; 218306 Sgt. Mech. H. G. Tiller; 306 Ch. Mas. Mech. D. G. Tindale; 8290 Mbr. Miss E. E. Titterington; 314070 C.P.O. C. Todd; 205711 Cpl. E. Tonkin; 225546 Cpl. C. H. Tonks; 16063 A./Ch. Mech. W. J. Toozes; 205707 Cpl. F. W. Torlot; 23344 Ch. Sec. Ldr. Miss F. A. Travis; 42894 F./Clk. P. V. Tree; 6656 Ch. Sec. Ldr. Miss L. M. Trusler; 302778 R.S.M. F. Truss; 1124 Ch. Sec. Ldr. Miss K. Tubb; 201547 F./Sgt. E. H. Tunnell; 112167 L.A.C. J. M. Turnbull; 17474 Sgt.-Maj. 2 W. G. Turner; 207068 Sgt. Mech. W. C. Turpin; 206004 Sgt. E. W. P. Tyrrell.

24954 Sgt. O. A. Usher.

35573 F./Sgt. J. Vale; 10012 Mbr. Miss N. Van Loock; 12264 F./Clk. F.

Venner; 220393 Cpl. A. H. Vickers; 8136 A./Spt. Ldr. Miss H. Vinogradoff.

200582 Ch. Mech. W. Wadlow; 313282 A./F./Sgt. J. Wailling; 407677 F./Sgt. F. Waite; 1212 Sgt.-Maj. 1 H. J. Wakeling; Can. 73645 Cpl. C. V. Wakely; 1714 Sgt.-Maj. C. G. Walker; 409837 Ch. Mech. D. J. Walker; 4322 F./Sgt. F. S. Walker; 56011 Sgt.-Mech. H. Walker; 214613 Cpl. S. Walker; 37624 F./Sgt. E. J. Walsh; 78674 Sgt.-Maj. 1 J. Wannop; S.R. 18 Sgt.-Maj. 1 H. W. Warboys; 2169 Mhr. Miss F. E. Ward; 8824 Mhr. Miss L. M. T. Ward; 25760 A./F./Sgt. A. A. Warner; 314425 F./Sgt. F. W. H. Warren; 2157 T./Sgt.-Maj. E. C. Watson; 26286 Sgt. F. B. Watson; 65835 Sgt.-Maj. 1 C. E. Watts; 29192 Sgt. G. E. Watts; 57648 Sgt. W. E. Wears; 58717 F./Sgt. B. S. Webb; 408696 F./Sgt. A. P. Webley; 3095 Sgt. Mech. A. Webster; 2436 Sgt.-Maj. 2 W. Webster; 9525 Mhr. Miss M. Weeks; 11929 Cpl. E. Wenhand; 25142 F./Sgt. F. L. Wheeler; 37586 Ch. Mech. W. Whitaker; 1946 Ch. Sec. Ldr. Mrs. A. White; 212750 Sgt. D. D. White; 123534 L.A.C. L. S. Whitehead; 202542 F./Sgt. F. H. Whiteley; 230687 A.C. 1 A. W. Whiting; 21210 Clk. 1 L. A. Whitty; 203768 Cpl. G. F. Wicks; 11621 Sgt.-Maj. L. M. Wiertz; 1913 Ch. Sec. Ldr. Miss B. Williams; 6234 T./Sgt.-Maj. H. A. Williams; 70714 A.M. 1 H. C. Williams; 228763 Sgt. Clk. J. W. Williams; 51092 F./Sgt. R. J. Williams; 75269 Sgt. W. E. Williams; 8707 F./Sgt. S. Williamson; 19111 Sgt.-Maj. F. Willis; 313297 F./Sgt. F. G. Wilmot; 18810 Sgt. Mech. E. Wilmott; 14279 Ch. Mech. J. A. Wilson; 1437 L.A.C. R. W. Wilson; 47157 A.M. 1 A. A. Wiltshire; 226532 Sgt. H. Winchester; 1098 Sgt.-Maj. 1 S. V. Winney; 12236 Ch. Sec. Ldr. Miss E. A. Winspear; 210392 A./Clk. 1 T. R. Winter; 9719 Sgt.-Maj. 1 E. A. Withers; 232830 A.M. 2 A. T. Wood; 14758 F./Sgt. E. Wood; 7296 Sgt.-Maj. 1 H. Wood; 7823 Sgt. S. A. J. Wood; 31 Snr. Ldr. Mrs. V. N. M. Wood; 36738 Sgt.-Maj. A. W. Woodgate; 263679 Cpl. H. Woodhead; 2878 Ch. Sec. Ldr. Miss C. I. Wooding; 5759 Sgt. C. Woodrow; 112745 L.A.C. G. F. Woolaston; 1744 Ch. Sec. Ldr. Miss R. Woolfe; 29076 Sgt.-Maj. 1 R. N. H. Workman; 201765 Sgt. J. Wrenn; 13057 Sgt.-Maj. 1 C. H. Wright; 4374 Ch. Sec. Ldr. D. M. Wright; 8472 A./Sgt.-Maj. 2 F. N. Wycherley.

214401 Sgt. T. E. Yates; 6735 F./Sgt. S. Young.

Civilian Staff

The following members of the civilian staff employed by, or serving in connection with, the Air Ministry, have been brought to the notice of the Secretary of State in respect of valuable services rendered in connection with the War:—

Mr. H. H. Adams (Thornton Heath); Mr. W. E. Boyce (Paddington); Mr. H. H. Chapman (West Croydon); Dr. W. C. Collins, M.D. (Chester); Mr. J. Cooke (Upper Holloway); Mr. U. Cooke (Biggin Hill); Mr. F. J. T. Cooper (Balham); Mr. V. Cozens (Newlyn); Mr. C. W. Crosbie (Bedford); Mr. H. C. Dwelly (Stoke Newington); the Rev. G. Frazier-Upton (A./Chaplain) (Coventry); Mr. J. S. Grosvenor (Kingston-on-Thames); Mr. V. C. Mountfort (Streatham Hill); Mr. W. R. Parker (Lewisham); Mr. R. C. Pearce (Battersea, S.W.); Mr. F. S. Rae (Battersea Park); Mr. G. R. Richardson (Surbiton); Mr. H. Russell (Upper Walthamstow); the Rev. W. G. Spurrell, M.A. (A./Chaplain) (Pembroke); Mr. S. Stephens (Cattewater); Mr. C. E. Stevens (Uxbridge); Mr. H. M. Stretch (Romanlea, Berks); Dr. H. M. Thomas, L.R.C.P., M.D. (Fishguard); Mr. W. Williams (Streatham Hill).

Mrs. D. M. Alban (Blackheath); Misses F. A. Anscombe (West Kensington); J. Armstrong (Palmers Green, N.); Mrs. L. Aston (Uxbridge); Misses E. H. Attwood (Canada); K. Barry (Thornton Heath); Mrs. Bedford (Barnes); Misses A. Bennett (Wanstead); E. D. Bircumshaw (Wimbledon); A. Boisseau (Canada); Mrs. C. E. Bond (Leyton, Essex); Mrs. A. R. Boughton (Canada); Misses F. E. Branchflower (Leytonstone); B. J. Burch (Salisbury, Wilts); O. Callender (Surbiton); O. E. Cardew (East Dulwich); B. R. Chapman (Hyde Park, W.); N. W. A. Chard (Crawley, Sussex); E. V. Cheney (East Ham); G. Clarke (Kensington, W. 8); D. A. E. Cole (Portman Square, W.); I. Collins (Canada); G. M. Dellagana (Brondesbury Park); D. E. Dunn (Bloomsbury, W.C.); M. Dwyer (Canada); Mrs. M. Elderton (Canada); Miss K. Farrer (Canada); Mrs. G. G. Finn (Barnes, S.W.); Misses I. W. Fitzwilliam (Jermyn Street, W.); K. F. Forsdyke (Broomwood Road, S.W.); E. Francis (Brompton Road, S.W.); B. George (Canada); B. Gibbon (Ripon, Yorks); E. M. Gibbons (Sutton, Surrey); E. M. Glendenning (Hampstead, N.W.); G. M. Godsal (St. Mary's Mansions, W.); Mrs. F. M. Gooch (East Ham); Mrs. N. Gordon (Canada); Mrs. E. F. Green (Ealing); Mrs. D. Greenall (Reading); Misses L. Groom (Wallington); D. Hale (S. Lambeth); M. Hannant (Canada); H. Harding (Highbury, N.); E. Harker (Canada); Lady Harrowey (Grosvenor Place, W.); Misses H. I. Hartley (W. Hampstead); F. L. Hayward (Surbiton); L. A. Heritage (Streatham); Mrs. E. G. Kingston (Brompton Road, S.W.); Mrs. M. M. Hodgson (Steatham); Mrs. E. Hogan (Canada); Miss G. M. Hood (Kingston-on-Thames); Mrs. F. C. Hollway (61, Lexham Gardens, W.); Misses B. E. M. Hubbard (Naughton, Suffolk); E. Hughes (Chelsea, S.W. 3); A. B. Hyam (New Cross); M. I'Anson (Walthamstow); A. L. Jarvis (Canada); Mrs. M. Johnson (Canada); Misses N. M. Jones (Golder's Green); G. J. Keogh (Forest Gate); Mrs. M. Kimpton (Canada); Mrs. A. E. King (Shepherd's Bush); Misses E. E. King (Hampstead, N.W.); E. M. King (Canada); G. E. Knight (Gloucester Road, W. 1).

Misses C. Lamb (West Hampstead); D. C. Lawman (Upper Tooting, S.W.); L. E. Lawrence (Westminster); C. McChesney (Ealing); E. J. McClellan (Canada); D. McCoy (Stamford Hill); E. Macdonald (Canada); L. G. McGuffin (Canada); P. MacKinnon (Grays, Essex); Mrs. T. McRae (Canada) Misses C. Macklin (East Ham); M. Maloney (Canada); E. Marshall (Canada); E. F. M. Marwood (Wandsworth); M. A. Matthew (Westminster); H. May (Canada); M. L. Meehan (Canada); Mrs. A. M. Megaw (Cleveland Gardens, W.); Misses K. Melville (Canada); D. I. Millard (Hornsey); Matron Miss V. G. Milman (Blandford); Mrs. L. E. Milroy (Hanover Square, W.); Mrs. M. G. Mogridge (Wimbledon Park); Mrs. G. Montague (Brixton Hill); Misses L. M. H. Nash (Hampstead); B. M. Nelson (Canada); Mrs. G. Norman (Bayswater, W.); Misses H. E. Norman (London, E.); M. Nott-Bower (Richmond); A. O'Brien (Canada); O. M. Ormsby (Canada); P. W. Osborne (Streatham); D. Parry (Finsbury); Mrs. L. M. Parsons (Canada); Mrs. G. E. Pearce (Forest Gate, Essex); Mrs. C. Perry (Marylebone, N.W. 1); Misses G. E. Rafter (Canada); A. Ratcliffe (Canada); Mrs. D. W. Read (Streatham); Misses M. Ryder (Tooting, S.W.); G. L. Roharts (Welwyn, Herts); E. B. Sandford (Paddington); A. Sandys (Yatesbury); N. Schofield (S. Croydon); D. F. Snow (Canada); Mrs. J. Spencer (Mornington Crescent, N.W.); Mrs. L. M. Stacey (N. Kensington); Miss E. Steele (Canada); Mrs. J. I. Strachan (Muswell Hill, N.); Misses K. M. Tackaberry (Canada); A. Tandy (Sheffield); V. R. Thompson (Dublin); Mrs. M. A. Thierry (Oxford Gardens, W.); Misses D. Threlkeld (Canada); V. S. Torckler (E. Molesey); C. W. Turner (London, E. 17); Mrs. A. M. Upton (Myatts Park, S.E.); Miss I. Vallee (Canada); Mrs. M. Van Dyke (Canada); Miss C. M. Vincent (Stoke Newington); Mrs. L. A. Vine (Hampstead); Mrs. G. Webster (Canada); Mrs. M. Weiss (Canada); Misses C. A. J. West (Streatham, S.W.); L. L. White (Highbury, N.); Mrs. A. Whitecross (Wimbledon Park); Misses D. V. Wiffin (Southfields, S.W.); H. M. F. Windle (Chelsea); H. Woodruff (Canada).

◆ ◆

Queenstown as an Aerial Port of Call

CONSIDERATION was given by the Queenstown Urban District Council on August 29 to a proposal of the Great Northern Aerial Syndicate, Ltd., of Liverpool, to establish an aerial base near Queenstown, to be used for the purpose of discharging American passengers travelling from the United States to Ireland by airships, capable of carrying 150 persons in addition to the crew.

It was stated that the syndicate had practically decided to fix their base at Queenstown for the Atlantic services, and that a service of smaller airships to carry 50 persons will be utilised to distribute the American passengers between Queenstown, Dublin, Liverpool, Manchester, York, Hull, Norway and Denmark.

The Council promised to help the project by every means in its power, and expressed satisfaction at Queenstown being chosen as a base for such important aerial services.

New Head of the N.P.L.

IT is announced that the Lord President of the Council has appointed Professor Joseph Ernest Petavel, D.Sc., F.R.S., M.I.Mech.E., etc., to be Director of the National Physical Laboratory in succession to Sir Richard Glazebrook, C.B., F.R.S., who retires on reaching the age limit on September 18 next.

Professor Petavel is Professor of Engineering and Director of the Whitworth Laboratory in the University of Manchester. He is a member of the Advisory Committee for Aeronautics of the Air Ministry. He was educated at University College, London, and undertook scientific research at the Royal Institution and at the Davy Faraday Laboratory until 1898. He was elected John Harling Fellow of the Owens College, Manchester, in 1900.

A Round the World Trip

MR. CHARLES J. GLIDDEN, who many years ago presented a trophy to the American Automobile Club, the competitions for which undoubtedly did a great deal to encourage motoring in the United States, and who has twice toured round the world by motor car, proposes to make a tour of the globe by aeroplane. He intends to cover in two years all points reached in his automobile tour, which required eight years. He will visit such extreme points as the Arctic circle, Sweden, and the most southern part of New Zealand.

Landing on the Jungfrau

RECENTLY several attempts were made to land on the Jungfrau, in the Bernese Alps, 13,670 ft. high. On August 17 Lieut. Ackermann, with Maj. Isler as passenger, started from Thun, and after circling the Aletschhorn and the Eggishorn, tried to reach a landing-ground which had been prepared on the Jungfraujoch. Adverse currents, however, upset the pilot's calculations, and the machine nose-dived into the snow on the side of a crevasse. The pilot and passenger were uninjured, but the machine was slightly damaged. A further attempt was made two days later, but with no better results. On August 22 Lieut. Pillichody tried, but the machine was driven out of its course by the wind and crashed on the snow.

Wrecking the Zeppelins.

THE story sent from Berlin to America last week by Karl Wiegand as to a young naval officer going round various air stations and cutting the cables by which a dozen Zeppelins were suspended in their sheds was a little suspect owing to its circumstantial details. The British Foreign Office and War Office appear to have heard nothing of it but from a statement authorised by the German Naval Office it appears to be a new version of a old incident. According to this statement some of the German airships which were to be handed to the Entente were dismantled during the last weeks of the war as they were no longer of any use for warlike purposes. Seven others were destroyed by their own crews about the time of the sinking of the warships at Scapa Flow, though nothing was published in the Press at the time.

German Aeroplanes Sold to Danish Firm

FROM a message from Copenhagen it appears that the Commission sent by the Entente Legations to inspect some 90 German aeroplanes bought by a Copenhagen firm, and held up by the Danish Customs authorities at Vandrup, has found that all the aeroplanes are new and bear German military marks.

Pending some more satisfactory explanation it looks as though the machines have been sent to Denmark in flat evasion of Article 202 of the Peace Treaty, which provides for the handing over to the Allies of all military and naval aeronautical material.

AIRISMS FROM THE FOUR WINDS.

Before this week's issue of Flight is on sale, the eliminating trial for the trio to represent Great Britain in the Schneider Cup seaplane race at Bournemouth next Wednesday, will have taken place, this preliminary having been carried through on Wednesday this week.

- - -

As to the contest itself, under the organisation of the Royal Aero Club, this is down to start on a circuit of 20 miles in Bournemouth Bay on September 10, at 2.30 p.m., for a distance of 200 nautical miles.

- - -

The Royal Aero Club has obtained the loan of the T.S.Y. *Ombra* (350 tons) to accommodate the members on the day of the race. This yacht will be anchored off Bournemouth Pier, and will be the official starting and finishing point, the competitors passing ten times during the race. Motor launches will convey members from Bournemouth Pier to the yacht between 12 noon and 2 p.m. Members should make application without delay for tickets (price £2 each) including luncheon and tea on board. An enclosure for members has also been reserved at the Pier-head, for which tickets may be obtained on application.

- -

The order of the Air Ministry this week that the new titles for R.A.F. officers are applicable to all officers, whether permanent or temporary, attached to or seconded for service with the R.A.F. is a wise departure. Confusion must otherwise have arisen continually.

- -

"A set of yesterday (Monday) morning's Paris newspapers brought by air express was delivered to *The Daily Telegraph* office early yesterday evening. Almost simultaneously we received the Paris papers of Friday last, which had come by the ordinary railway route. Those of Saturday and Sunday have not yet arrived."

Comment would be superfluous upon the above paragraph published in the *Daily Telegraph* on Tuesday last, September 2!

- -

Mr. Holt Thomas is once more the far-seeing pioneer, with the pluck for practical application, in aviation. Nothing could be more convincing than the regularity of the Paris-London Service to schedule time as carried out by his organisation. It has been modestly stated that the weather has not been ideal! As a fact the elements during part of the week seemed as if they had had a mandate to do in at the outset all attempts at commercial flying. But the result must have been disappointing to the clerk of the weather, and already an excellent tone of sympathy is observable in business circles, widely different to that predicted by the ghouls of pessimism. Why even the postal authorities are now nibbling at supporting the scheme, so that in 10 or 15 years it may be possible to send letters officially by air-post. Many may not know it, but quite a lot of the mails are conveyed by motor vehicles now and even for some years back. But in the early and *late* early days of motorism, each bureaucrat refused to countenance the beastly thing and, moreover, unofficially, swore by bell and book they never would. But they *have*—when they were compelled to. And so, no doubt, with air-mails.

- - -

Some R.A.F. Impressions

Lt.-Col. Holt, D.S.O., formerly commanding 9th Wing, R.A.F.

In another direction the speed of the 'plane has quite possibilities of playing a part.

"When the new Cross-Channel Air Service is permitted to carry letters," writes a City Editor, "it may become an important adjunct to the modified form of arbitrage business that has been recommenced with the removal of the restriction on the import of securities.

"So long as all business is on a cash basis rapid delivery of securities is an important factor in stock and share business. When speculative dealing was permissible actual delivery of the securities was not an essential part of business on the Stock Exchange. Now it is, and the quicker they can be transported from one place to another the easier it is to deal."

Only those who understand what arbitrage business means can appreciate what important results may accrue in this direction alone.

- -

Canada also presents a practical application of the aeroplane to the peculiar requirements of northern latitudes. From a recent exploration expedition by means of aeroplanes to the hinterland of Labrador, a correspondent of the *Daily Telegraph* writes, the discovery of vast resources of pulpwood lands resulted. The locations were hitherto believed to be of little value. The expedition was undertaken by the Newfoundland Government along the coastlands still under the jurisdiction of the island. The aeroplanes made many flights extending for 400 miles inland. A series of photographs and maps of the unexplored districts has been obtained. It is expected the results of the exploration will lead to the exploitation of large areas of pulp in the forestland by the coast which is now extremely valuable.

- -

Quite in a different direction, the unique outlook obtained from an aeroplane, has proved of remarkable value in quite an unexpected way. In one of the papers, which are to be read before the British Association Meeting, opening at Bournemouth, is one in which it is set out how the excellence of air photography has resulted in the discovery of the sites of lost Asiatic cities for which archaeologists have been vainly digging and searching for generations.

The slight difference of colour over a buried wall can make the outline of a town absolutely distinct from the air, though quite invisible on the ground.

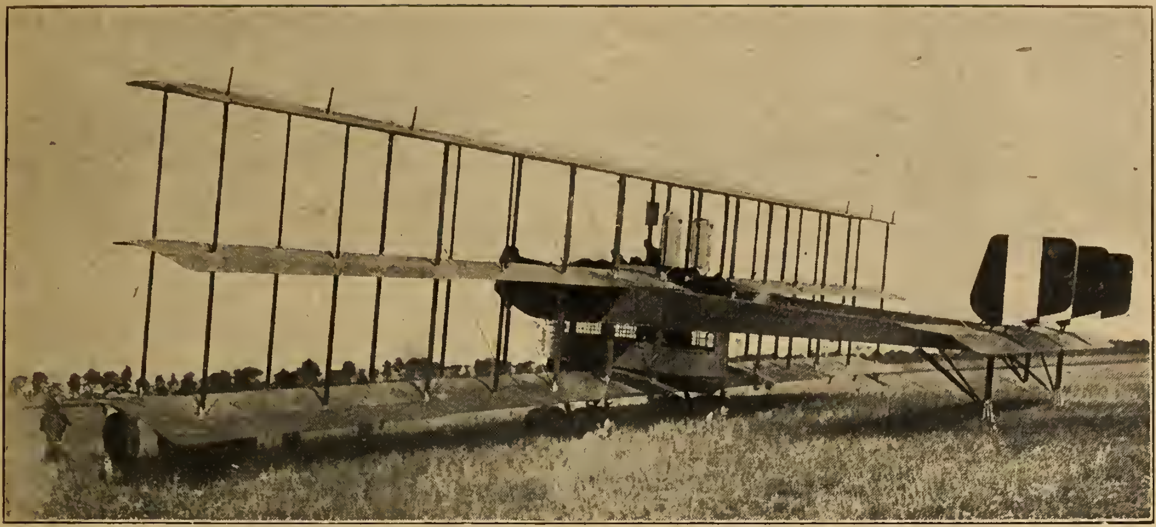
- - -

II Brigade R.A.F. H.Q.
Cologne Germany
Capt Wastrell D.S.C
Capt. Frankish MBE "Q"-with stores well in hand
Brig Gen J.H.W. Becke CMG DSO A.F.C. & The Brigade Major
Capt Wood M/G
Capt F Pratt Education Officer
2 2/4
"A" minor & "A" Major Lt Linford & Capt Kavonagh MBE
A

WHETHER the conquest of the air will ever change the natural instincts for adventurous mountain climbing, born in so many thousands of our noble selves, man and woman, is more than doubtful. This side of getting the better of nature's obstacles to our advance is a phase of character which will always have its devotees. On the other hand, there is without question a vast majority of the so-called "traveller" who is simply out to see each and everything out of the way with the least trouble and with the expenditure of the least possible amount of energy. To these the obtaining a view of the world below from the summits of the Alps, and other elevations of the world, by the help of the aeroplane, in overcoming the element of space, will appeal with no uncertain appeal. Therefore, if adequately safe landing points for 'planes can be ensured, it should be a paying proposition to convey tourists by this means to the upper regions of Switzerland.

- - -

IN this connection, according to the *Daily Chronicle* special correspondent at Zermatt, there is every prospect of early developments. The day is no longer distant, he says, when aspiring tourists will be comfortably deposited by an aero-



A CAPRONI PASSENGER TRIPLANE: This machine appears to be a peace-time development of the type CA 4 described in "Flight" of June 19, 1919. The two tractor engines are mounted in the nose of the twin *fuselages*, while the pusher engine is placed high in the stern of the central *nacelle*.

plane on the summit of the Matterhorn, which Edward Whymper conquered 55 years ago, after seven seasons of strenuous efforts, and at the price of the lives of three active young Englishmen, and one of the boldest guides of the period. Indeed, recent exploits of Swiss aviators, which I have witnessed there, the correspondent continues, render it not improbable that "flying up" the Matterhorn and other great Alpine peaks, or at least close around their summits, may soon become a popular holiday sport in Switzerland. What is probably the most elevated flying field in Europe has just been completed at Montana, a frequented summer and winter resort in the Canton of the Valais, at a height of about 5,000 ft. above the sea level. This first of Alpine flying fields was inaugurated a few days ago by a number of sensational flights, in the course of which the Swiss airman Rhyner circled around the summits of the Matterhorn and the Weisshorn for several hours.

- - -

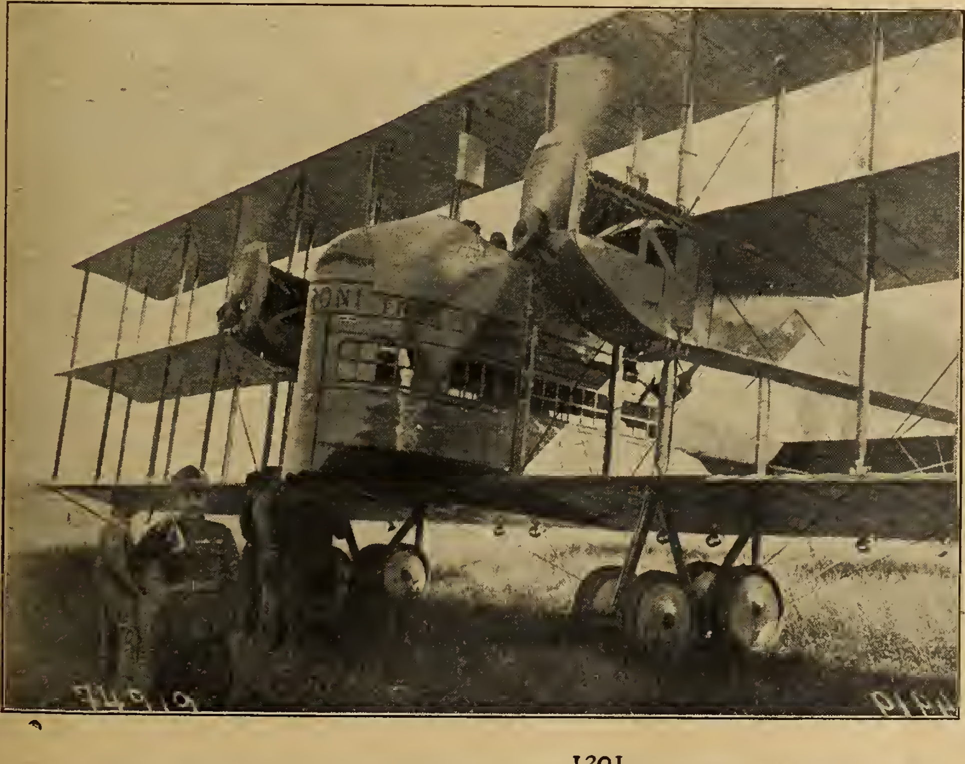
THESE feats will be repeated regularly in fine weather, and hotel guests who are unequal to the exertions of difficult climbing, or deem the dangers of flying less than those of mountaineering, will be able to book seats as passengers, and skim lightly over the crags and precipices which cost the ardent Alpinist many hours of high physical tension to overcome. Alpine aviation thus bids fair to become a recognised institution in Switzerland, by which all those interested in the development of the "tourist" industry hope to attract new swarms of pleasure seekers to the "playground of Europe."

- - -

Two Swiss military aviators, Major Isler and Lieut. Ackermann, after flying around the summit of the Jungfrau in the Bernese Oberland, last month, landed in the midst of the glaciers of the Jungfraujoch.

A suitable landing place had been levelled on the glacier, but the course of their machine was deflected by a sudden gust of wind, and it stopped on the verge of a gaping crevasse, into which the airmen were very nearly precipitated—a mountain accident of an entirely novel character.

This incident suffices to show that Alpine aviation is not without its special dangers. Swift and treacherous air



A Caproni Triplane.—A close-up view of the cabin. This extends from the bottom to the middle plane, and the passengers are enclosed, while the pilot is situated in a smaller cockpit on top of the cabin.

currents also swirl about the great Alpine peaks even in the finest weather, and threaten to hurl airmen to destruction upon ragged ridges and rock faces. Only by experience will these difficulties gradually be vanquished.

It is stated in the Swiss newspapers that an air passenger service is being organised along the line London-Lausanne-Montana-Milan. This would mean flying over the Simplon Pass at a great height, and certainly would afford the air traveller marvellous views of mountain scenery.

Mountaineers naturally do not wax enthusiastic over the possibilities of Alpine aviation, which they are inclined to regard as a further desecration of the Alps by the vulgar crowd. Mountain guides, in centres such as Zermatt and Grindelwald, are more melancholy still, and apprehend serious competition in their profession from their new sport.

* * *

SIR MARTIN CONWAY, on the other hand, is in no way disturbed over these prospects of invasion of his happy hunting ground. In an interview Sir Martin regards it all as "chitter." "There is not," he says, "a single peak of any importance in the Alps on which anyone could land from an aeroplane by any possibility whatever. They can fly about the mountains, of course, as they can fly about London, but between Alpine climbing and flying there is no relation whatever, and I do not think that aeroplanes will ever be there in such numbers as to make any marked difference to the existing calm and beauty of the scene. I doubt, indeed, whether they will be seen around the Alps as often as they are in London.

"Montana, where the most elevated flying ground in Europe is reported to be completed, is all grass. And there are undoubtedly grassy meadows here and there at high altitudes of a sufficient size to land upon, though they are rather lumpy. But I doubt whether there are more than half-a-dozen snowy plateaus, if as many, on which an aeroplane could land, and even from these it might be difficult to get off again.

"The only possibility of using aeroplanes for mountaineering that I can conceive will be in the Himalayas. In those mountains there are large snowfields at high altitudes on which an aeroplane might land, thus enabling the mountaineer to get over the difficulties of the valleys in the lower regions, and to begin to climb the great heights from suitable altitudes. The difficulty in the Himalayas is to get to the bottom of your mountain. No one, for instance, has ever got within 30 or 40 miles of the base of Mount Everest, and with the exception of two or three minor peaks, no mountain in Asia has been climbed at all.

"In the Alps, of course, the conditions are entirely different," Sir Martin continues, "they are on a much smaller scale. If it should ever become practicable to make an aeroplane that will hover like a bird and slowly settle down on a given spot, maintaining its balance whilst there, and be able to start again without running, the relation of mountaineering to flying in the Alps would be different. Under such conditions of perfection an aeroplane might be able to alight on some of the highest peaks, but even then one has to remember that many a peak is so sharp that you have to cut off the top before you can even stand on it.

"As to flying about the Alps, it may be useful for map makers, and there may be for tourists a certain picturesqueness in looking down upon the glaciers—at any rate, it will give people a new view of the scene—but those who look down upon the mountains from a height above them will lose the wonder and beauty of the Alps. You want, not to look down upon mountains, but to look up at them from below."

* * *

ALPINE excursions *via* the air will come, all the same, we fancy.

FLYING-BOATS FOR SCANDINAVIA

SOME observations on the lessons of the recent flight of the F 5 flying-boat, N 4044, from Felixstowe round Scandinavia, have been issued by the Air Ministry. The flight—during which 2,450 sea miles were covered in a total flying time of 40 hrs. 40 mins.—was made entirely as a demonstration of the commercial uses of flying-boats, and is noteworthy because no mishap occurred of any kind during the 27 days the craft was away. The Rolls-Royce engines, of the low-compression Eagle VIII type, worked magnificently throughout. This type demonstrated its reliability in the Trans-Atlantic flight competition, and has now shown its durability in conditions of protracted exposure.

A very good impression was created in each of the Scandinavian capital towns visited, and it is hoped valuable results will accrue to the British aircraft industry in opening up what is, perhaps, the best market in the world for water-going aircraft. As sea-faring people, the Scandinavians were quick to see the merits of flying-boats. Very few land aerodromes exist in these countries, and the land lying between them is difficult and generally dangerous for alighting. On the other hand, sheltered stretches of water are found everywhere, and there are numerous natural "Seaplane Harbours."

Practically the whole of Norway is navigable by seaplanes making use of the fiords, and in Denmark all the large towns are approachable by water; in Sweden a natural seaplane highway extends right across the country, formed by the two large lakes, Vättern and Vänern, the Gotha Canal, and countless small lagoons and lakelets.

It was generally found that the feeling in Norway, Denmark and Sweden towards British aviation is favourable, but it cannot be too strongly emphasised that the near proximity of these countries, especially Sweden to Germany, renders them particularly exposed to German influences. In Sweden, the interests of British aviation are being stoutly upheld by two British demobilised flying officers, who are giving exhibition and passenger flights at Stockholm with Avro machines. The Germans are doing their best to obtain a footing in Denmark, and a short time ago announced aeroplanes and seaplanes for sale at unmistakably "cut" prices. The same policy is being pursued by German companies throughout Scandinavia, although this method of obtaining business cannot be said to have helped their cause, as several accidents have already occurred with the machines. The competition of our trade rivals must not be disregarded; it is a very real factor.

It is important to realise that once a country becomes permeated by machines of one type, a market for spare parts is secured, and the difficulty of effecting a radical change of type increases as time goes on; a golden opportunity will be lost if the British aircraft industry does not respond to the great good-will which already exists in Scandinavia towards British people and British manufacturers.

With regard to the flight itself, the object of demonstrating the advanced state of development of British aircraft and the potentialities of flying-boats for commercial purposes was excellently achieved. From the technical standpoint, the experience gave proof of high efficiency; the hull of the flying-boat was as seaworthy after its month's immersion and exposure as when it left Felixstowe, and the reliability of the Rolls-Royce engines was beyond praise. The wireless telegraphy installation was thoroughly trustworthy, and communication was maintained with Dundee during the entire period of the voyage across the North Sea.

Thanks largely to the unstinted assistance of the authorities at the places where descents were made, the arrangements for mooring and refuelling also worked perfectly.

The times and distances of the stages flown were as follows:—

	Sea miles.	Hours Flying.
Felixstowe to Dundee, July 11	360	6–0
Dundee to Christiansand, July 20	380	7–15
Christiansand to Christiania, July 22 ..	150	2–20
Christiania to Copenhagen, July 29 ..	265	4–15
Copenhagen to Stockholm, August 3 ..	390	4–30
Stockholm to Goteborg, August 4	300	5–0
Goteborg to Esbjerg, August 5	245	4–25
Esbjerg to Felixstowe, August 6	360	6–55
	2,450	40–40

In addition, demonstration flights, aggregating 5½ hours, were made.

An extraordinary example of accurate air navigation was furnished on the outgoing journey, when flying over the North Sea through thick mist and clouds, from Dundee to the coast of Norway, the machine arrived at scheduled time at a point not more than two miles from the intended "landfall" on the Norwegian coast.

Flying Weeks fotNottingham and Derby

SITES at Nottingham and Derby have been licensed, and flying weeks will be run at these towns by some of the Blackpool and Southport Avro pilots. A popular flight should be the journey between these two Midland towns and return.

PERSONALS

Casualties

Lieut. Louis Bennett, 40th Squadron, R.A.F., B.E.F., reported "missing" on August 24, 1918, is now officially reported as killed in action, having been shot down in flames, after destroying two enemy observation balloons. He was an American, and the only son of Hon. and Mrs. Louis Bennett, of West Virginia. When the United States declared war he left Yale, and raised and trained at his own expense the West Virginia Flying Corps, which he offered to his Government to serve as a unit in France, like the Lafayette Escadrille. This being refused, he joined the R.F.C., and came over with the Canadians, in order to get into action. His record between August 15 and 24 was three enemy planes and nine balloons destroyed—four in one day—for which he was congratulated and recommended for the D.F.C.

Lieut. Walter Gilman, who was previously reported missing on July 13, 1918, after alighting in the sea when returning from a bombing raid, and now officially presumed died on or since that date, was the only son of Mr. and Mrs. William Gilman, Hazelcroft, Alderley Edge, Cheshire.

Lieut. James Gordon Moore, R.A.F., died on Thursday, August 14, 1919, as the result of wounds received in action, aged 24 years.

Married

Lieut. A. G. D. Alderson, R.A.F., son of the Rev. A. D. Alderson, of Tockwith, York, was married on August 18, at Swanage, to Edith Mary, eldest daughter of Mr. David Doig, of Rosslyn House, New Barnet.

Robert Joseph Carlton Groves, A.I.F., elder son of Mr. and Mrs. Robert Groves, of Melbourne, Australia, was married on August 12, at Bromley Parish Church, to Katherine Mary, only daughter of the late Revd. Richard F. Earnshaw and Mrs. Earnshaw, of 33, Selby Road, Anerley, S.E. (late of Northampton).

Capt. S. Berkeley Harris, A.F.C., R.A.F., only son of Capt. and Mrs. G. E. Harris, Quadrille Court, Lymington, was married on August 21, at St. Jude's Church, Southsea, to Enid, only daughter of Paymaster-Com. and Mrs. Campion, 1, Sussex Place, Southsea.

Lieut. Lionel R. V. Spencer, Aust. F.C., son of Mr. R. Spencer, of the Old White Hart Hotel, Melbourne, was married on August 6, at All Saints, Scarborough, to Dorothy Cecelia, eldest daughter of Mr. G. T. Pattman and Mrs. Pattman.

To be Married

The engagement is announced between David Stewart Anderson, Lieut. R.A.F., son of the late Mr C. D. Anderson, and nephew of Mr. R. Woolley Walden, J.P., and Phyllis Jessie, only daughter of Mr. and Mrs. James Yeo, Woodhurst, Warlingham, Surrey.

The engagement is announced between Flt-Lieut. Hector A. Campbell, A.F.C., Seaforth Highlanders, attached R.A.F., youngest son of Col. and Mrs. Campbell, of Larachan, Sutherlandshire, to Ecie Collingwood-Allen, elder daughter of Major and Mrs. H. C. Allen, Charlton Lodge, Shepton Mallet, Somerset.

The engagement is announced between Capt. G. F. Caswell, R.A.F., and May, daughter of George Edwards, J.P., and Mrs. Edwards, of 180, Piccadilly, W., and "Cheniston," Egham, Surrey.

A marriage is arranged, and will shortly take place, between Capt. R. J. O. Compston, D.S.C., F.C., R.A.F., younger son of the Rev. H. F. Compston, Fellow of King's College, London, and Nina, only child of the late Arthur Hayward Barclay, Capt., 18th Hussars, and adopted daughter of Lieut.-Col. Hubert F. Barclay, of Essendon Close, Hatfield, Herts.

The engagement is announced between Capt. Aubrey B. Ellwood, D.S.C., R.A.F., youngest son of the Rev. C. E. and Mrs. Ellwood, Cottesmore Rectory, Oakham, and Lesley Mary Joan, daughter of Mr. and Mrs. W. P. Matthews, The Old House, Walmer, Kent.

The engagement is announced between Lieut.-Col. F. Howard Jenkins, O.B.E., M.C., R.A.F., second son of the late J. H. Jenkins, M.R.C.S., L.R.C.P., of Lytham, Lancashire, and Harriet Fernelith, second daughter of Duncan J. Robertson, O.B.E., County Clerk of Orkney.

The engagement is announced between Capt. William Robert Kempson, R.F.A. (T.), late R.A.F., of Thorpe, Norwich, and Miss Enid Margaret Fearnside, daughter of Colonel C. F. Fearnside, I.M.S., and Mrs. Fearnside, of Haven House, Conway.

The engagement is announced between Lieut. Ritchie Francis Henry Moffett, R.A.F., son of J. Ritchie Moffett, of Ladybrand, O.F.S., South Africa, and Hilda Pauline, daughter of Mrs. Yerbury, 26, Milton Road, Acton, London, W.

The engagement is announced of Capt. A. Courtenay Snow, R.A.F., only son of Mr. and Mrs. John Snow, Penllwyn Park, Carmarthen, and Dorothy Elizabeth Bligh, youngest daughter of Mrs. Livesay, Eaglehurst, Alverstoke, Hants.

Items

The will of the late Lieut. Thomas Henry Lucas, R.A.F., of Swindon, Wilts, who died in Egypt, has been proved at £360.

The will of the late Maj. Maurice Nasmith Perrin, R.A.F., of Kensington, has been proved at £14,817.

* * *

Roll of Honour

Published August 29—*Died:* Lieut. P. E. Williams, Cent. Ont. Regt., attached R.A.F.

A message from Archangel on August 30 announced that Major Macdonald of the Flying Corps had been killed in the disaster to the monitor *Glowworm.*

General Lee Killed

Brig.-Gen. Lee, late R.A.F., was killed at Weston-super-Mare on Monday evening.

The aeroplane in which he was flying, with two passengers, while making a turn at a height of between 100 and 200 ft., crashed to the ground. Gen. Lee was badly injured about the head, and both legs were broken, and he died before assistance arrived.

The two passengers escaped with minor injuries and shock.

Italian Machine crashes in Austria

Word comes from Vienna that a Caproni aeroplane, starting from the aviation ground at Aspern, near Vienna, with two officers of the Italian Armistice Commission, the pilot and an engineer, for Rome *via* Turin, crashed from an altitude of less than a thousand feet. All four occupants were killed immediately and the aeroplane was completely wrecked.

Double Fatality in Norway

While flying a Farman machine at Vaernebmeren, near Trondhjem on August 29, Lieut. Jordan was caught in a violent storm, and crashed immediately from a height of 50 metres. The wreckage burst into flames and the pilot and passenger (Lieut. Stokke) were killed.

Spain Wants 20 School Machines

Apparently the Spanish authorities have decided to go ahead with the instruction of pupils, as it is stated that they are contemplating the purchase of 20 school machines.

THE ROYAL AIR FORCE

London Gazette, Aug. 22.

Permanent Officers.

The attention of the officers named in this *Gazette* is directed to Air Ministry Weekly Orders Nos. 866 and 942 of 1919, relating to the grant of permanent commns. and to the rates and conditions of pay and other emoluments.

The following are granted permanent commns, in the RA.F. in the ranks stated, with seniority as shown in the current Air Force List :—

Colonels.—H. R. Brooke-Popham, C.B., C.M.G., D.S.O., A.F.C., (Actg. Brig.-Gen.) B. C. H. Drew, C.M.G., C.B.E. (S.O.).

Lieutenant-Colonels.—A. D. Warrington-Morris, C.M.G., O.B.E. (S.O.), R. E. M. Russell, C.B.E., D.S.O. (S.O.), J. L. Forbes (A.P., T.), F. Ranken (A.P., T.), C. T. Maclean, D.S.O., M.C. (A.), O. H. K. Maguire, D.S.O. (A.).

Majors.—R. H. Verney, O.B.E. (A.P., T.), A. H. W. E. Wynne, O.B.E. (S.O.), A. J. Miley, O.B.E. (A.P., T.), R. Hilton-Jones, O.B.E. (S.O.), R. M. Hill, M.C., A.F.C. (A.), G. H. Norman (A.), H. J. F. Hunter, M.C. (A.), V. S Brown (A.P., T.), F. W. Scarff, M.B.E. (A.P., T.), W. A. McLaughry, D.S.O. M.C., D.F.C. (A.).

Captains.—R. Addenbrooke-Prout, O.B.E., M.C. (S.O.), A. S. C. MacLaren, M.C., A.F.C. (A.), K. M. St. C. G. Leask, M.C. (A.), O. M. Sutton, M.C. (A.), J. Noakes (A.), O. Stewart, M.C, A.F.C. (A.), G. S. M. Insall, V.C. (A.), H. J. Edgar (A.), G. Barrett, A.F.C. (A.), G. L. Godden, O.B.E. (T.), C. Turner, A.F.C. (A.), J. F. Roche (A.), M. F. Browne (T.), R. F. L. Dickey, D.S.C. (A. and S.), W. J. de Salis, D.S.C. (A. and S.), G. T. R. Hill (A.), J. G. S. Candy (A.).

Lieutenants.—R. S. Capon (A.), A. G. Jarvis (A.), J. W. D. Leigh, M.C. (A.), T. C. Luke, M.C. (A.), C. G. Mathew (A.), J. H. Jephson (A.) ; Aug. 1.

The following temp. appt. is made :—

Staff Officer, 3rd Class.—(T.).—Sec. Lieut. H. Norrington ; May 1 (substituted for notification in *Gazette* of July 22).

Flying Branch.

Lieut. S. L. Pope relinquishes the grading for purposes of pay and allowances as Capt. ; Aug. 4.

The following relinquish their commns. on ceasing to be employed :—Lieut. P. W. Taylor, D.C.M. (Lieut., R.G.A.) ; April 30. Lieut. D. F. Lawson (Lieut., Dorset R.) ; July 23. Sec. Lieut. (Hon. Lieut.) W. L. W. Dryland (Lieut., Northants R.), Lieut. A. D. MacDonald (Can. Engrs.) ; July 29. Lieut. W. E. Lambert (Lieut., B. Col. R.) ; July 31.

(Then follow the names of 117 officers transfrred to unemployed list.)

The following Lieuts. resign their commns. :—L. L. Grant ; July 23, 1918 (substituted for notification in *Gazette* June 1, 1918). G. B. E. Norburn (Lieut., R.I. Rif.) ; Aug. 22.

Lieut. T. J. Donovan is cashiered by sentence of a General Court-martial ; Aug. 1.

Sec. Lieut. C. L. Stewart relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; July 28.

Sec. Lieut. (Hon. Lieut.) W. S. McLean (R.F.A.) relinquishes his commn. on account of ill-health contracted on active service ; Aug. 21.

The initials of Lieut. H. A. Wallace are as now described, and not " A. H." as stated in *Gazette* July 8.

The surname of Lieut. S. H. Wallage is as now described, and not " Wallace," as stated in *Gazette* July 8.

The surname of Sec. Lieut. B. G. Whatmough is as now described, and not " Wattmough," as stated in *Gazette* July 8.

The initials of Sec. Lieut. R. T. North are as now described, and not " N. T.," as stated in the *Gazette* July 29.

The surname of Sec. Lieut. (Hon. Capt.) E. E. Carral-Wilcocks as is now described, and not " E. E. C. Wilcocks," as stated in the *Gazette* of June 13.

The notification in the *Gazette* of July 8 concerning Sec. Lieut. C. S. Gregg is cancelled.

Administrative Branch.

Lieut. (Hon. Capt.) H. G. White to be Lieut. (Hon. Capt.), from unemployed list, prec. next below Lieut. E. King ; Aug. 9.

The following are granted temp. commns. as Sec. Lieuts. :—A. P. Jacoby (Temp. Lieut., K.A. Rif.) ; Nov. 13, seniority April 1, 1918, and to be Hon. Lieut. W. A. Hatchett ; Aug. 18. A. G. Owen ; Aug. 19.

(Then follow the names of 21 officers transferred to unemployed list.)

Lieut. J. Dudley relinquished his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; Aug. 7.

Sec. Lieut. (Hon. Lieut.) J. D. C. Curtis, M.C. (Lancashire R.), relinquishes his commn. on account of ill-health caused by wounds ; Aug. 21.

The initials of Sec. Lieut. J. G. Elliott are as now described, and not " J. T." as stated in the *Gazette* of June 3.

The Christian names of Harold Clyde Thomas are as now described, and not " H. C.," as in the *Gazette* of Aug. 1.

The surname of Lieut. P. R. Mallinson is as now described, and not " Mattinson," as stated in the *Gazette* of Aug. 12.

The surname of Sec. Lieut. K. Draco is as now described, and not " Drago," as stated in the *Gazette* of July 29.

The surname of Lieut. G. Wallas is as now described, and not " Wallis," as stated in the *Gazette* of July 8.

The notification in the *Gazette* of July 18 concerning Sec. Lieut. H. Smith, D.F.C., is cancelled.

The notification in the *Gazette* of July 29 concerning Sec. Lieut. A. Challins is cancelled.

Technical Branch.

Capt. C. J. Smith to be Actg. Maj., Grade (B.), from Aug. 6, 1918, to April 30.

Capt. C. J. Smith to be graded for purposes of pay and allowances as Maj. whilst employed as Maj., Grade (B.) ; May 1.

Sec. Lieut. E. A. Blundell to be Sec. Lieut., Grade (A.), from (A'ship) ; June 26, 1918 (substituted for the notification in the *Gazette* of June 3).

(Then follow the names of 26 officers transferred to unemployed list.)

Lieut. J. T. Rossiter resigns his commn., and is permitted to retain his rank ; July 31, 1918.

The notification in the *Gazette* of April 1 concerning Lieut. C. A. Elliott is cancelled (substituted for the notification in the *Gazette* of June 27).

The notification in the *Gazette* of July 30, 1918, concerning Lieut. J. T. Rossiter is cancelled.

The notification in the *Gazette* of Aug. 15 concerning Sec. Lieut. E. L. M. Emtage is cancelled.

Medical Branch.

C. P. V. MacCormack is granted a temp. commn, as Capt. ; Aug. 22.

Lieut. C. Duggan to be Actg. Capt. whilst employed as Capt. without pay and allowances of that rank ; June 20.

G. H. H. Maxwell is granted a temp. commns, as Lieut. ; Aug. 22.

T. H. K. MacLaughlin is granted a temp. commn, as Lieut. ; Aug. 7.

Transfd. to unemployed list :—Capt. J. W. Brash ; March 1. Capt. G. Sparrow ; May 19. Lieut. N. C. Cooper ; June 23. Capt. N. C. Graham, M.C. ; Aug. 13.

Chaplains' Branch.

The Rev. A. S. Bishop relinquishes his commn, on ceasing to be employed ; April 26.

Memoranda.

The following temp. Hon. Lieuts. relinquish their commns, on ceasing to be employed :—P. J. Boucher ; May 31. F. J. Lynes ; Aug. 20.

Transfd. to unemployed list :—Sec. Lieut. R. J. Walker ; July 17. Sec. Lieut. C. A. Russell ; Aug. 14.

Capt C. F. Greaves relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; Aug. 12.

London Gazette, August 26.

The following temporary appointments are made at the Air Ministry :—

Staff Officers, 3rd Class (P.).—Flying Off. E. N. D. Worsley, Sec. Lieut. H. Baker (August 1).

Staff Officer, 4th Class (R.).—Lieut. E. H. Eldridge (August 20).

The following appointment is made :—

Staff Officer, 1st Class (P.).—Lieut.-Col. C. T. Maclean, D.S.O., M.C. (substituted for notification in *Gazette* of August 19).

Flying Branch.

Maj. R. B. B. Colmore, O.B.E., to be Maj. (A'ship.), from (S.O.) (May 12) (substituted for notification in *Gazette* of August 5).

Capts. to be graded for purposes of pay and allces., as Majs. whilst employed as Majs. (A.) :—R. M. Drummond, D.S.O., M.C. (May 1) ; C. W. Hyde (from May 1 to 11).

Capt. (actg. Maj.) R. S. Booth, A.F.C., to be Capt. (A'shp.), and to relinquish the actg. rank of Maj. from (S.O.) (August 10).

Lieuts. to be actg. Capts. whilst empld. as Capts. (A.) :—C. S. Stonehouse from October 25, 1918, to April 30) ; W. L. Fenwick (June 1).

Lieuts. to be graded for purposes of pay and allces. as Capts. whilst empld. as Capts. :—W. L. Fenwick (from May 1 to 31) ; T. H. French, D.F.C. (from May 1 to July 1) ; T. S. Ivens (from May 1 to July 15) ; J. R. Milne, D.F.C. (from May 1 to July 15) ; F. V. Way, A.F.C. (from May 1 to June 22) ; S. Baker, S. E. Faber, A.F.C., E. M. Henderson, R. C. Jenkins, M.C., S. P. Marcus, H. V. Pendavis, D.S.O., W. K. Sutton, R. L. Lyster-Smythe, H. E. Walker, M.C., D.F.C., E. W. White (May 1).

Lieut. R. A. Denne to be Lieut. (A.) from (Ad.) (April 15).

Sec. Lieut. H. G. Pratt to be Lieut. (August 31, 1918).

Sec. Lieut. H. A. Castaldini to be actg. Lieut. whilst empld. as Lieut. (O.), from December 11, 1918, to April 30 (substituted for notification in the *Gazette* of January 24) ; A. A. Phillips (temp. Sec. Lieut., R. W. Kent R.) is granted a temp. commn, as Sec. Lieut. (O.) (October 30, 1918) (substituted for the notification in the *Gazette* of December 31, 1918).

The following relinquish their commns. on ceasing to be empld. :—Lieut. H. Seymour, and is permitted to retain his rank (August 31, 1918) (substituted for notification in the *Gazette* of August 30, 1918) ; Lieut. Hon. Capt. D. Owen (Capt., Nova Scotia R.) (May 31); Lieut. E. C. L. Copner (Lieut., Devon R.) (July 30) ; Lieut. J. M. Leach (Lieut., York R.) (August 6) ; Sec. Lieut. (Hon. Lieut.) D. McD. Northcombe (Lieut., W. Ont. R.) (August 13); Lieut. (Hon. Capt.) A. M. Mitchell (Capt., R.A.S.C.) (August 20).

(Then follow the names of 106 officers transferred to unemployed list).

Capt. E. F. Elderton relinquishes his commn. on acct. of ill-health caused by wounds, and is permitted to retain his rank (August 20).

The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank :—F. J. Taylor (caused by wounds) (July 28); A. N. Nesbit (caused by wounds (August 7) ; A. Coombs (August 13) ; H. A. Smeeton (August 15).

Lieut. J. Macgeorge (Gord. Highrs.) resigns his commn., and is permitted to retain his rank (August 27).

Sec. Lieut. J. N. Hamman resigns his commn. and is permitted to retain his rank (March 6) (substituted for notification *Gazette*, November 29, 1918).

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—A. L. Fachnie (July 11) (substituted for notification in *Gazette* of June 20) ; S. Soothill (caused by wounds) ; G. E. Williams (caused by wounds) (August 14) ; H. R. Messinger (contracted on active service (August 16) ; J. Levy (August 20) (substituted for notification in *Gazette* of January 10).

Sec. Lieut. P. A. Templeton is antedated in his appt. as Sec. Lieut. (A. and S.) (May 25, 1918).

The name of Sec. Lieut. (Hon. Capt.) L. Wilmot-Johnson is as now described, and not " J. L. Wilmot," as stated in *Gazette* of July 29.

The initial of Sec. Lieut. C. Crosthwaite is as now described, and not " G." as stated in *Gazette* of August 15.

The initials of A. C. D. Anderson are as now described, and not " A. C." as stated in *Gazette* of September 6, 1918.

The notification in *Gazette* July 29, concerning Sec. Lieut. W. R. Wright refers to " Walter Redvers Wright."

The surname of Lieut. (Hon. Capt.) H. N. Witting is as now described. and not " Whitting " as stated in *Gazette* of June 13.

The notification in *Gazette* of December 31, 1918, concerning Sec. Lieut. M. Ross-Jenkins (deceased) is cancelled.

The notification in *Gazette*, March 28, concerning Lieut. E. Tasker, A.F.C., is cancelled.

The notification in *Gazette*, April 1, concerning Capt. E. J. B. How is cancelled.

The notification in *Gazette*, April 11, concerning Sec. Lieut. G. Gardiner is cancelled.

The notification in *Gazette*, May 6, concerning Lieut. J. Davidson is cancelled.

The notification in *Gazette*, June 27, concerning Sec. Lieut. J. Stopford is cancelled.

The notification in *Gazette*, July 22, concerning Lieut. H. S. Preston is cancelled.

The notification in *Gazette*, July 25, concerning Sec. Lieut. R. Russell is cancelled.

The notification in *Gazette*, July 29, concerning Sec. Lieut. W. Kinghorn (deceased) is cancelled.

The notification in *Gazette*, July 29, concerning Sec. Lieut. H. J. Clark is cancelled.

The notification in *Gazette*, July 15, concerning Lieut. J. H. Williamson is cancelled.

The notification in *Gazette*, April 25, concerning Lieut. A. C. Anderson is cancelled.

The notification in *Gazette*, July 18, concerning Sec. Lieut. A. L. Fachine is cancelled.

The notification in *Gazette*, August 15, concerning Lieut. D. Cairns is cancelled.

The notification in *Gazette*, February 14, concerning Sec. Lieut. F. L. Roberts is cancelled.

Administrative Branch

Sec. Lieuts. to be Lieuts.:—H. J. Clark (August 9, 1918); (Actg. Capt.) G. D. Ashby (October 20, 1918); and to retain the actg. rank of Capt. until April 30 (substituted for notification in *Gazette* July 18).

Sec. Lieut. H. F. Hendry (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (August 26, 1918).

G. J. Mauusell (Sec. Lieut., Lond. R.) is granted a temp. commn. as Sec. Lieut. (April 1, 1918).

Lieut. S. McGaw (Lieut., Gord. Highrs.) relinquishes his commn, on ceasing to be empld. (August 1).

(Then follow the names of 28 officers transferred to unemployed list.)

Lieut. A. A. Denison, M.B.E., M.C. (Lieut., York and Lancs. R.), resigns his commn. and is permitted to retain his rank (August 27).

Lieut. E. J. Street (Regular Army Officer) relinquishes his commn. on account of ill-health (August 26).

Lieut. (Hon. Capt.) K. E. Claytou (Somerset L.I.) is dismissed the Service by sentence of a General Court-Martial (August 6).

Sec. Lieut. H. B. Willoughby relinquishes his commn, on account of ill-health contracted on active service, and is permitted to retain his rank (August 14).

Sec. Lieut. T. L. Davies (Dgn. Gds.) relinquishes his commn. on account of ill-health (August 14).

The notification in the *Gazette* of April 4 concerning Sec. Lieut. J. Sadler is cancelled.

The notification in the *Gazette* of May 23 concerning Sec. Lieut. H. T. Bolt is cancelled.

The notifications in the *Gazette* of July 18 concerning Sec. Lieut. R. A. Smith, Sec. Lieut. W. J. Bradshaw, and Capt. C. D. Smart, M.C., are cancelled.

The notification in the *Gazette* of May 20 concerning Lieut. A. L. Freeman is cancelled.

The notification in the *Gazette* of August 8 concerning Lieut. A. N. Nesbitt is cancelled.

Technical Branch

Sec. Lieut. (Hon. Capt.) J. R. Cassidy to be Lieut. (April 23, 1918), without pay and allowances prior to August 22, 1918.

Sec. Lieut. C. C. Hicks to be Lieut., without pay and allowances of that rank (April 20).

The following relinquish their commns. on ceasing to be empld:—Sec. Lieut. A. L. Bird (April 6, 1918); Capt. H. A. Saunders (Capt., R. Marines) (May 24).

(Then follow the names of 33 officers transferred to unemployed list.)

Sec. Lieut. F. L. Roberts relinquishes his commn. on account of ill-health, and is permitted to retain his rank (August 15).

The surname of Sec. Lieut. (actg. Lieut.) H. F. Weet is as now described, and not "West," as stated in the *Gazette* of June 10.

The notification in the *Gazette* of January 3 concerning Sec. Lieut. A. A. Davis is cancelled.

Medical Branch.

The following are granted temp. commns. as Capts.:—J. G. Skeet (late Capt., A.I.F.) (August 10); G. M. Mellor (August 21).

Lieut.-Col. E. O. B. Carbery, O.B.E. (Surg.-Commander, R.N.), relinquishes his commn. on ceasing to be empld. (August 15).

Transferred to unempld. list:—Capt. G. Visger (August 1); Capt. R. H. Robbins (August 14).

Dental Branch

W. P. Bole is granted a temp. commn. as Lieut. (July 28).

Chaplains' Branch

The Rev. E. Roberts is transfd. to unempld. list (April 9).

The notification in *Gazette*, August 22, concerning Rev. A. S. Bishop is cancelled.

Memoranda

Here follow the names of three Overseas Cadets granted temp. commissions as Sec. Lieuts., and the names of 130 Cadets granted Hon. Commissions as Sec. Lieuts.

Lieut.-Col. C. R. Finch-Noyes, D.S.O., A.F.C. (Paymaster-Lieut., R.N.) relinquishes his commn. on ceasing to be empld (August 16).

The follg. temp. Hon. Lieuts. relinquish their commns. on ceasing to be empld.:—A. J. Mackay (May 16); C. A. Packer (May 31); W. R. V. Morgan (June 16); R. Searle (July 31); P. C. Thornton (August 24).

Transferred to unempld. list:—Sec. Lieut. W. J. Randall (March 13); Capt. W. A. C. Ricketts, from (S.O.) (May 4); Lieut. E. G. Clement from (S.O.) (August 1); Sec. Lieut. M. L. Bisson, Sec. Lieut. J. H. F. Hock, Sec. Lieut. G. T. Horne, Sec. Lieut. S. J. Livingstone, Sec. Lieut. W. E. May, Sec. Lieut. E. Moorlands. Sec. Lieut. L. M. Montgomery August 14), Capt. F. Spencer from (S.O.) (August 16).

The initials of 176681 Cdt. K. McArthur are as now described, and not R. McArthur, as stated in the *Gazette* of August 19.

London Gazette, August 29.

The following appointments are made:—

Brigadier-General Staff.—Col. (actg. Brig.-Gen.) B. H. H. Cooke, C.M.G., C.B.E., D.S.O., is graded for purposes of pay and allowances as Maj.-Gen. while officiating in command of an area; Feb. 27.

Staff Officers, 1st Class (P.).—Col. A. M. Bent, C.M.G., C.B.E., is graded for purposes of pay and allowances as Brig.-Gen. while officiating as Brig.-Gen., Staff; Feb. 27. (T.) Maj. T. G. Hetherington, C.B.E., is graded for purposes of pay and allowances as Col. while officiating as Col., Staff, from Feb. 18 to July 31.

Staff Officer, 3rd Class (P.).—Capt. E. F. Wilkinson; July 23.

Flying Branch

Capt. C. H. Elliot-Smith is graded for purposes of pay and allowances of Maj. while employed as Maj. (A.); May 1.

Capt. R. S. Smith relinquishes the grading for purposes of pay and allowances as Maj. (K.B.); July 20 (substituted for notification in *Gazette* of Aug. 1).

Capt. B. C. Clayton to be Capt. (A.) from (T.); May 15.

The following Lieuts. are graded for purposes of pay and allowances a Capts. while employed as Capts. (A.):—H. G. Davis, D.F.C., S. G. Frogley, G. C. Gardiner, D.F.C., H. Hillier, D.F.C., A. E. Morgan, W. S. Reid; May 1.

The following relinquish the actg. rank of Capt. on ceasing to be employed as Capts.:—Lieut. H. F. Nicholls, D.F.C.; July 29. Lieut. W. F. J. Harvey D.F.C.; July 30. Lieut. G. L. Hobbs, M.C.; Aug. 8.

Sec. Lieut. H. A. Gastaldini is graded for purposes of pay and allowances as Lieut. while employed as Lieut. (O.); May 1.

Sec. Lieut. J. T. O'Brien to be Sec. Lieut., from Unemployed List, prec. next below Sec. Lieut. C. A. White; July 23.

The following relinquish their commns. on ceasing to be employed: Sec. Lieut. C. L. Douthwaite (E. Yorks. R., T.F.); March 12. Lieut. W. G. Fluke, D.S.O. (Lieut., S. Staffs. R.); May 12. Capt. H. S. Parsons (Capt., Can. Forces); June 19. Sec. Lieut. (Hon. Lieut.) M. McRae (Capt., Can. Forces); July 13. Sec. Lieut. C. E. Eddy (Lieut., Gen. List, S. Afr. Forces); Aug. 5. Lieut. (Hon. Capt.) H. G. L. Mayne (Capt., K.O.S.B.); Aug. 9. Lieut. (Hon. Capt.) .C H. L. Coney (Capt., N. Staffs. R.); Aug. 11. Lieut. J. Cave (Lieut., Manitoba R.), Sec. Lieut. H. A. Crommelin; Aug. 13. Lieut. J. Sharp (Lieut., S. Ir. Horse); Aug. 15.

(Then follow the names of 71 officers who are transfd. to the Unemployed List under various dates).

Capt. E. K. H. Turnour (Lieut., R.N.) resigns his commn., and is permitted to retain the rank of Capt.; Aug. 30.

The following Lieuts. relinquish their commns. on account of ill-health and are permitetd to retain their rank:—J. E. Howell; Aug. 20. W. S. Featherstonhaugh; Aug. 21.

Lieut. L. H. Mackay (Scottish Rifles) resigns his commn., and is permitted to retain his rank; Aug. 30.

Lieut. M. J. P. Scully (R. Inniskilling Fus.) is cashiered by sentence of a General Court-martial; Aug. 11.

Sec. Lieut. D. E. Culver relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Aug. 19.

The surname of Lieut. G. W. Gauld is as now described, and not "Gould," as stated in the *Gazette* of April 25.

The surname of Sec. Lieut. R. P. Coton is as now described, and not "Caton," as stated in the *Gazette* of May 27.

The initials of Sec. Lieut. C. A. Muir are as now described, and not "J. A." as stated in the *Gazette* of June 3.

The surname of Lieut. H. S. Wellby is as now described, and not "Welby," as stated in the *Gazette* of May 27.

The surname of Lieut. J. G. Prestwich is as now described, and not "Prestwick," as stated in the *Gazettes* of July 1 and June 24.

The initials of Sec. Lieut. J. T. O'Brien are as now described, and not "J. D.," as stated in the *Gazette* of July 4.

The initials of Lieut. S. Y. Grant are as now described, and not "S. W.," as stated in the *Gazette* of April 25.

The notification in the *Gazette* of Aug. 27, 1918, concerning Flight Cadet H. W. Williams is cancelled.

The notification in the *Gazette* of March 28 concerning Lieut. (actg. Capt E. Swale, D.F.C., is cancelled.

The notification in the *Gazette* of April 4 concerning Lieut. (actg. Capt.) M. G. W. Stewart, D.F.C., is cancelled.

The notification in the *Gazette* of May 20 concerning Capt. C. G. Davis M.C., is cancelled.

The notification in the *Gazette* of June 3 concerning Lieut. H. L. Young is cancelled.

The notifications in the *Gazette* of June 24 concerning Sec. Lieut. J. S. McGeown and Sec. Lieut. H. R. Hayden are cancelled.

The notification in the *Gazette* of July 11 concerning Sec. Lieut. T. C. Stranger is cancelled.

The notification in the *Gazette* of July 18 concerning Sec. Lieut. (Hon. Lieut.) M. C. Sexton is cancelled.

The notification in the *Gazette* of July 29 concerning Lieut. W. C. Siddaway is cancelled.

Administrative Branch

Lieut.-Col. (actg. Col.) A. W. C. McFall relinquishes the actg. rank of Col. on ceasing to be employed as Col.; Aug. 1.

Maj. (actg. Lieut.-Col.) D. Mackeuzie relinquishes the actg. rank of Lieut.-Col. on ceasing to be employed as Lieut.-Col.; Aug. 1.

Capts. to be actg. Majs. whilst employed as Majs., without pay and allowances of that rank:—R. W. Dawes, J. L. Walshe; July 31.

Capt. L. M. Boddam-Whetham to be Capt., from (S.O.); Aug. 7.

Capt. A. F. Marlowe is graded for purposes of pay and allowances as Capt. whilst employed as P.T.O.; April 10.

Lieut. H. F. Fuller to be actg. Capt. whilst employed as Capt.; July 18.

The following Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts.:—(Hon. Capt.) P. Colbeck, M.B.E.; (Hon. Capt.) R. T. H. Watson; May 1. R. L. J. Gerard, from May 1 to June 5; C. H. Tancred, from May 1 to May 26.

Sec. Lieut. H. F. Hendry to be Lieut.; March 2.

The following relinquish their commns. on ceasing to be employed:—Lieut.-Col. (actg. Col.) W. P. Alexauder, and is permitted to retain the rank of Col.; Aug. 1. Lieut. D. H. Bell, M.C. (Lieut., Queen's Own Cam. Highrs.), Sec. Lieut. (Hon. Capt.) T. G. Horn (Capt., Extra Regimentally Empld. List); Aug. 12.

(Then follow the names of 11 officers who are transfd. to the Unemployed List under various dates.)

Lieut. R. L. G. May (Lieut., Royal Fus.) resigns his commn.; Aug. 27.

Lieut. W. R. Ashwell (Leic. R., T.F.) relinquishes his commn. on account of ill-health contracted on active service; Aug. 28.

Lieut. W. B. Judd (Lieut., Dur. L.I.) is cashiered by sentence of a General Court-martial; Aug. 7.

Sec. Lieut. W. S. Greasley relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Aug. 22.

The surname of Lieut. D. M. K. Marendaz is as now described, and not "Masendaz," as stated in the *Gazette* of May 6.

The surname of Sec. Lieut. C. W. Slarke is as now described, and not "Starke," as stated in the *Gazette* of May 27.

The initials of Sec. Lieut. J. L. O'Hagan are as now described, and not "J. R.," as stated in the *Gazette* of May 20.

The notification in the *Gazette* of July 22 concerning Sec. Lieut. R. C. Rosser is cancelled.

Technical Branch

Maj. R. C. Lane is to be Maj., Grade (B), from (S.O.); July 31.

Capt. W. E. L. Seward, M.C., to be graded for purposes of pay and allowances as Maj. while employed as Maj., Grade (A); May 1.

The following Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (A.):—E. S. Cohen, A. E. Landon, W. Sutherland, J. A. V. Welsh (substituted for notification in the *Gazette* of July 22); May 1.

The following Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (B.):—J. Durward, F. M. I. Watts, M.B.E.; May 1. E. L. W. Smythe, from (Ad.), from May 1 to 27 (substituted for notification in the *Gazette* of July 8).

Sec. Lieut. (Hon. Lieut.) P. L. Lindup to be graded for purposes of pay and allowances as Capt., whilst employed as Capt., Grade (A); May 1.

Sec. Lieut. H. Barnes-Moss to be graded for purposes of pay and allowances as Capt., whilst employed as Capt., Grade (B); May 1.

Lieut. H. A. Adams to be Lieut., Grade (A), from (S.O.); May 12 (substituted for notification in the *Gazette* of May 30).

Lieut. A. A. Davis to be Lieut., Grade (B), from (O); July 27, 1918 (substituted for notification in the *Gazette* of Aug. 30, 1918).

Sec. Lieut. (actg. Capt.) W. W. Hamond to be Lieut., and to retain the actg. rank of Capt. until April 30.

Sec. Lieut. M. P. Graddon to be Lieut.; Oct. 27, 1918.

Sec. Lieut. G. A. Gillings to be Lieut., without pay and allowances of that rank; Nov. 17, 1918.

Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts., Grade (A):—E. J. Wilkins, from Nov. 10, 1918, to April 30 (substituted for notification in the *Gazette* of Sept. 17, 1918); L. Hawkins, from (Ad.), from June 16, 1918, to April 30 (substituted for notification in the *Gazette* of Sept. 17, 1918.)

Sec. Lieuts. to be graded for purposes of pay and allowances as Lieuts., whilst employed as Lieuts., Grade (B) :—Hon. Lieut. G. H. Heys, from (Ad.), J. E. Tyrrell, Hon. Lieut. N. W. Walmsley ; May 1.

(Then follow the names of 21 officers who are transfd. to the Unemployed List under various dates.)

The surname of Sec. Lieut. A. Gall is as now described, and not "Gill," as stated in the *Gazette* of June 24.

The surname of Sec. Lieut. W. F. Bevis is as now described, and not "Beirs," as stated in the *Gazette* of May 6.

The Christian names of Sec. Lieut. Robert Boyd Cheery are as now described, and not as stated in the *Gazette* of May 9.

The notification in the *Gazette* of Aug. 15 concerning Sec. Lieut. W. Brown is cancelled.

Medical Branch

Maj. G. D. Bateman, O.B.E., to be Lieut.-Col. ; Nov. 21, 1918.

Lieuts. to be Capts. :—H. B. E. Green ; Aug. 12. S. A. Nield-Faulkner ; Aug. 14.

R. W. Ryan is granted a temp. commn. as Capt. ; Aug. 22.

(Then follow the names of six officers who are transfd. to the Unemployed List under various dates.)

Capt. C. P. Strong relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; Aug. 22.

Dental Branch

Lieut. L. G. Smith to be Capt. ; July 1.

Memoranda

Sec. Lieut. (Hon. Lieut.) P. J. Burns to be (Hon. Capt.) ; June 19.

(Then follow the names of 132 cadets granted hon. commns. as Sec. Lieuts.).

Capt. (actg. Maj.) W. C. Murray (Temp. Dental Surg., R.N.V.R.) relinquishes his commn. on ceasing to be employed ; Aug. 31.

(Then follow the names of five officers who are transfd. to the Unemployed List under various dates.)

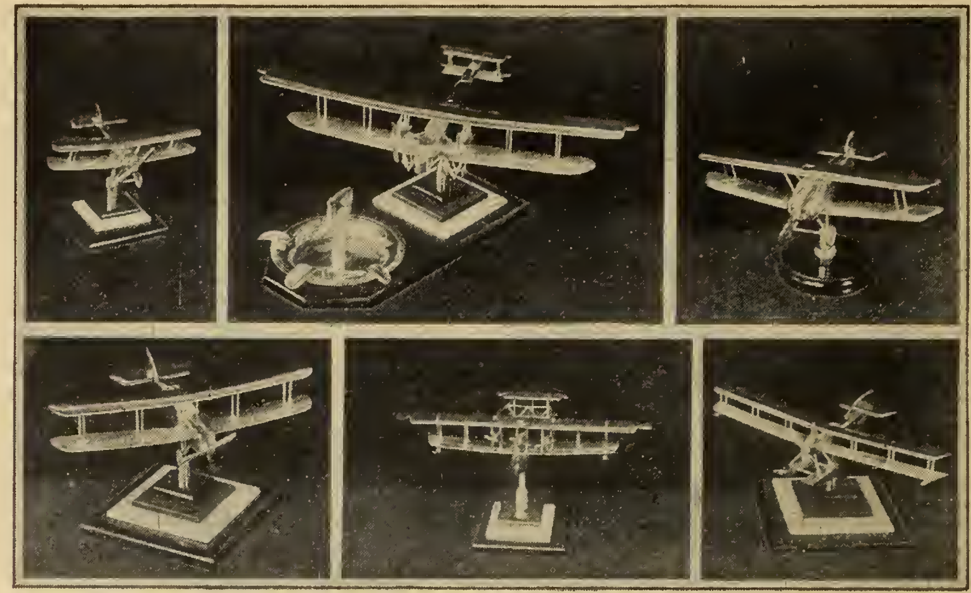
MASCOTS AND SOUVENIR MODELS

THERE are, no doubt, many pilots and others connected with aviation who have some sentimental attachment to a particular make of aeroplane—associations arising from active service during the War or a connection with a firm responsible for the origin of a machine. In such cases, mementoes of the machine are always welcome, and up to now these have generally taken the form of sundry photographs, cuttings from FLIGHT, and perhaps some component of the machine itself—salved from the crash ! The ideal memento, however, is undoubtedly a scale model of the complete machine, and thanks to Messrs. Rogers Bros. and their "Tabloid" Aero and Engineering Works at Farnham Royal, Slough, it is now possible to obtain small, but wonderfully realistic scale models of practically every well-known type of aircraft. These models are made of metal, heavily silver-plated, and are exceptionally strong. Mounted on suitable stands, they form handsome ornaments, or useful paper-weights, ash trays, etc., whilst they can also be used as mascots on aeroplanes, boats or cars.

The size of these models varies from 5½ ins. to 12 ins.—the scales ranging from ⅛th to ¼-in. The following are some of the types ready for delivery :—Avro 504 K., B.E. 2 c and e, Blackburn Kangaroo, Bristol (Scout, Fighter and Mono), D.H. (2, 4, 5, 9 and 9A), F.E. 2 b and d, Handley Page 0.400, Henry and Maurice Farman, Martinsyde F 3, Nieuport 27, R.E. 7 and 8, S.P.A.D., Short 84, S.E. 5 and 5A, Sopwith (Pup, Camel, 1½ Strutter, Triplane, Snipe, Dolphin), and Vickers Vimy. A model of any other type of machine can be made, however, provided drawings of the machine are obtainable.

That the maker of these models, Mr. Rogers, is thoroughly conversant with the design and construction of aircraft, is borne out by the fact that he has had over six years' experience in the construction of aircraft, having from time to time been associated with such firms as Messrs, Blériot, Fairey, Martinsyde, Sopwith and Whitehead.

Some idea as to the excellent workmanship of these models may be gathered from the accompanying illustration, showing six well-known types, although, to do them justice, they should be seen in actual being to be fully appreciated. Messrs. Rogers Bros. will be pleased upon application to supply any further particulars of these and other models to any of our readers who may be interested.



Six realistic scale models manufactured by Messrs. Rogers Bros. These are, reading from left to right: Top, Sopwith Pup, Handley-Page 0.400, Sopwith Camel ; bottom, Airco D.H. 4, N.C.4 flying boat, Short Seaplane

◆ ◆ ◆ ◆

Aerial Services from Scarborough

ARRANGEMENTS have been made by the North Sea Aerial Navigation Co., Ltd., to run services between Scarborough and Middlesborough, Stockton and Darlington, and later services will be organised between Scarborough and Hull and Harrogate. The single fares range from £5 to £7 10s. Three-seater machines are being used, and it is anticipated that the trips will prove popular as all the journeys can be completed within the hour.

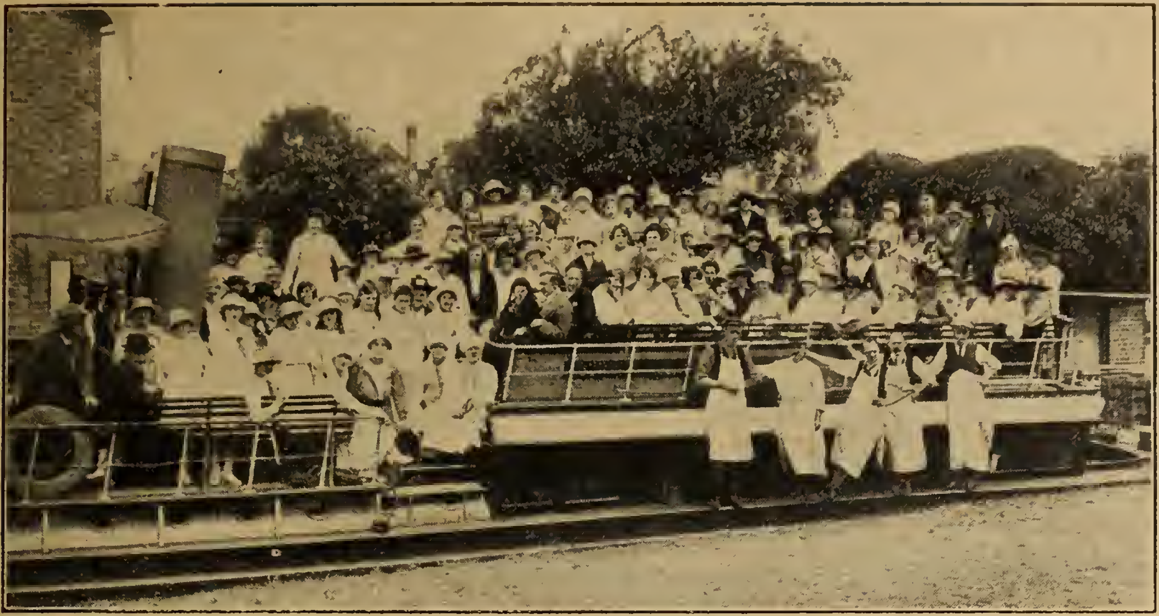
The Swedish Air Smuggling Case

THE hearing of the case against Dr. Stockhausen and the Countess Solms-Wildenfels, who are charged with smuggling valuables into Sweden by aeroplane, has been begun at Trelleborg. For the accused it was explained that the Prince of Wied had a permit to export his fortune to Switzerland, but considered Sweden a safer place owing to numerous German railway robberies, he decided to carry his valuables by aeroplane. The charge of attempting to deceive the Customs was ludicrous as the duty only amounted to 265 kr. (£14 14s.). The evidence showed that Dr. Stockhausen and the Countess of Solms-Wildenfels tried to escape, and that they denied before the police that they had any valuables in their knapsacks.

Dick Turpin Up to Date

AMONG the many curious stories coming from Germany now is one to the effect that after the chairman of the Berlin Insurance Co., had been decoyed to a boarding-house at Carlsbad and made to sign a cheque for a million and a half marks, the robbers used an aeroplane to get to Berlin in quick time to cash the cheque. They left their victim locked in his room, and when after some hours he got on to the window-sill and shouted for help, he was taken for a lunatic.

SIDE-WINDS



A BEVY OF "AERO COVERINGS, LTD.": Beauty on a happy up-river flip, whose enjoyment, by the absence in "quantities" of mere man, was apparently in no way interfered with.

SAND-YACHTING is quite an exhilarating sport and those who, for one reason or another cannot get up aloft, will find in it plenty of excitement. Sand yachts are a speciality of the Meteor Manufacturing Co., Ltd., of 98, Tollington Park, London, N. 4, and they will be pleased to send particulars of their "Lady Betty" model to anyone interested and to arrange for a demonstration. This sand yacht is built entirely of steel tube and is British-made throughout.

MESSRS. S. SMITH AND SONS, LTD., AT PLAY AT THEIR SPORTS AT NEASDEN LAST WEEK-END: 1. Start of the 100 yards children's race (girls). 2. Finish of the 60 yards ladies' egg-and-spoon race first heat: (1st, Miss E. Dilk; 2nd, Miss F. Marmo). The *apparent* winner in the photograph, before touching the line, is seen throwing her egg in the air and catching it. 3. Mr. W. A. Hill winning the high jump, 5 ft. 4 ins. This competitor had remarkable skill in jumping. 4. Start of Heat 2 of the sack race. 5. Mr. Holland winning the sack race final. 6. Ladies' tug-of-war, Team A. 7. Start of the 60 yards ladies' skipping race. 8. Finish of the 60 yards veterans' race

At the exhibition in Amsterdam on Thursday week, the 28th ultimo, Her Majesty the Queen of Holland was graciously pleased to accept a photograph of the "Vickers-Vimy-Rolls" Transatlantic aeroplane, which successfully accomplished the first non-stop Atlantic flight on June 15 last. The presentation took place at the Vickers' stand at the E.L.T.A. Exhibition.

* * *

At the flying exhibition the other day, Mr. Kenworthy was awarded second prize with a twin-engined 8-seater Blackburn Kangaroo machine. There were nine competitors, and with the exception of the Kangaroo, all the machines were stunt types manned by the cream of European pilots. Prizes were awarded for start, climb, landing and general impression of safety. The demonstration was a valuable one, and brought out the fine qualities of the Kangaroo for use in countries such as Holland.

* * *

The Triplex Safety Glass Co., Ltd. have now ready for the market two new models of Triplex safety glass goggle that have been specially designed for motorists. There is a model that will appeal to lady motorists and both will be at a reasonable price; the model "A" costing 10s. 6d. and the model "C" 12s. 6d. (including case). The firm consider that both types will give greater range of vision than has been hitherto obtainable. Agents throughout the country will shortly have ample stock, and a list of the agents in any district will be gladly given on application to the Triplex Safety Glass Co., Ltd., 1, Albemarle Street, W. 1.

* * *

Accidents will happen in the best-regulated families, and it is, therefore, as well to be prepared for any emergency. Those who are going in for flying either occasionally or regularly, are reminded that Messrs. Bray, Gibb and Co., Ltd., of 166, Piccadilly, W. 1, effect all classes of insurance both against personal accident while flying, and all risks attaching to aviation generally. They will also give any assistance, in the way of advice, to anyone who is contemplating aerial insurance of any sort.

* * *

The Cambridge School of Flying announce one or two changes in connection with their school at Hardwick, Cambs. They have substituted De H. 6 and Avro machines for the Caudron type, and four courses of tuition are now arranged. The first is on De H. 6 machines, for which the fee is £100; the second is on Avros, the fee being £180; while the other courses are for riggers to gain the Air Ministry certificate. The aerodrome manager is Capt. W. H. Kelley, who has had many years' experience, first in the R.F.C. and lately in the R.A.F., the pilots are under Capt. R. Birkbeck, D.F.C. while the secretary of the school is Capt. J. L. Lee-Jones, B.A., who will answer any enquiries at 2, Downing Street, Cambridge.

* * *

After a strenuous season the staff and employees of Aero Coverings recently enjoyed a trip up the River Thames, a party of about 130 finding accommodation on the steamer *Princess Beatrice*. Fortunately the weather was all that could be desired, and it was obvious that every one thoroughly appreciated the interest and kindly thought of the directors. On arrival at Chertsey a cricket match, "works *v.* staff," was played to the undoing of the works team, and during the afternoon several employees who had distinguished themselves on the occasion of the fire at the works a little while back, found themselves the victims of a little presentation.

* * *

From Messrs A. Lloyd and Sons, Ltd., sheet-metal workers, packing-case and crate makers, of 74 and 75, Cheapside, London, E.C. 2, comes particulars of a very handy tool-chest, which can be supplied in any number from stock and on reasonable terms. Strongly made, with dovetailed sides, a lid bound with iron, and an inside tray fitted with five partitions, it measures 20¾ ins. by 17¼ ins. by 12¾ ins. outside. It is painted and finished off in serviceable style. Lloyd and Sons, Ltd., who specialise in all kinds of woodware are always pleased to answer enquiries.

* * * *

COMPANY MATTERS

The Air Navigation Co., Ltd.

It is announced that as and from August 5, 1919, the style and title of this company will be changed to the Air Navigation and Engineering Co., Ltd.

NEW COMPANIES REGISTERED

FIAT MOTORS, LTD., 5, Albemarle Street, W. 1.—Capital £5,000, in £1 shares. Under agreement with Wembley Motors, Ltd., and "Fiat, Turin, Italy," agents and concessionaires for motors, aircraft, etc.

STUBBS AND GARNER, LTD., Lowland Road, Runcorn, Cheshire.—Capital £3,000, in £1 shares. Manufacturers and dealers in aeroplanes, motor cars, etc. L. Stubbs, first director.

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl.=cylinder; I.C.=internal combustion; m.=motors.

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.
Published September 4, 1919

17,549. W. G. Tarrant. *Fuselages.* (130,623.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.,
Published September 4, 1919

3,438 and 3,439. D. J. Mooney and P. J. Waldram. Structural members of aircraft. (130,637 and 130,638.)
3,654. R. Boyle and H. K. Reeves. Parachutes. (130,653.)
3,751. E. G. Cole and C. G. Spencer and Sons. Captive, etc., balloons or airships. (130,657.)
3,936. J. E. Ellor and Sir H. Fowler. Aircraft engines and propellers. (130,664.)
4,123. and 4,124. A. J. Roberts. Airships. (130,668 and 130,669.)
4,187. J. S. White and Co., A. Forster and J. H. Brown. I.C. engines. (130,673.)
4,549. Vickers, Ltd., Sir J. McKechnie and H. B. Pratt. Aerostat structure of rigid airships. (130,689.)
4,557. Vickers, Ltd., and Sir J. McKechnie. Rigid airships. (130,690.)
4,559. Vickers, Ltd., and Sir J. McKechnie. Cars for aerial machines. (130,691.)
4,632. C. J. Cooke. Non-recoiling guns for aircraft. (130,694.)
4,679. H. W. Phillips and L. C. Ford. Spars, ribs, etc., for aircraft. (130,695.)
4,838. H. J. L. M. de la Chevardiere de la Grandville. Propellers (130,702.)
11, 162 P. Molloy. Securing together parts of aircraft, etc (130.722)
11,641. J. Cooke. Inclinometers. (130,724.)
11,860. S. E. Saunders. Laminated propellers. (130,725.)
12,473. W. F. Savage and B. H. Mallinson. Aeroplane wing incidence control. (130,738.)
13,074. W. D. Warner. Aeroplane control devices. (119,856.)
13,275. A. A. Holle. Aerofoils. (130,790.)
13,279. Boulton and Paul and J. D. North. Pulleys for aircraft control cables. (130,791.)
14,418. J. Moore. Wood spars for aircraft. (130,818.)
14,473. A. J. T. Ireland. Balancing of airscrews, flywheels, etc. (130,821.)
14,819. S. Fullerton. Aeroplane wing spars. (130,825.)
18,035. A. G. Leigh. Aeroplanes. (130,859.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.
Published September 4, 1919

442. P. Swan. Aircraft controls. (130,884.)
2,715. E. S. and N. T. Jones. Dirigible parachutes. (127,803.)
9,742. W. H. Apthorpe and Cambridge Scientific Instrument Co. Spirit, etc., levels. (130,939).
11,798. H. L. M. J. Benard. Signal lights. (130,948.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlix, l, li and lii)

NOTICE TO ADVERTISERS.

In order that "Flight" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT
The Aircraft Engineer and Airships
36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent. London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates*:—

United Kingdom.	s.	d.	Abroad.	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under war conditions.

Cheques and Post Office Orders should be made payable to the Proprietors of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "Flight" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 559 (No. 37, Vol. XI.) SEPTEMBER 11, 1919 [Weekly. Price 6d. Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.*

These rates are subject to any alteration found necessary under war conditions

CONTENTS

Editorial Comment: PAGE
The Future of the Big Rigids .. 1209
Last Monday's Conference .. 1210
The Gattie Clearing House and Aviation .. 1210
The Small Airship as explorer .. 1212
Flight—and the Men: Mr. F. Koolhoven .. 1211
The Last Loop .. 1213
The Grahame-White Limousine .. 1214
The Royal Aero Club—Official Notices .. 1219
The Lawson "Aerial Transport" .. 1220
Commercial Air Transport .. 1225
Aviatik Milestones .. 1226
Airisms .. 1231
Personals .. 1234
Royal Air Force .. 1235
Side-Winds .. 1237
Correspondence .. 1238

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Sept. 26 ...	No. 40 Squadron R.A.F. Dinner.
Oct. 5 ...	Aviation Meeting at Barcelona.
Nov. ...	Entrance Examination for R.A.F. College.
Dec. 19 to ... Jan. 4, 1920.	Paris Aero Show.

EDITORIAL COMMENT

The Future of the Big Rigids

THE fate of the big rigid airships upon which work has been stopped, in obedience to the demand for economy, still hangs in the balance. The position at the moment is that there are five of these large craft on the stocks in various stages of completion, all of which are larger than R 34, which set up the Atlantic record a few weeks ago. Of these, R 80 is said to be 90 per cent. completed, and work has been stopped, Messrs. Vickers, who are the contractors, being still, at the time of writing, awaiting a decision by the Government as to whether she is to be finished or scrapped, the latter course entailing a waste of several hundreds of thousands of pounds. R 36, building by Messrs. Armstrong Whitworth, is about one-third completed, and unless something happens very shortly she will be scrapped, although about a quarter of a million has been expended already. R 39 is well advanced, as also is R 37, the latter at Messrs. Short's works at Bedford. Work on all these craft has been ruthlessly stopped, and it is clear that, except possibly in the case of R 80, the Government will expend no more money on their construction.

The only way out of the situation is for private enterprise to purchase these ships from the Government, complete them, and run them commercially. As a matter of fact, there is still another way out, and that is by way of an offer of sorts from the Government of an associated Power which is able to visualise the future with a surer eye than our own, and seems determined to develop the big airship and to take advantage of all the experience for which we have paid so dearly. We refer to America, which has laid certain proposals before our own Government, which, if they be accepted, would enable us to complete the ships building at practically no cost to ourselves. What is likely to happen in this direction we cannot, of course, say, but we should very much prefer to see the ships taken over by British enterprise and run commercially, as we are fully assured they could be.

Economy is a fine thing, but we have scarcely come to the pass when we want to hand over the whole of our experience to our strongest rival simply to assist her in doing what we dare not undertake for ourselves. Since the successful voyage of R 34, the Americans have conceived a profound belief in the big rigid as a commercial proposition, and there is no doubt they intend to go all out on its development and use. From the point of view of aviation at large, this is doubtless a very good thing, but we certainly do not like to contemplate this country, which did most of the investigation and experiment during the War, falling behind in the race for useful aerial supremacy whether in lighter- or heavier-than-air craft. Nor need we do so, if the Government and private enterprise can get together and agree upon a common line of policy in which something more than "sympathetic support" shall be given by both parties to an arrangement.

Last Monday's Conference Last week the Air Ministry decided to call a conference between its representatives and "interested parties" in the future of the big rigids, this conference to be held last Monday. In the first place, we hold that the term "parties interested" means what it says. The Air Ministry made a public announcement in the Press that this conference would be held, and invited "interested parties" to ask for cards of admission. It thus made a public statement upon a matter of public interest, and invited *bonâ fide* applications from individuals or firms for cards of admission. What happened was simply that the Air Ministry organised a packed meeting which got the matter of airships no farther forward.

Much has appeared in the Press recently about the future of the airships, and it has therefore become a public matter to a greater extent than usual. The imagination of the people has been fired by the success of R 34's voyage, and by the constant sight of the "British Zepps" in the skies over our largest cities and towns. Moreover, in the matter of the disposal of the ships now building, there is involved a very large sum of public money in which the people are very directly interested. If, then, the Air Ministry and the Government were sincere in their apparent desire to do the best possible in the matter of these ships, it would follow that there was nothing to conceal, and at least the Press, who were tacitly invited to ask to be admitted, allowed to have been present at the conference, which, we repeat, was to be open to "interested parties." But these are not the methods of the Ministry. Application for permission to be present merely elicited a reply to the effect that this was to be a private meeting for the discussion of private matters between the Ministry and "persons interested." A report, it was said, of the proceedings would be officially issued later. It seems to us the Air Ministry has simply succeeded in making itself look ridiculous. If the conference was to be a private affair, then nothing ought to have been said publicly. The Ministry knows the people it wants to discuss things with, and could have invited them privately, and not given the public a smack in the face by first inviting them and then shutting the door We have no complaint on our own account, since, from all we have heard about the proceedings at this wonderful conference, we saved time and temper by not being present.

What seems to have happened was that Gen. Seely, who presided, said precisely nothing in a great number of words, and that the representatives of the great armament firms, who seem to have been the only "persons interested" in the proceedings, said exactly nothing in a very few. The representative of the Postmaster-General attended to say that if the business firms interested in aviation saw fit to constitute airship services, his department would give the "most sympathetic consideration to any feasible proposals." Gen. Seely, later on, could not commit the Government to anything in the shape of subsidies, but any schemes of promise would receive their "most sympathetic support." The whole of the proceedings demonstrated that the Government has no settled policy regarding the future of commercial aviation. It had been expected that the Air Ministry would have put forward something like concrete proposals for the sale of the airships now on the stocks, and have told the conference what the policy of the Government generally was to be in the matter of aviation. Instead, both sides were obviously sparring for an opening The Government seemed to be afraid to make a proposition, because by waiting it might get better terms, and the "persons interested" were waiting for the Government to lay the cards on the table. And so the conference separated without anything done or any progress made, and left with the parting warning from Gen. Seely that time was short, and the Government must have the proposals of the private interests by the end of the month!

One useful thing only seems to have come of the affair. It was arranged that Gen. Sykes should form a committee of officers on the staff of the Ministry to advise firms contemplating the establishment of airship services on such matters as the amount of capital required to initiate them, costs of running, and so forth. That means that people need be under no misapprehension in the matter of costs, so far as they have been ascertainable by the Air Ministry experts, who alone have exact knowledge of these things. Further than this, the conference produced nothing, and the parties are still watching each other from their respective sides of the fence. Why does not the Ministry be frank, and state the real terms upon which it is willing to part with the airships now under discussion? It must know—it does know—what terms the Government is prepared to make with private firms for the sale of the craft. Why not say what they are at once, and be done with huckstering?

◆ ◆ ◆

The Gattie Clearing House and Aviation Our sister journal, the *Auto.*, has been a warm supporter of the principle of the Gattie scheme of a central goods clearing house for London, and in so far as it is applied to land transport, it is probably right. Undoubtedly, if the major part of the claims advanced in favour of the scheme can be justified—and we are inclined to think they can—there can be no question that it ought to be adopted. There is one claim, however, which cannot be fully justified. Mr. Gattie, in his evidence before the Board of Trade Committee which is enquiring into the *pros* and *cons* of the clearing house scheme, said that he proposed to use the roof as a landing and taking off stage for aeroplanes, thus, as it were, centralising transport by land and air. It has been pointed out, large as the proposed area is to be, it is too small to be effective for the purpose of landing and despatching aircraft. The clearing house is, if it ever materialises into accomplished fact, to cover some 15 acres of ground, and the roof is to afford a space for landing 1,400 ft. long by 480 ft. wide. Now, the Report of the Civil Aerial Transport Committee lays it down that it is necessary to have a clear run of 600 yards in all directions, with an area of 60 acres, or four times that of the roof of Mr. Gattie's clearing house. Major Blake, in the *Daily News*, lays it down that an aeroplane of the Handley Page type requires an aerodrome at least 1,200 ft. in all directions, and even the Air Ministry in its competition rules allows for a space of 825 ft. in all directions for landing. There is no need to question these figures, which may be taken as correct for all practical purposes, so that the conclusion must be inevitable that the proposed clearing house cannot be adapted to the purposes of aerial navigation. If it were possible for an aeroplane to land or take off in any direction at all, it would be simple enough, as the 1,400 ft. length of the building would just about suffice. But the trouble is that this

Flight—And the Men

"Flight" Copyright.

Mr. FREDERICK KOOLHOVEN, Chief Designer, The British Aerial Transport Co., Ltd.

is just what an aeroplane cannot do. It must land and ascend into the wind, and, obviously, the 480 ft. of width is totally inadequate.

Further, the plan of the clearing house provides for no fewer than 26 towers ranged on either side of the main building. This feature of its construction seems to be fatal, since machines would have to come into the aerodrome at a sufficient height to miss the towers, and would therefore require far more landing space than as though they were not there. We are afraid that, unquestionably meritorious as the scheme is in principle, it is, if we may be permitted to express it thus, a wash-out so far as direct aerial communication is concerned.

◆ ◆ ◆

The Small Airship as Explorer

The question of the use of the aeroplane in opening up new countries has often been debated, and there is little doubt that it can be used to extreme advantage, in such countries as central Australia, where open country, likely to afford good landing grounds, is the prevailing feature. Singularly enough, the possibility of using the small airship for the exploration of new lands has not been as thoroughly discussed, but there is nevertheless a very strong probability that it will be found to be of extreme use in this direction, since it possesses features of air endurance beyond those of the aeroplane which render it more independent of the nature of the contours and natural features of the country over which it is operating. The exploring aeroplane might very well be compelled to make a landing in dense bush or forest, for example, where the low-flying airship would have leisure to examine the features of the country, and, if no suitable landing ground were discernible, would return to her base for renewal of supplies before trying again.

We are minded to these reflections by an interesting report that has reached us to the effect that a proposal is on foot for a survey of British Guiana by airship. Although the colony has been in British possession for 120 years, it has never been surveyed owing to the difficulties of transport. It is known to be extremely rich in minerals. Gold is washed in all the river valleys, while all the mountains are more or less auriferous. There are also promising diamond fields, while iron ore and manganese are believed to exist in considerable quantities. So far as we understand the project, it is to use airships for the transport of the gold and diamonds produced in the interior, a very large proportion of which are now lost in transit owing to the difficulties of river navigation, and at the same time to prospect and survey so much of the interior as may be possible. There is no need to speculate upon the probable measure of commercial success with which the venture is likely to meet. Indeed, that would be impossible without knowing more about the intentions of the promoters and about the country itself than we can claim to know. The main points that appeal to us are that here is a field of usefulness opening up for the airship which it seems singularly capable of filling, and that it is an altogether interesting departure in commercial aviation. The sphere of the great rigid airship is by now fairly well defined, but the rôle of the small craft of the "Blimp" or "Twin" type is not so clear. Many think that it has no particular use, save, perhaps, for joy-flights at holiday resorts or as an experimental type, but it would certainly seem as though a sphere of real usefulness is opening up in the direction we have indicated.

◆ ◆ ◆ ◆

Forced Landings in Holland

The Air Ministry announces that all pilots, both service and civil, who are compelled to effect a forced landing in Holland should report at once by telegraph or telephone to the Military Attaché, The Hague. The Military Attaché has made every arrangement to render rapid help as soon as he has proper details. Pilots should not leave the neighbourhood before they have made a written statement of the extent of the damage done to the private property in the landing; one copy of this must be handed to the owner or local authority, and one copy sent to the Military Attaché.

Civilian Aircraft Fuel in France

The Air Ministry announces that in connection with the opening up of civil communication by air between Great Britain and France, the French authorities have raised objections to the use of petrol and oil by civilian machines, which has been imported into France without payment of the ordinary dues, for military purposes. Aircraft companies and all others concerned must, in future, provide their own petrol and oil at Le Bourget through the ordinary commercial channels.

Air Flights to Belgium

The Air Ministry announces that the report circulated in the Press a few days ago that a hitch had occurred in the signing of the International Air Convention is without foundation. It is pointed out that aerial communication between London and Brussels is permissible, provided that no goods are carried.

Kite Balloons for Weather Observation

Pilots of aircraft are warned by the Air Ministry that kite-balloons will be flown from time to time for purposes of meteorological observation at the following places :—Merifield (Tor Point), Larkhill (Salisbury), Caldale (Orkneys), North Queensferry (near Edinburgh).

The cables of these balloons when flying will be marked by streamers at intervals of not more than 500 ft.

Relinquishment of R.A.F. Stations.

It is announced by the Air Ministry that the following Royal Air Force stations are to be relinquished and disposed of :—Lowestoft (Balloon Base); Hicking Broad (Seaplane Station); Bembridge (Seaplane Station); New Bembridge (Aerodrome); Seahouses (Aerodrome); Seaton Carew (Aerodrome); Marham (Aerodrome); Tynemouth (Aerodrome); Leadenham (Aerodrome); Upper Heyford (Aerodrome); Usworth (Aerodrome); Helperby (Aerodrome); Ashington (Aerodrome); Scalo Hall, Lancs. (Landing Ground), (after October, 1919).

Sheffield as Aviation Centre

The *Sheffield Independent* announces that Sheffield has been chosen as one of the four permanent repair bases for the R.A.F., and that the base will probably employ 1,500 men permanently. Sheffield aerodrome had previously been chosen as a permanent civilian landing station, and is on the aerial trunk route, London-Manchester-Belfast.

FLIGHT "MILESTONES" IN AMERICAN NEWSPAPERS

Our "Milestones" are being reproduced in American aeronautical publications without a single word of acknowledgment. We would say that these greatly lose the value of the originals in Flight, as our scale drawings, prepared at great trouble and expense, are ALL of uniform scale, relatively to one another, whereas the copyists reproduce from our drawings at any old size, so that direct comparison is impossible. We issue this note of warning, as, irrespective of the discourtesy, if nothing worse, of annexing without acknowledgment the result of the work of Flight's technical staff, those to whom this series appeals, should understand they are unable through foreign publications to appreciate the full value which attaches to the original Flight series..—Ed.

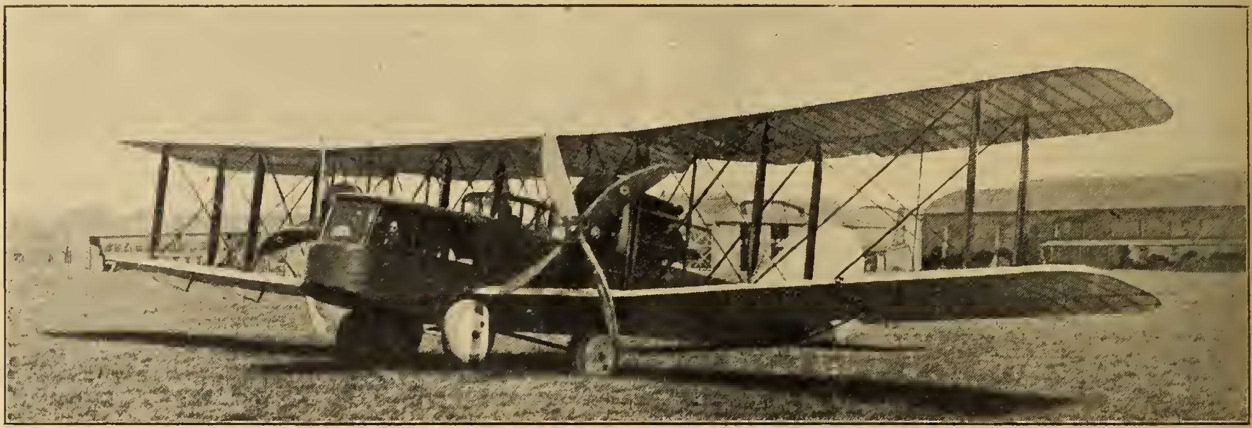
" THE LAST LOOP."—While downing a Hun your machine may have been seriously damaged without your knowledge. Under these circumstances, any unnecessary " stunting " is to be avoided. *(Drawing prepared by the Air Technical Services for use at the R.A.F. Schools.)*

THE GRAHAME-WHITE "AERO-LIMOUSINE"

WHAT may be described as the first item on the post-War programme of the Grahame-White Co. has made its appearance, and looks like making a success of the future before it. We refer to the "Aero-Limousine," which has just successfully emerged from its initial trials at Hendon, and which is illustrated and described herewith.

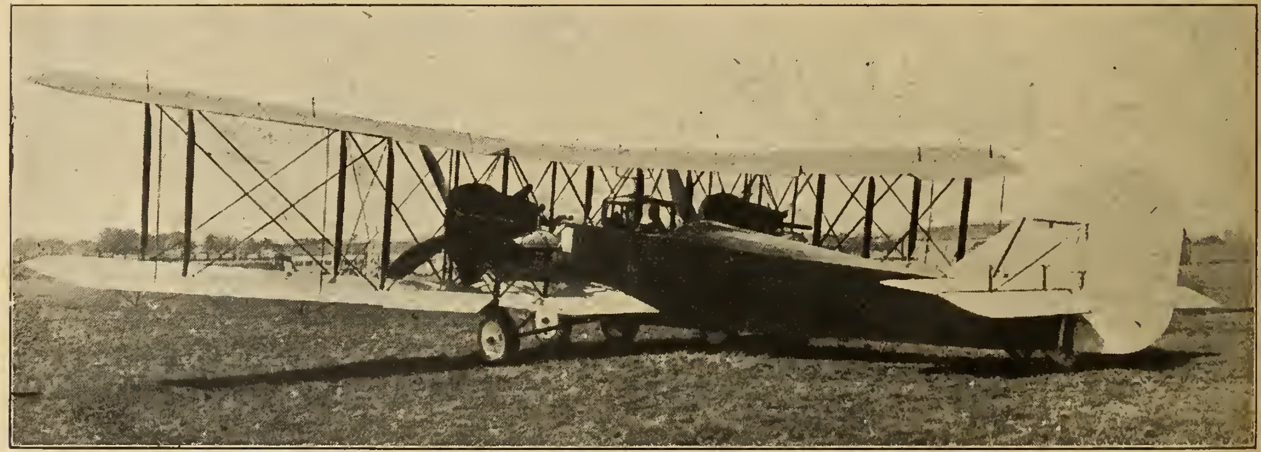
Although in general design and construction it presents nothing of a startling nature, a close inspection reveals a careful consideration of every detail that makes for efficient and thorough design. The ultimate use to which this machine is to be put has been borne in mind in the design of each detail throughout. It has been the aim of the designer, M. Boudot, to produce in this machine the safety, combined with the comfort, of the passengers, and reliability rather than mere performance, and the question of weight has not been allowed to predominate over strength, utility and comfort.

The "Aero-Limousine" is a *fuselage* biplane fitted with two engines, one mounted between the upper and lower planes on each side of the *fuselage*, driving direct four-bladed tractor screws. The passenger's cabin, which is in the extreme nose of the *fuselage*, is, so far, the most comfortable and luxuriously fitted one we have seen. It is apparant that the Grahame-White Co.'s experience in motor car body work—which, by the way, has been one of the firm's "side-lines" for some time back—has come in useful. The whole cabin, in fact, is exactly similar to a first-class motor-car body, even to the outside finish. In this first model provision is made for four passengers, seated in pairs tandem fashion, the left-hand front seat being hinged so as to swing back and give access to the front seats. In future models, however, it is proposed to lengthen the cabin and provide two additional tip-up seats giving a seating accommodation for six passengers on the lines indicated by one of the accompanying drawings. The whole of the interior of the cabin is upholstered in a neat grey Bedford cord, whilst large Triplex windows, extending completely round the sides and front of the cabin, give plenty of light and afford an excellent view in every direction. A large door on the port side of the cabin—well clear of the tractor screw—and a strong foot-step allow of easy access. There is an adjustable ventilator in the nose of the cabin, and two air-outlets in the rear of the roof for ventilation, whilst the temperature can be regulated by means of an electrically heated carpet. Communication can be made with the pilot by means of a speaking tube, and an air speed indicator and altimeter are fitted in front of the cabin.



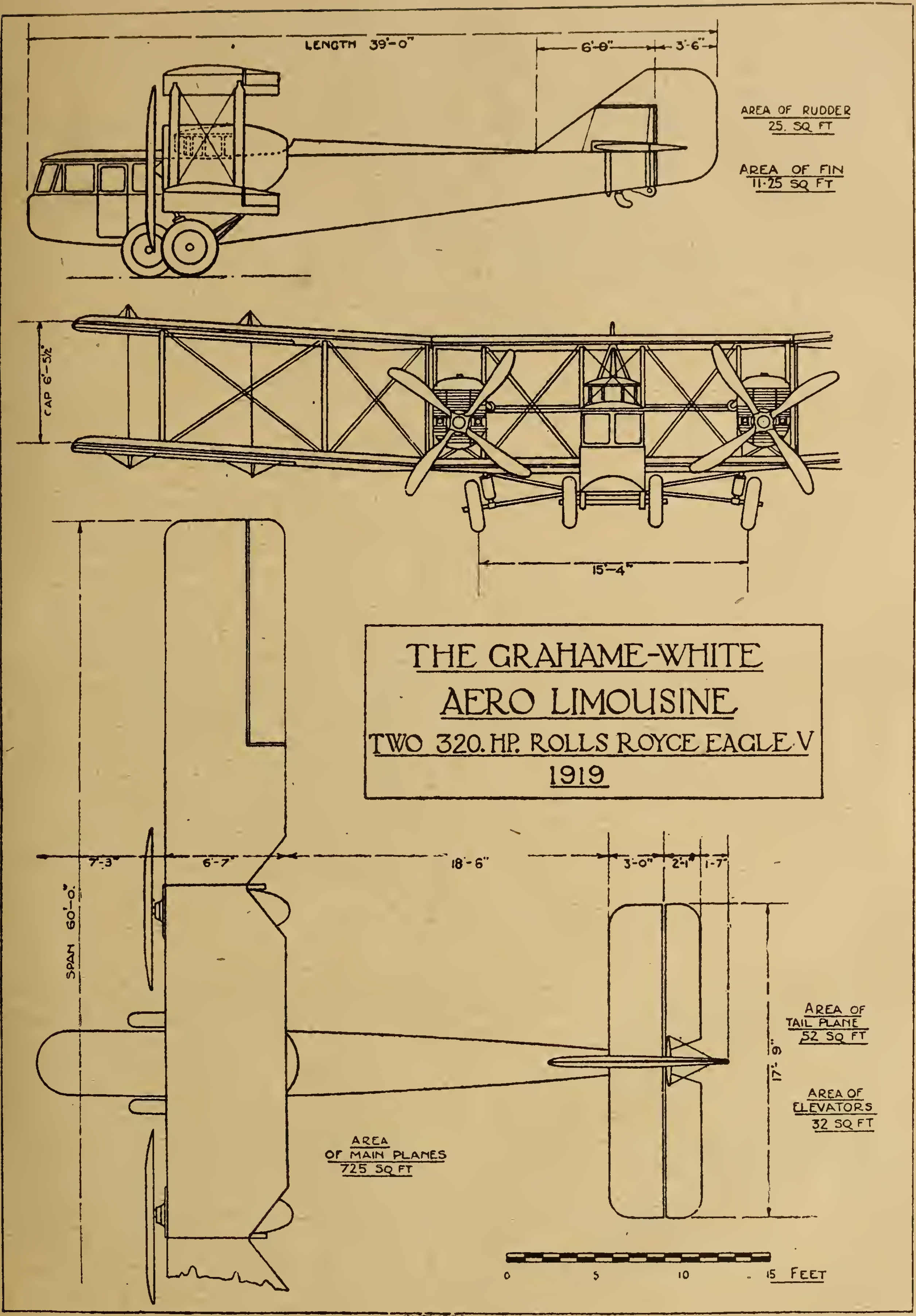
Three-quarter front view of the Grahame-White "Aero-Limousine."

The pilot's cockpit is situated at the rear of and immediately above the cabin. It is exceptionally roomy and comfortable, and ample protection is provided by means of a sort of conning tower. The view, too, from the pilot's cockpit is quite good. All the instruments are neatly disposed around the cockpit, and the engine and petrol controls are located on the right and left-hand sides respectively. The engine switches, which can be operated either separately or simultaneously, are mounted slightly forward on the left-hand side of the pilot.

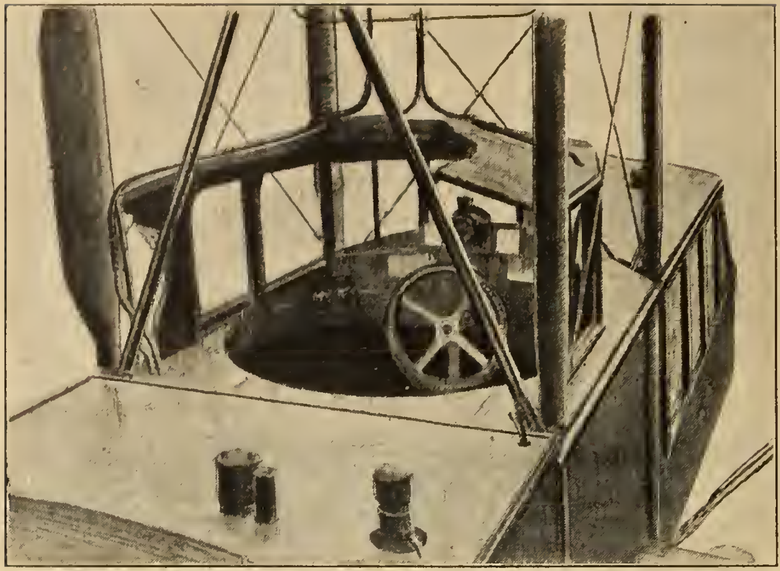


Three-quarter rear view of the Grahame-White "Aero-Limousine."

The control is of the wheel and rudder bar type, the arrangement of the rudder bar being most noteworthy. In this the bar is mounted below the cockpit floor, in which are cut two slots having their edges reinforced on the top by steel plates. Working in these slots, and sliding on the plates, are the foot pedals, which are connected to the rudder bar by a spindle extending below each and working in a slot in the rudder bar. The rudder bar is of wood reinforced by steel plates with



THE GRAHAME-WHITE "AERO-LIMOUSINE": Plan, side and front elevations to scale.



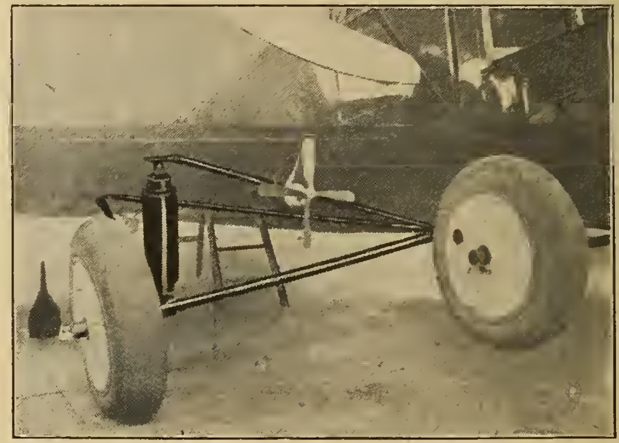
Sketch showing the pilot's "conning-tower" on the Grahame-White "Aero-Limousine."

lightening holes. On the left of the pilot's seat is a hand-wheel operating the tail plane incidence gear, which is of the usual nut and worm type.

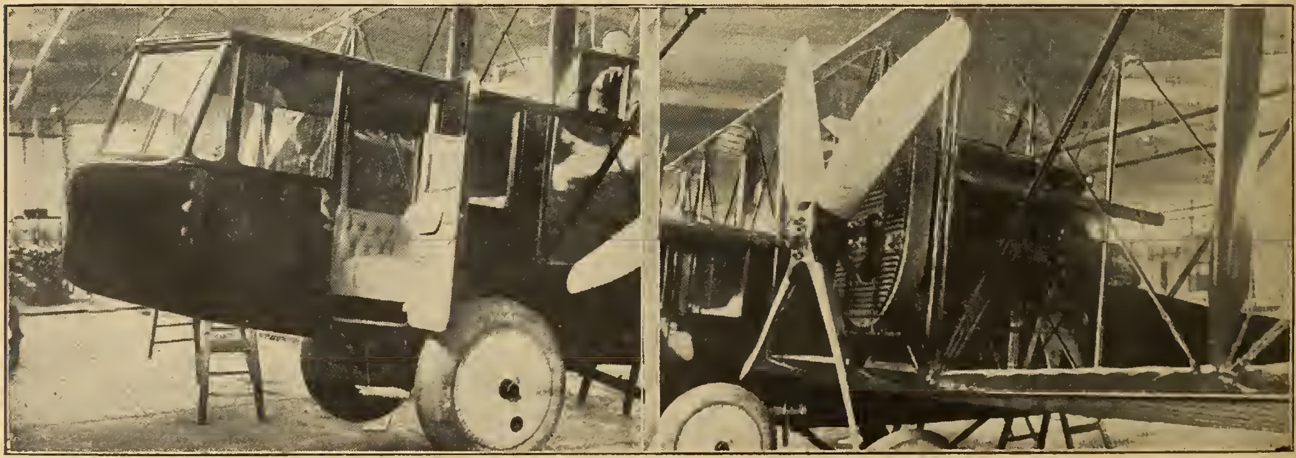
In construction the *fuselage* follows more or less standard practice, the rear portion aft of the cabin being of wire-braced girder construction with square section *longerons* and channel-section struts, the last bay being braced laterally by three-ply. The fore portion of the *fuselage* is built up on hoop-formers of ash reinforced with three-ply, thus giving a "straight-through" construction with no wire cross-bracing. Where the formers are exposed to view inside the cabin, they are covered with a thin veneer of mahogany, which, when polished, gives a neat finish to the decoration of the cabin. The outer covering is three-ply and fabric for the cabin, and doped fabric for the rear portion. The fabric covering is "laced" on the under side by means of a novel quick-fastening arrangement sometimes used for fastening rain-coats, overalls, dresses, etc., an arrangement that can only be described as consisting of a length of "tape" which on being pulled along the edges of the covering—to which it is connected—joins the latter together.

The main planes are of standard construction, and are built up in seven sections, comprising a centre section of about 20 ft. span and two outer sections for the top plane, and a similar arrangement for the lower plane, except that the centre section is divided into two by the *fuselage*. The outer sections are hinged at the roots of the rear spars so as to fold back, thus facilitating housing, the overall width folded being 28 ft. The tubular compression members are all of the same diameter, but vary in gauge according to the stresses imposed. The same fittings are thus employed in each case. Both upper and lower outer sections are given a dihedral angle of 4 degrees, but have neither stagger nor sweepback. The interplate struts are steel tubes with built-up wood fairings giving a deep streamline shape. External bracing is by cable, streamlined by wood fairings. Unbalanced *ailerons* are fitted to both upper and lower planes.

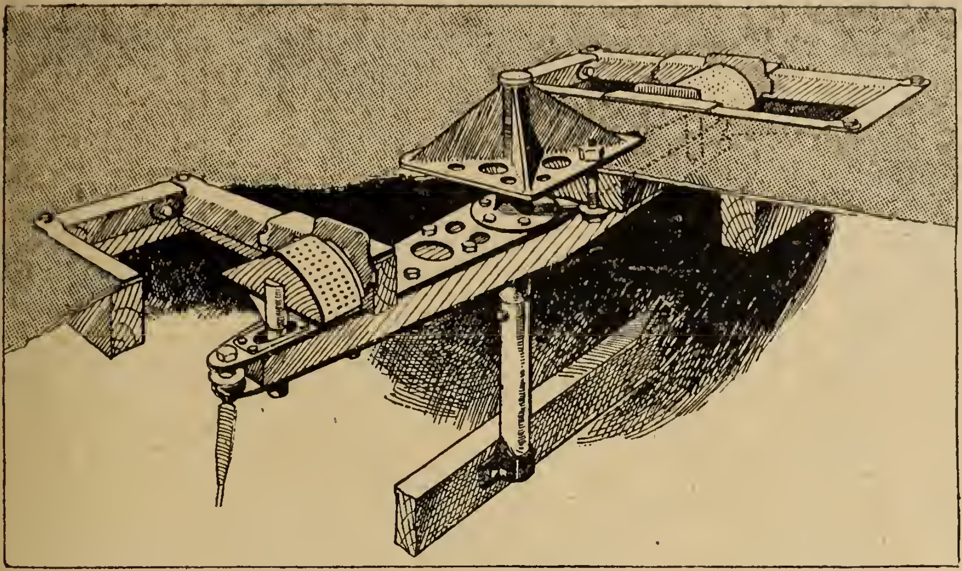
The tail plane, which is rectangular in plan form, is of



One side of the landing chassis of the Grahame-White "Aero-Limousine."



THE GRAHAME-WHITE "AERO-LIMOUSINE": Two views showing, on the left, a general view of the cabin, and on the right, the port engine and mounting.



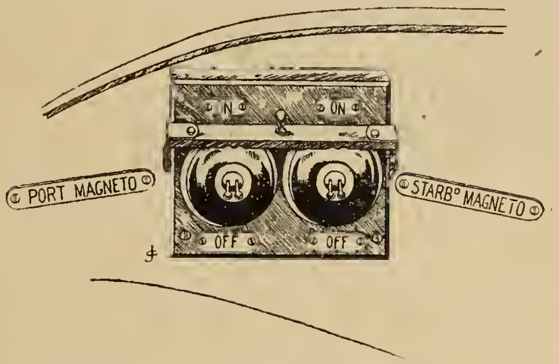
The Grahame-White "Aero-Limousine": Sketch showing the rudder-bar, which is mounted below the cockpit floor and pedals.

symmetrical streamline section, and, as previously mentioned, its angle of incidence can be varied during flight. The elevators are unbalanced and divided, whilst the rudder, which is of ample proportions, is balanced. A large vertical fin is mounted above the *fuselage*. All the tail surfaces are of standard construction, and are braced by cable and steel struts, which are streamlined. The tail skid is very neat and well throughout, as may be seen by one of the accompanying sketches.

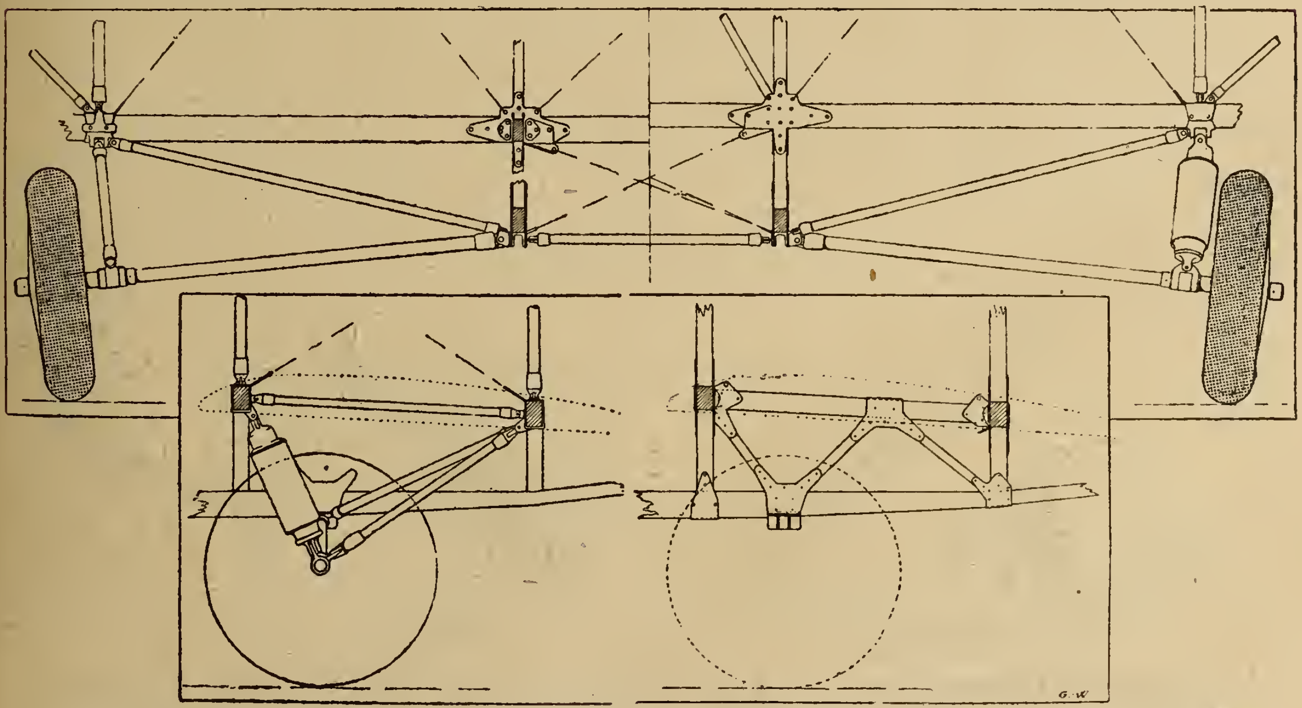
An exceptionally strong and efficient landing chassis is fitted, the general arrangement of which is clearly shown in the illustrations. It consists of two separate units, the main landing gear, and what may be termed an emergency gear. The latter, which comes into action only to prevent the machine from tipping on her nose, and to take the weight of the machine should the main chassis fail, consists of two large wheels rigidly mounted on the *fuselage*, slightly in advance of the main wheels.

The two wheels of the main landing gear are situated under the engines, and are connected to the main plane and *fuselage* by a neat and very effective triangular system of tubular members. The shock-absorbing device is incorporated into the front strut of the vee, and consists of a set of steel springs combined with an oil dashpot.

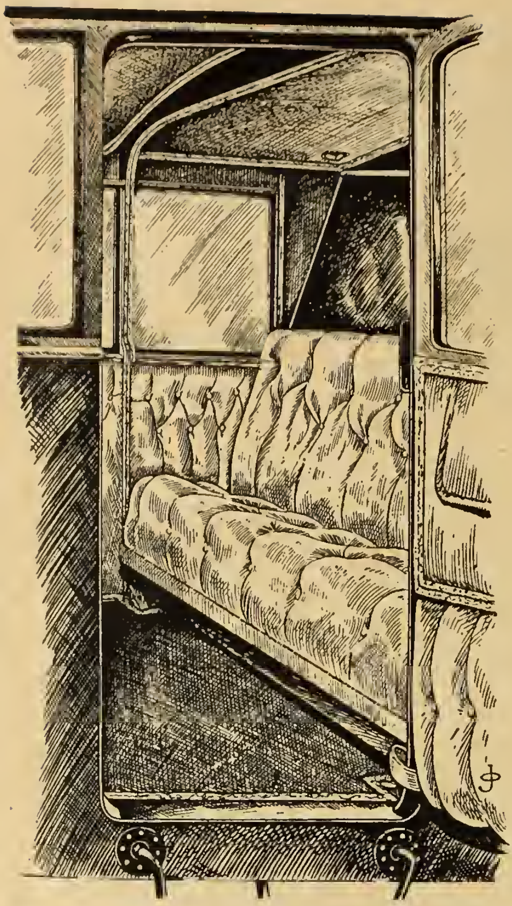
The power unit consists of two Rolls-Royce Eagle Mark V engines, of 320 h.p., mounted one on each side of the *fuselage* between the top and bottom planes. They are carried in strong tubular steel mountings, with the radiators in front.



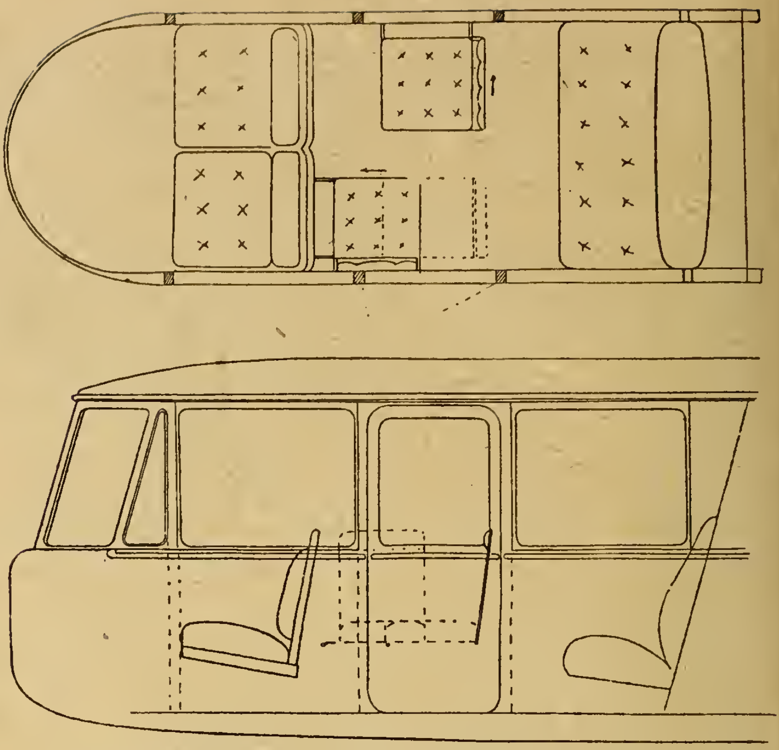
The double switch for the two engines on the Grahame-White "Aero-Limousine."



General arrangement of the landing chassis of the Grahame-White "Aero-Limousine." Note the diagonal strutting of the *fuselage* to take landing stresses.



View looking into the cabin of the Grahame-White "Aero-Limousine," showing the rear seat.



THE GRAHAME-WHITE "AERO-LIMOUSINE": An alternative six-seating arrangement for the cabin.

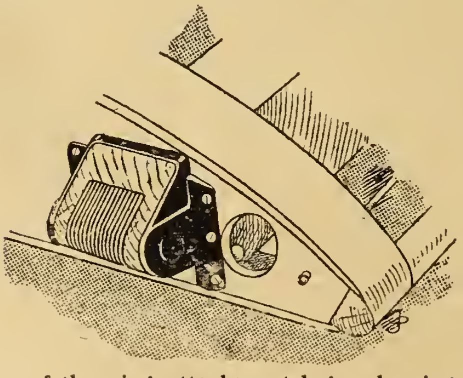
The total horse-power available is well above that required to fly the machine, so that it is possible to fly comfortably at three-quarter throttle, thus considerably increasing the life of the engines, to say nothing of making for reliability. The engines can be started either by means of a starting handle, mounted on the rear of each engine, or else by way of a magneto-starter from the cockpit.

It is worthy of note that all the petrol has been stored as far away as possible from the engine and pasengers, in order to reduce the risk of fire to a minimum. The main tank is located immediately behind the pilot's cockpit, whilst the gravity tanks are mounted in the centre section of the top plane. The petrol supply is maintained by two windmill pumps mounted in the slipstream of each tractor screw just below the lower plane centre section. There is also an auxiliary pump operated from the cockpit.

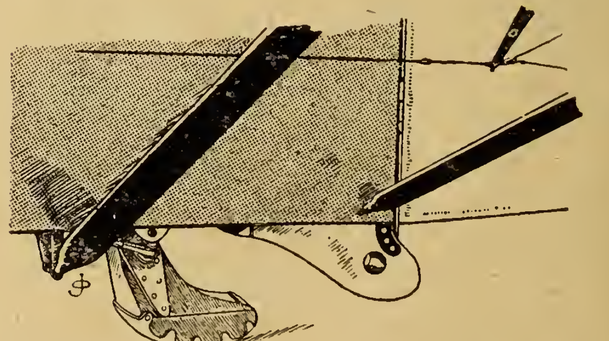
The following is the general specification and performance of the G.-W. "Aero-Limousine":—

Span	60 ft.
Chord	6 ft. 7 ins.
Gap	6 ft. 5½ ins.
Dihedral	4° top and bottom wings.
Overall length	39 ft.
Overall height	11 ft.
Span with wings folded	28 ft.
Total area, including *ailerons*	725 sq. ft.
Area of *ailerons*	106 sq. ft.
Area of tail plane (fixed portion)	52 sq. ft.
Area of elevators	32 sq. ft.
Area of fin	11·25 sq. ft.
Area of rudder	25 sq. ft.
Maximum cross section of body	21 sq. ft.
Side area of body	162 sq. ft.
Engine, No. and type	2 Rolls-Royce Eagle Mark V, 320 h.p.
Tank capacity in gallons	125 galls.
Fuel weight (petrol, oil, water)	1,162 lbs.
Useful load	1,000 lbs.
Weight of machine, empty	5,785 lbs.
,, ,, ,, fully loaded	7,947 lbs.
Surface loading	10·96 lbs. per sq. ft.
Power loading	12·4 lbs. per b.h.p.
Performance Speed	
Maximum speed at ground level	116 m.p.h.
Maximum speed at 10,000 ft.	105 m.p.h.
Speed at ¾ throttle	104 m.p.h.
Landing speed	50 m.p.h.

Climb to 5,000 ft., 4 mins.; to 10,000 ft., 9·9 mins. *Ceiling*, 17,000 ft.



One of the wing attachment lugs, showing the ash packing, of the Grahame-White "Aero-Limousine."



Sketch of the tail-skid of the Grahame-White "Aero-Limousine." Note the protecting block beneath the stern-post.

THE GOVERNMENT AND AIRSHIPS

THE meeting of those interested in the commercial use of airships was held in Australia House, Strand, on Monday, to discuss with representatives of the Air Ministry the question of the disposal of airships and the Government's policy for assisting aerial commercial enterprise. Representatives of the large aircraft-producing firms, shipping companies and forwarding agents were present.

Maj.-Gen. Seely, Under-Secretary of State for Air, who presided, said the Government was anxious to do the best it could for the State in the disposal of the lighter-than-air type of machine and, at the same time, to aid commercial enterprise. Any nation which depended only upon service vessels would be greatly handicapped by comparison with other nations which had commercial airship services. The Government had decided that airships were to be handed over to the Air Ministry. At a conference with the Admiralty it was agreed that in future it would be the duty of the Air Ministry to tell the Admiralty what could be done in the air, for the Admiralty then to state their requirements, and for the Air Ministry then to carry out their wishes. General Seely read a letter from the Admiralty in which it was stated that the Admiralty had recently reviewed, in the light of the latest appreciation by His Majesty's Government of the general political situation, the size of the Fleet and its attendant craft. The development of rigid airships was not yet at a stage where any fixed proportion of the fleet could be laid down. The immediate object must be to cut down expenditure, and the Admiralty had come to the conclusion that for their purpose not more than two rigids would at present be required, one of them being of the latest type. This conclusion was reached on the assumption that the Air Ministry would encourage commercial enterprise in development and construction, and that they would in the future be responsible for development, and able to supply the Admiralty in reasonable time with airships should they be required for naval purposes.

They had a very large number of non-rigid airships, mostly designed to escort ships and overcome the submarine menace. He thought about 85 of these were now in existence, of which five were called the North Sea type, good, serviceable vessels, of considerable size. In regard to rigids, what would be available depended upon what was decided by those present, in consultation with General Sykes's department. Supposing it were decided to have all the airships now building of which there were plans, there would be a very considerable number. The R 33 and the R 34 were now in existence; the 36, 37, 38 and 39 were in various stages of completion, and the 40 was planned. That meant that if they found it worth while, with the assistance of the Government, to take up all the airships available, there would be four and possibly more to operate the service.

On behalf of all the Government Departments concerned, General Seely assured his hearers that they would give every assistance that could profitably be given to a well-organised concern which would take over those ships under the conditions which, of course, it would be necessary to impose. The conditions would be similar to those which applied to such ships as would be available in case of emergency to be handed over to the Government, under very generous terms in view of the fact that the airship business was exceedingly costly. Assistance with regard to wireless telegraphy and meteorological information would be put whole-heartedly at their disposal, and the Post Office were anxious to help in every way they could. Experimental work would be continued, and information so obtained would also be available, as well as other technical information. He could not commit the Government to any subsidy, but he pointed out the enormous advantage in having so large a quantity of material now offered to them at what would be a very low rate. As those ships were surplus to Government requirements, of course they would not attempt to charge anything like the full price for them.

With regard to sheds and personnel, General Seely said that one huge shed was more than one-third completed. Probably anyone who wished to operate would wish to do so farther south—probably at Cairo—which would seem to be a central point. This shed would take the largest airship now built, and with a little additional length would take the largest airship they could at present contemplate, which would be of 5,000,000 cubic ft. capacity. The problem of the terminal points for airship services was most intricate and difficult. He thought he was right in saying that airships had travelled about 2,000,000 miles with only one accident, through fire, involving destruction of the ship. That was a remarkable record, and showed what could be done. Recent efforts had shown that travel in the air was an accomplished fact, and that it had a very large percentage of efficiency. The promoters would have another great advantage in the very large number of demobilised personnel which would come back to a service such as they might start. Taking it all over, he thought the prospects for starting such a service were favourable, and he earnestly hoped that meeting would bear fruit. It would be most unfortunate if this country, which managed to secure air supremacy during the War, should lose it in the days of peace. He did not think there was much likelihood of that happening, but the lighter-than-air business was one in which they wanted the help of everybody. Germany got a long way ahead of us in it before the War, and we had nearly overhauled her now in our technical knowledge. If we were to confine ourselves only to service work there would be a great risk of falling behind in the race for supremacy in lighter-than-air. The future for it was boundless. It might be many years before it reached full fruition, but there was a vast future for airship travel.

During the discussion, Sir Lionel Fletcher urged that the capital in such a firm should be all-British. He thought they should get from the Post Office information as to which route was to be developed first, and he wanted to know whether the company could rely upon the Government's support in every national way.

To this Gen. Seely replied: "Absolutely." He added that it would be an advantage if the capital were all-British, especially in view of the fact that any scheme would have to provide for ships being taken over by the Government in time of war. On the other hand, it might well be that an airship company would be in a totally different position from any other, in that it constantly had to cross friendly States, to whom it might be desirable to give a share, so he would not like to lay down now that all capital must be British. The scheme must be one which was approved, as regards its capital and directorate, by the British Government. With regard to design, he thought the divergence from our military type might become great, although it was likely to be less in the case of the airship than in the case of the aeroplane. He should think it would probably be wise for the Government to let the company design any kind of airship it wished, because, although it would not be as useful for service purposes, perhaps, as a specially designed ship, it would be more useful than no ship at all. With regard to the routes, it would be a convenience if they followed routes which would be best from an imperial and strategical point of view, but he did not think they could impose any such conditions. Probably the Indian route was the one which promised the greatest chances of success. Most of the present stations would be at their disposal, but he did not think he could say definitely now whether they would be let or sold. It was a very urgent matter on the grounds of public economy that they should come to a decision at the earliest possible moment. He therefore begged them to put themselves in communication with each other and Gen. Sykes with the least possible delay, and he hoped that within a month they would be in a position to come to the Government with a definite proposition. Air machines received from Germany would be included in the total that would be handed over for commercial purposes.

Sir Trevor Dawson (Vickers, Ltd.) approved the scheme in view of the promise of Government support, and suggested the formation of a committee of financial representatives to discuss details.

Gen. Seely said that both he and Gen. Sykes considered it was essentially a case for one big concern rather than for competing concerns.

Mr. Holt Thomas, Mr. Short (Bedford Aviation Co.), Sir Glynn West (Armstrong, Whitworth and Co., Ltd.), and others expressed approval of the scheme, and it was decided to form the committee suggested, to meet Gen. Seely, Gen. Sykes (Controller-General of Civil Aviation), Gen. Maitland, and other officials of the Air Ministry to discuss details.

Gen. Seely said he had the assurance of Lord Inverforth that red tape would not be allowed to hamper the negotiations in connection with the scheme. The matter was too important to brook delay. He was quite sure they would make the airship service of great good to the State, and they would have every possible chance to take the lead in the matter of airships, for the good of the Empire and mankind generally.

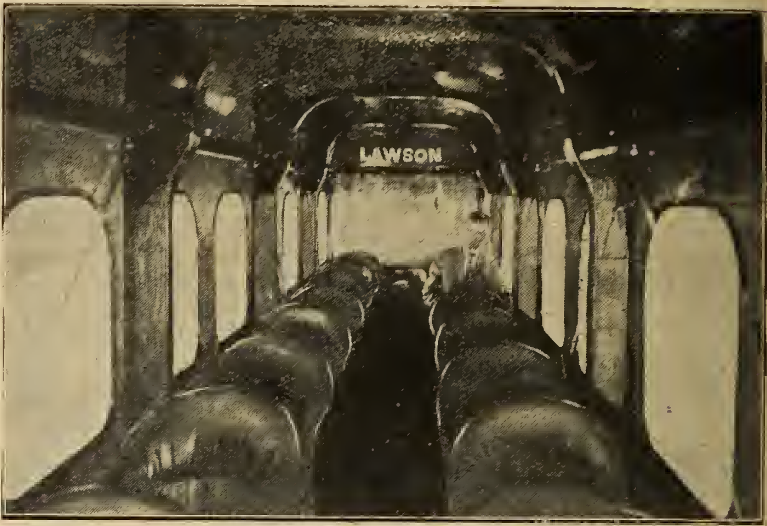
THE "LAWSON" AERIAL TRANSPORT

We have received the following particulars of the latest American commercial aeroplanes, the Lawson "Aerial Transports," designed by Alfred W. Lawson, of the Lawson Airline Transportation Co., Milwaukee, Wis.

The accompanying drawings are of the Type C 1, to which our description mainly refers, whilst the photographs show the Type C 2, which has just been completed and put through its trials. The C 2, which, with a large fleet of the same type, is intended for a daily service between New York and San Francisco, differs from the C 1 only in some of the dimensions and the arrangement of the air-screws. These, it will be seen, are pushers in the C 1 and tractors in the C 2. The following description of C 1, therefore, will also serve for C 2.

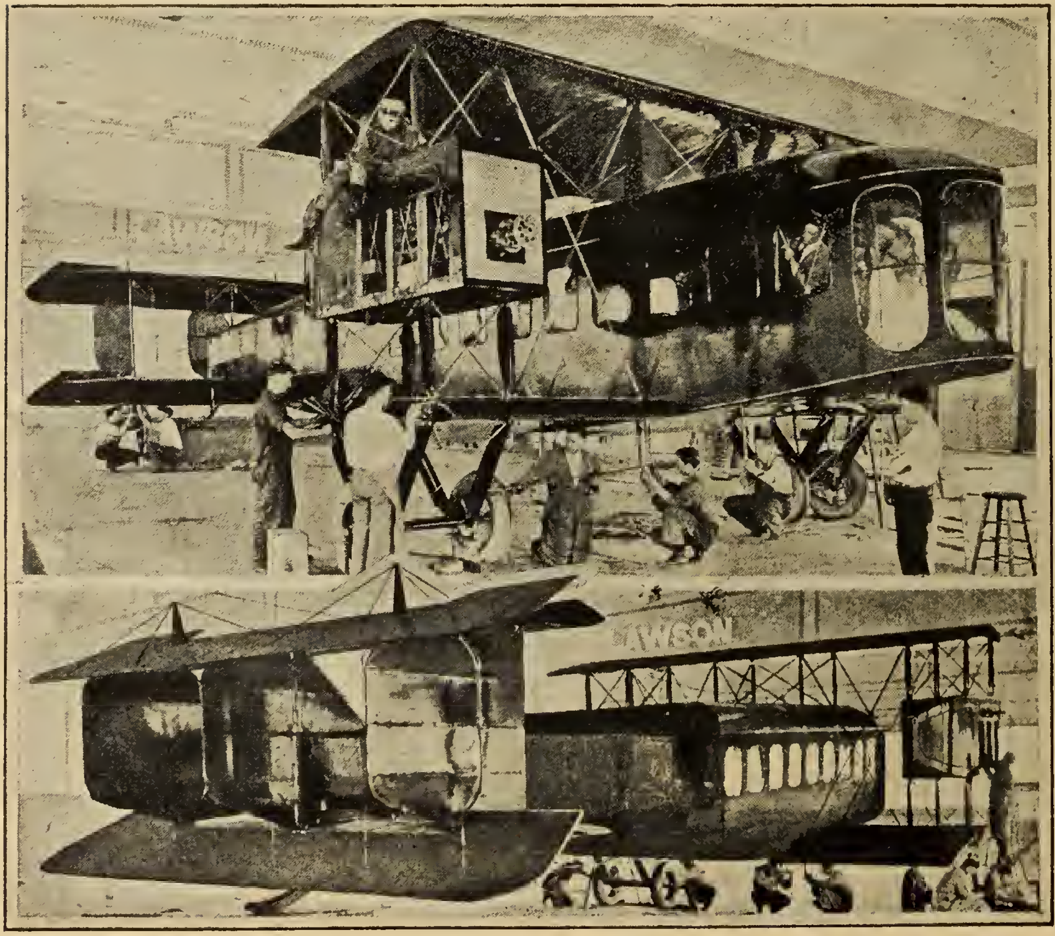
The whole machine has been designed from a strictly commercial point of view, and all the details of its construction and performance characteristics take into consideration the safety and comfort of the passengers. It possesses a high degree of inherent stability, a very flat gliding angle, and a relatively high factor of safety. The manœuvrability, both in the air and on the ground, is good, all the control surfaces being of generous proportions and well balanced.

The *fuselage* is built to accommodate 26 passengers, the seats being placed at windows on each side of the body, as shown in the illustrations, and an aisle between the seats allows passage from the front and rear of the cabin. On the port side of the cabin, forward of the wings, is a door of ample proportions to ensure easy entrance and exit, one of the pilots' seats being made to swing back out of the way. All the seats are of wicker construction, upholstered with green leather and provided with safety belts. They are secured to the floor, but are readily detachable, and sleeping quarters may be installed for a fewer number of passengers when cruising for considerable distances.

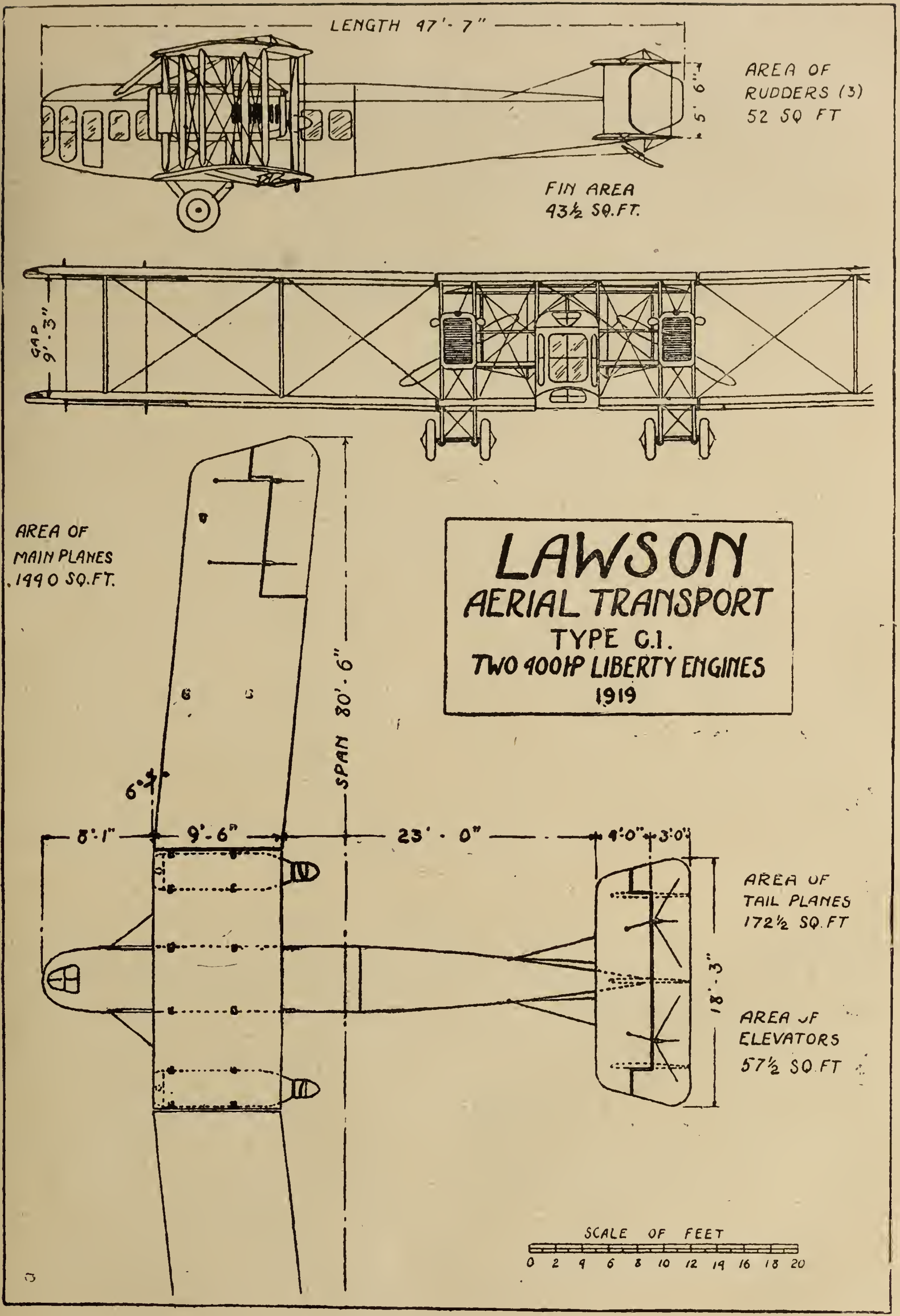


The interior of the cabin of the Lawson "Aerial Transport."

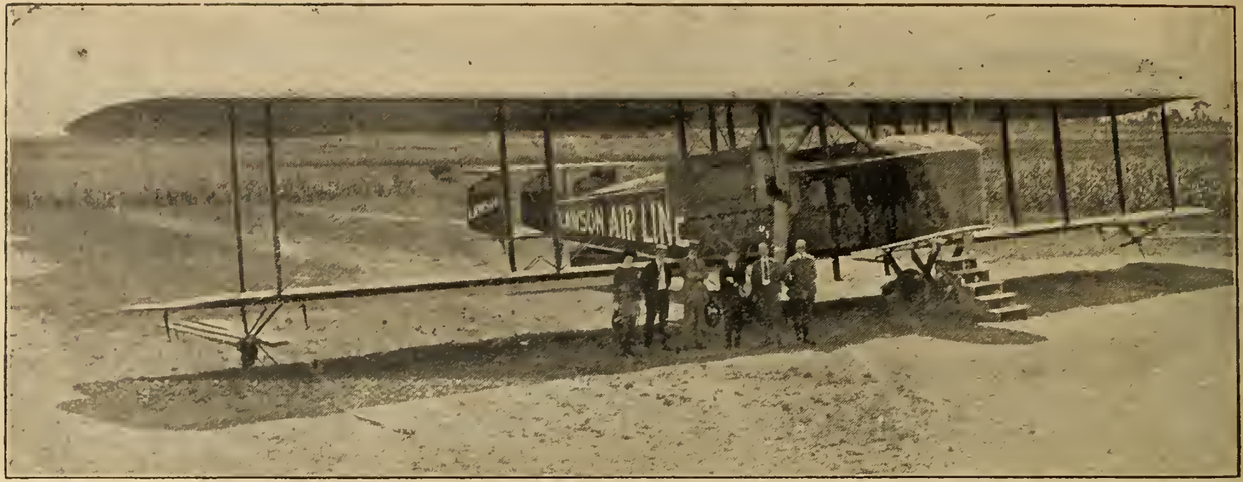
The interior of the cabin is finished in polished mahogany, and the floors are covered with carpet. The depth of the body is sufficient to allow one to stand up without stooping when walking through. The cabin is built up on box formers



Two views of the *fuselage*, with centre sections and engines, of the Lawson "Aerial Transport."



THE LAWSON "AERIAL TRANSPORT," TYPE C 1: Plan, front and side elevations to scale.



Three-quarter front view of the Lawson "Aerial Transport," Type C 2.

without transverse bracing, and is covered with veneer. The rear portion of the *fuselage* is of girder construction with veneer panel struts and wire bracing, and is covered with fabric. The *longerons* are of solid section ash in the cabin portion, and spruce at the rear.

The main planes, which have the U.S.A. 5 wing-section, are in seven sections, comprising one top and two bottom centre sections carrying the power plant, and the outer sections. The latter have a sweep back of 6° and a dihedral angle of 1°. The wings have a comparatively high factor of safety of 14, and are strongly braced internally and externally by double cables. The interplane struts are of deep streamline section wood. Balanced *ailerons* of wood construction are fitted to both top and bottom planes.

A large biplane tail is fitted having a cambered upper surface and a comparatively flat under surface. The *fuselage* terminates in a tubular steel stern post to which is attached the rear spar of the lower tail plane, and also the tail skid. The tail plane is adjustable. The rudders, of which there are three, and elevators are of the balanced type of wood and steel construction, mainly the latter in the case of the rudders.

Dual control is provided at the forward end of the cabin, the wheels being 18 ins. diameter, and mounted on columns carried by a transverse rocking shaft extending right across the body; the usual foot-bars operate the rudders. All control cables are duplicated. For night flying, electric lights are provided for the instrument-board, cabin interior and wings.

The landing-gear is composed of two pairs of 36 ins. by 8 ins. wheels, carried on large streamlined tubular steel struts. One pair of wheels is located under each engine in such a way as to take up evenly the landing shocks with a minimum of strain to the *fuselage* and wings.

Two Liberty engines, of 400 h.p. each, are installed, mounted on stout ash bearers, braced by steel tubes. They are completely enclosed by neat metal "bonnets," in the nose of which are mounted the radiators. Effective silencers are fitted, which add greatly to the comfort of the passengers.

The general specifications are as follow :—

Span, top and bottom	80 ft. (95 ft. C 2)
Chord, top and bottom	9 ft. 6 ins.
Gap	9 ft. 3 ins.
Overall length	47 ft. 7 ins.
Overall height	14 ft.
Area of main planes (including *ailerons*)	1,440 sq. ft.
Area of *ailerons* (4)	168 sq. ft.
Incidence of main planes	3°.
Weight of machine fully loaded	12,000 lbs.
Speed	100 m.p.h.
Climb in 10 mins.	4,000 ft.
Ceiling	15,000 ft.
Gliding angle	1 in 8.
Fuel duration	5 hours.
Range	500 miles.

"WIRELESS" AND AIRCRAFT

THE Air Ministry makes the following announcement :—The form of licence to be granted for the use of wireless to and from aircraft, and the conditions under which such licences will be granted, are under consideration. In the meantime, pending the issue of the licence by the Postmaster-General, temporary provisional authority for the installation and use of wireless apparatus in aircraft can be obtained, in approved cases, by application to the Secretary of the Post Office.

For the present the wave length suggested for wireless telephony is 480 metres. This is the wave length which the existing Air Ministry W/T stations at present employ for work with aircraft.

For the benefit of designers and others interested, it may be said that the Postmaster-General's licence, when available, will probably contain provisions to the following effect :—

The sending apparatus installed at any aircraft station shall be constructed so as to be capable of using waves of 600 m. interrupted continuous wave and 900 m. continuous wave; such of the following wave lengths, namely, 220, 300, 450, and 800 m. interrupted continuous wave, and 200-550 m., 650-950 m., 2,000-3,000 m. continuous wave, may also be used for transmission as are authorised in writing by the Postmaster-General.

The use of the wave of 600 m. (hereinafter referred to as the "aircraft-ship" wave) shall be confined to the use of the system known as "Interrupted Undamped Wave or Tonic Train, or I.C.W.," and the use of 900 m. (hereinafter referred to as the "Aircraft Normal Wave,") shall be used only for continuous damped waves or wireless telephony.

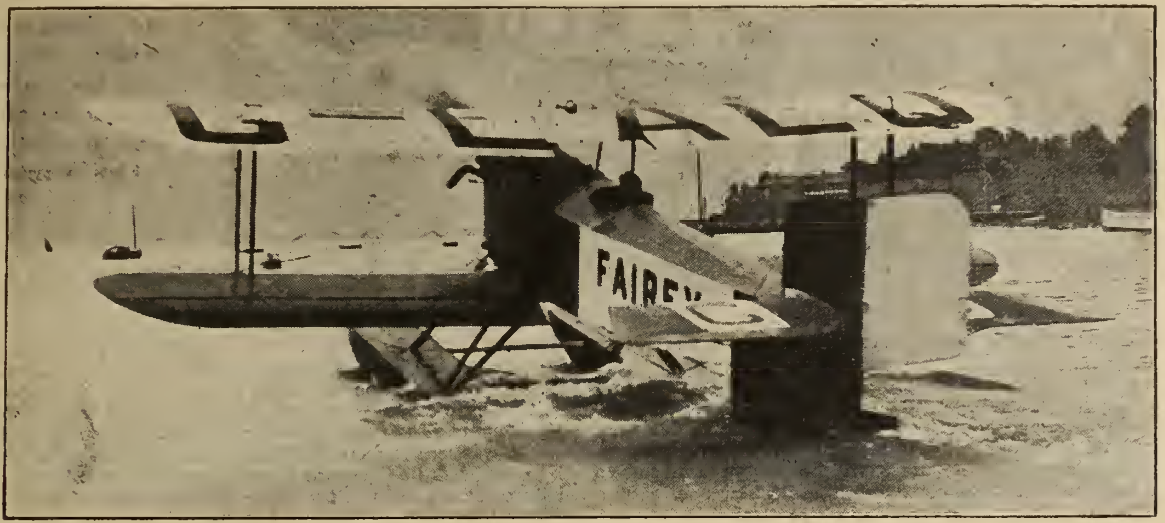
Should an aircraft station be also fitted with a supplementary installation on long continuous waves, such installation shall be so constructed as to be capable of using the wave length of 2,400 m.

The range of wave lengths for which the receiving apparatus may be constructed is not limited, but the apparatus must be capable of receiving on 600 m. and 900 m., and on 2,400 m. when a transmitter working on this latter wave length is installed; it must also be made to embrace any other wave length on which a transmitter installed has been authorised to work.

The input of power to the licensed apparatus measured at the terminals of the power generator or battery shall not exceed 100 watts, provided always that when vacuum valves, having heated filaments, constitute a part of the sending or receiving apparatus, or both, the power employed for heating the said filaments shall be excluded in computing the said maximum input.

THE JACQUES SCHNEIDER CUP RACE

By the time this week's issue of FLIGHT is distributed, the seaplane race for the Jacques Schneider Cup and Prize will, barring accidents, have been flown over a triangular course, having for its starting and finishing point Bournemouth pier, and with turning points at Swanage and Christchurch respectively. Or, more correctly speaking, the two turning points will be in Swanage Bay and outside Hengistbury Head. The total distance to be flown is approximately 200 miles, and as the course is 20 miles competitors will make 10 laps of the course, with two alightings on the sea during the first lap. As the majority of the machines entered are extremely fast, some of them will probably have a maximum speed of somewhere in the neighbourhood of 150 m.p.h., the fastest machine will probably cover the whole distance of 200 miles in about 1½ hours, allowing for some slight loss of time at the turning points. For seaplanes this speed is a very considerable increase on what is usually attained, and the race should, therefore, provide some exciting moments.



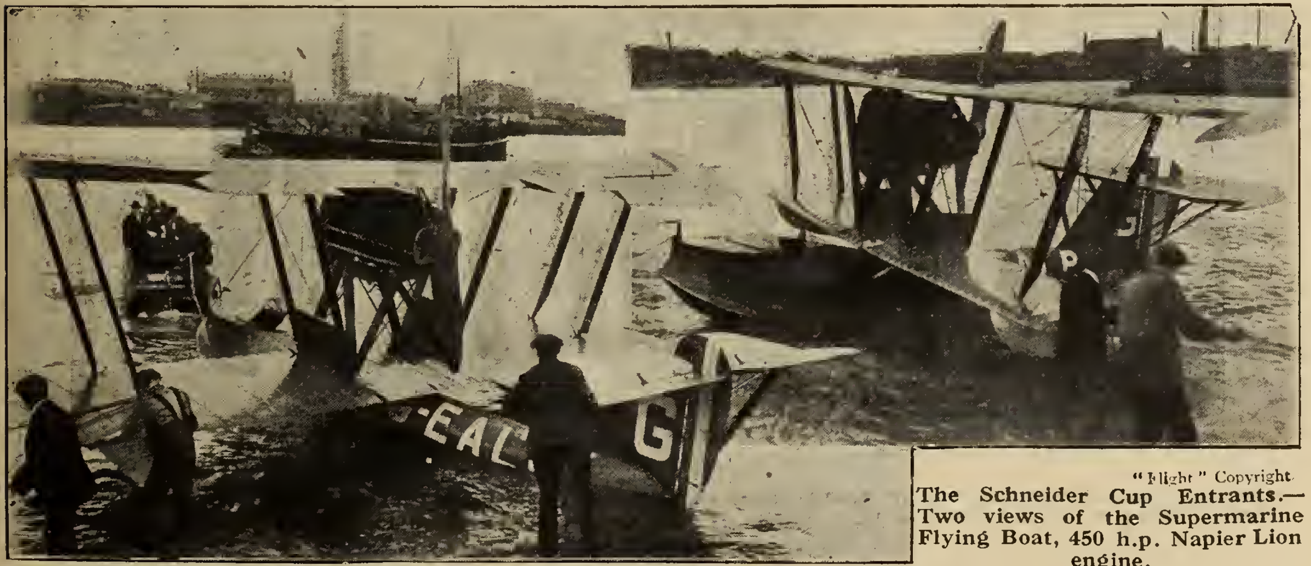
"Flight" Copyright

THE SCHNEIDER CUP RACE.—The Fairey Seaplane, 450 h.p. Napier Lion engine. This machine is similar to the type III, but has had its wing area reduced.

One of the machines at least, the Sopwith, is more lightly loaded than any seaplane we have ever heard of, less than 5 lbs./h.p., and as the loading per h.p. is one of the most important factors as regards performance, this machine should put up a rather startling speed. In fact, we doubt if it will be possible to fly her "all out" without her climbing.

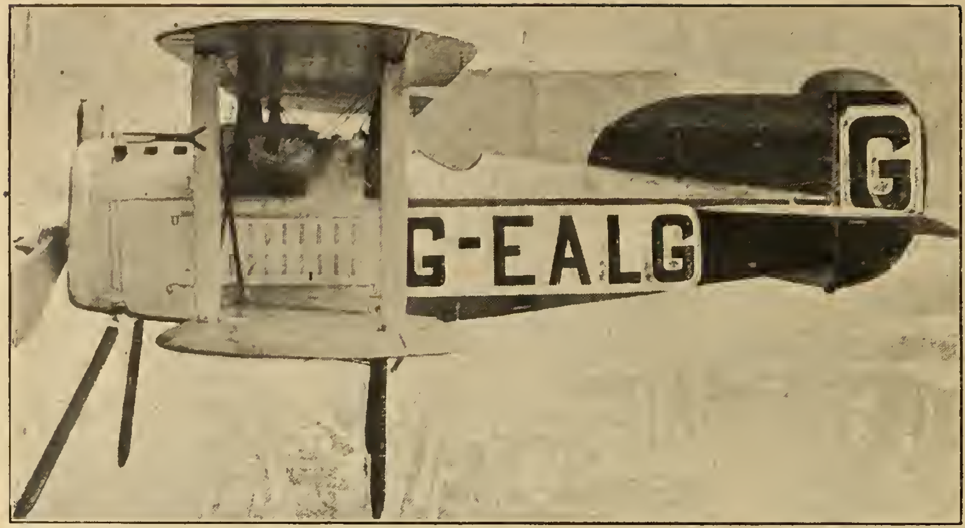
Some of the other machines also are very fast and, although they may actually be a little slower than the Sopwith as regards speed, they may possess other qualities which will help to even the score and provide some really good racing.

In our last issue we published scale drawings and photographs of the Sopwith and Avro machines, and photographs of the Fairey Seaplane and "Savoia" flying boat. At the time of going to press no particulars are available of the French entrants—two Nieuports and one Spad. We are, however, in a position to publish photographs of the actual Fairey Racer—which, it will be seen, is of very much shortened span



"Flight" Copyright

The Schneider Cup Entrants.—Two views of the Supermarine Flying Boat, 450 h.p. Napier Lion engine.



Schneider Cup Entrants in dock.—The Avro Seaplane having her float repaired. Note the large fin and balanced rudder which have been substituted for the original ones.

"Flight" Copyright

having only one pair of struts on each side—and of the Supermarine Flying Boat.

The eliminating trials were to have been held at Cowes on Wednesday of last week, but, owing to various slight mishaps, these did not take place. The Sopwith, in alighting, damaged a float and was only beached with difficulty. However, the damage is only slight, and it will be a simple matter to repair the damaged float or to substitute a new one in time for the race.

The little Avro Seaplane also damaged one of her floats, by hitting some floating object we understand, and has had to go to dry dock. She is shown in one of our photographs undergoing repairs at the Hamble works of Messrs. A. V. Roe. It will be noticed that a much larger tail fin, and also a larger, balanced, rudder, has been fitted since the publication of the scale drawings in our last issue. Otherwise little or no alteration has taken place.

The Fairey seaplane, although similar in general design to the one illustrated by a recent photograph in FLIGHT, which was sent to us by the Fairey Co. as the machine entered by them, has had her wings cut down very much, only one pair of struts being now fitted on each side. This should result in a very considerable increase in speed, and as the machine has a 450 h.p. Napier-Lion engine she should prove very fast.

The little flying boat entered by the Supermarine firm also promises a good turn of speed. As the accompanying photographs show, she is of the pusher type, with the 450 h.p.

"Flight" Copyright

THE JACQUES SCHNEIDER CUP RACE: Some Officials and a competitor at Messrs. S. E. Saunders' sheds at Cowes. From left to right Messrs. H. E. Perrin, H. G. Hawker, S. E. Saunders, Maj. Mayo, Alec Ogilvie and Frank McClean.

Napier Lion engine mounted fairly high in the gap. Apart from the centre section struts there is only one pair of struts on each side, and these are sloped outwards on account of the slightly greater span of the top plane.

Just as we are going to press we learn that the officials of the Royal Aero Club have decided that the Avro must stand down, as only three machines from each country are allowed to take part in the race.

Next week we hope to be able to publish a full account of the race.

Cowes, Tuesday, Sept. 9.

By Our Special Commissioner.

As a result of an elimination trial between the Avro-Puma seaplane and the Supermarine flying-boat on Monday, the former has had to "stand down," and the Supermarine has been selected as the third machine to represent this country in the Schneider International Seaplane Race. Purely from the point of view of speed, the Avro machine was, if anything, the faster, but the Supermarine boat gained on points chiefly as regards getting off and alighting. Today the Supermarine boat was out for a spin over Southampton Water and Calshot, and appeared to be tremendously fast. The Sopwith seaplane, 450 h.p. Cosmos "Jupiter," has also been flying, and is undoubtedly the fastest of the machines entered. The Fairey seaplane is all ready for tomorrow's race.

The Italian representative, the "Savoia" flying boat, with 250 h.p. Isotta-Fraschini engine, is also at Cowes. She is similar to the standard S 13, except that she is a single-seater, and the wing area has been reduced, there being now only one pair of struts on each side. The boat is flat-sided and with a single step. The boat bottom is somewhat different from that of our boats in that it is slightly concave just in front of the step instead of having a Vee bottom.

The I.F. engine is a very clean-looking job, and it has an immensely healthy roar. This machine also is very fast, and when taxying along the sea appears to make far less spray than our boats, probably on account of the hollow bottom and flat sides.

The French Spad is a monocoque body tractor seaplane, with two long floats. These have Vee bottoms both in front of and behind the step. The under-carriage strutting is rather unusual, and, although apparently very strong, could probably be simplified with advantage. This machine is rather unlike the usual Spad land machine, having a single I-strut on each side, while its top plane has a pronounced sweep back, the bottom plane being straight. The engine is a 300 h.p. Hispano-Suiza, with the radiator mounted in the nose.

The Nieuports have had very hard luck. Both the original machines were crashed during trial flights over the Seine, and a spare machine, piloted by Casale, actually made the trip from France to Cowes in 2½ hours, only to come to grief by striking a buoy outside Cowes. The floats were smashed, and the machine was standing with its tail in the air and the engine submerged when Lieut. Casale was picked up.

However, the machine was salved, and is now at Saunders' sheds, having a new engine and floats fitted, while the Saunders works are busy rebuilding the wings. Everybody is working like Trojans, Saunders' men no less than the Nieuport mechanics, and it is confidently expected that the Nieuport will be ready tomorrow in time for the race.

This machine also has a monocoque body, with fin and tail plane built integral. It has floats very similar to those of the Spad. The 300 h.p. Hispano-Suiza engine is all but streamlined off by the nose of the body, the two radiators, of very unusual design, looking for all the world like lobster pots, being mounted on the undercarriage struts, below the body. The Nieuport looks speedy, but I have not seen her in the air yet.

Another Nieuport, piloted by Malard, is now rumoured to be on its way from France, but at the time of writing it has not turned up.

Tonight the Saunders sheds at Cowes are the scene of great activity, and everybody is full of praise of the sporting way in which Mr. Saunders has placed not only his sheds, but his workshops at the disposal of competitors. All manner of adjustments and repairs can be, and are being, carried out which would have been next to impossible under less favourable conditions.

Everything points to a very good race tomorrow, and the weather is fine, and looks like remaining so for a day or two.

◆ ◆ ◆ ◆

COMMERCIAL AIR-TRANSPORT

BREAN DOWN, SOMERSET

Recently in spite of the weather conditions often being anything but pleasant, a large number of passengers have been taken up—the majority being ladies—at the Brean Down Aerodrome, near Burnham-on-Sea, where the Warwick Aviation Co. have two Airco 6 machines in use. The low fares of 10*s.* 6*d.* and 21*s.* and the free flight system have attracted many visitors from Weston-super-Mare, Burnham, and the surrounding country. The pilots, Lieut. W. A. Warwick, Lieut. H. A. Yeo, and Lieut. F. V. Webb, late of the R.A.F., have each seen extensive active service in France. Up to the present no stunting has been carried out, but it is hoped that another machine will be available shortly for this purpose.

BRIGHTON

During the week ending September 6, the Avro machines made 50 flights from their aerodrome and 100 passengers were carried. The weather was very indifferent all the week, and it was impossible to fly for some part of every day. On Saturday afternoon passengers were taken up at Chichester, and a cross-country trip from Brighton to Chichester and return with two passengers was made.

HOUNSLOW

During the week the Avros made 85 flights and took up 149 passengers. Cross-country flights made included one to Margate, one to Weston-super-Mare, two to Brooklands and one to Woolwich and return.

On the 8th inst., an officer of the Guards chartered an Avro at Hounslow and flew to Hythe, starting at 7 a.m., to be in time for a Musketry Course which commenced there that morning.

The Avro Co. is not running any regular service to the Continent, but in its capacity as "Air Taxi" is always ready to take passengers there when they want to go. Its first flight to Paris was made on Saturday, 6th inst., when the Avro Limousine, piloted by Capt. R. T. Fagan, D.F.C., left Hounslow at 4.50 a.m. carrying two Norwegian gentlemen. A non-stop flight was made and Le Bourget was reached at 7.35 a.m.—an excellent flight of 2 hours 45 mins.

PAIGNTON

Although flying was possible only on two days last week, the Avro seaplanes made 46 flights, and carried 76 passengers. Cross-country flights were made to Teignmouth and Babbacombe. This week the Avros have had an exceptionally busy time. On Monday, Tuesday, and Wednesday, special trips were made over H.M.S. Queen Elizabeth and H.M.S. Lion, moored in Torbay. On the first day 70 passengers were taken up, and at least 50 on each of the other days.

MARGATE.

Flying on an Avro at Margate, under the supervision of Capt. Duncan Davis, is quite the most popular and delightful sport of the season, and 273 passengers have thoroughly enjoyed their air trips this past week. Many enthusiast were over 60 years of age, and several under 6. There were also a number of celebrities, including a well-known M.P. and his son. Tea is served on the aerodrome, which makes an afternoon at Manston a very pleasant affair.

At Herne Bay, there are hundreds of spectators, and always many passengers waiting their turn. In this coming week, flights are being given around the Fleet for £3, and already many trips have been booked.

WINDERMERE.

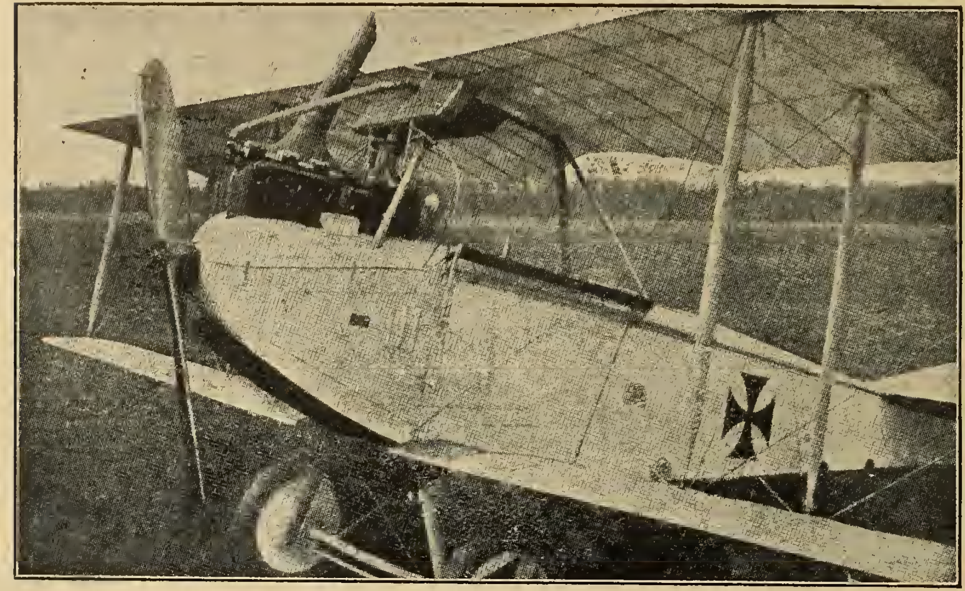
In the last two weeks the Avro seaplanes at Windermere have been chiefly engaged with carrying the *Daily News* to Douglas. They completed their contract last Wednesday. After delivering the papers to Douglas for this last time, Capt. Pixton filled up with petrol and flew over to Port Erin and took up a few passengers there. Unfortunately, he could only manage a few, owing to lack of petrol, and being short-handed, with no local organisation. So he had to disappoint a great many. One passenger at Port Erin booked a passage to Windermere, calling in at Douglas on the way.

AVIATIK "MILESTONES"

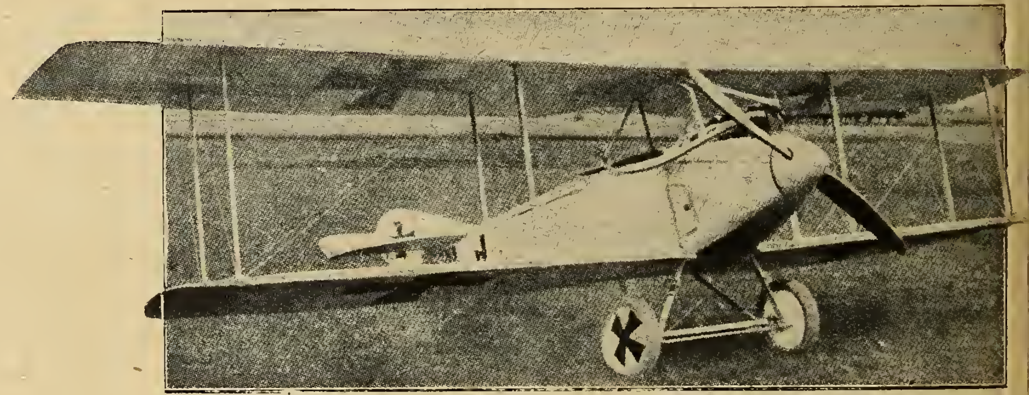
OF the German aircraft firms which were in existence before the War, one of the best known and most important was the Aviatik (Automobil-u. Aviatik A.G.), whose works were originally at Mülhausen, Alsace. Quite early in the War, however, the proximity of the works to the front made it necessary to transfer them to a safer locality. This was hurriedly done, under cover of darkness it is alleged, and works were established at Freiburg im Breisgau. The demands for output soon rendered these works too small, and a large factory was established at Leipzig-Heiterblick, which is at the present time the main Aviatik factory. Work was commenced at this factory in 1916, and in addition the Grade works at Bork i. d. Mark, near Berlin, were purchased by the Aviatik firm, who enlarged them considerably and established a flying school there. The Aviatik firm intends to remain in the aircraft industry after the War, and in view of this fact, as well as on account of the amount of work done by this firm during the War, a few brief notes on the various Aviatik types, based on an article published in *Flugsport*, may not be without interest.

The Aviatik, Type C I

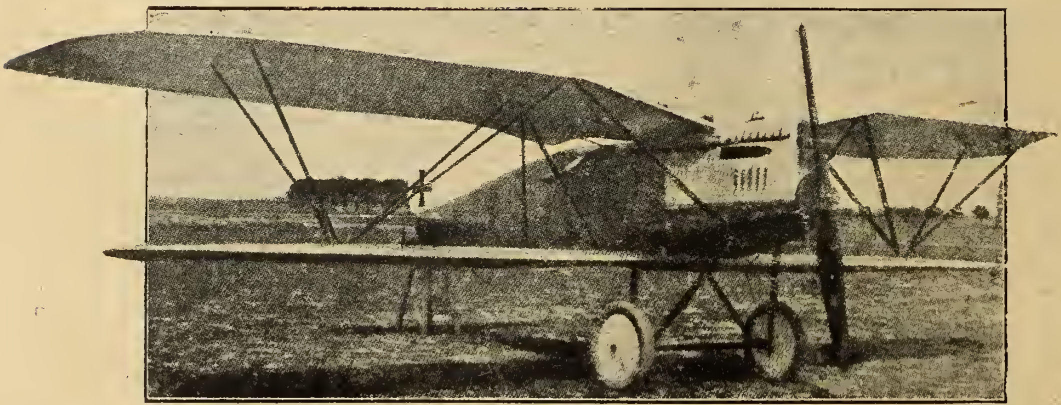
This machine, which was built during 1914-1915, had a



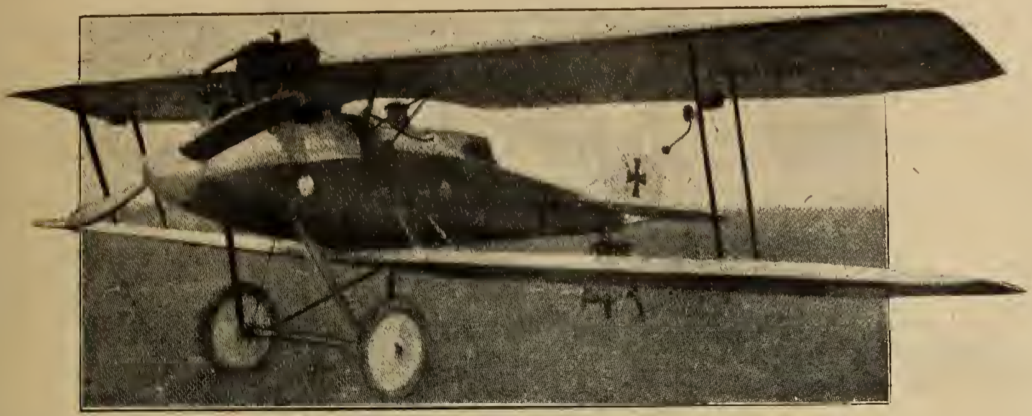
The Aviatik, Type C I.



The Aviatik, Type C III.



The Aviatik, Type C V: Note the unusual wing bracing and the dropped centre section.



The Aviatik, Type C VIII.

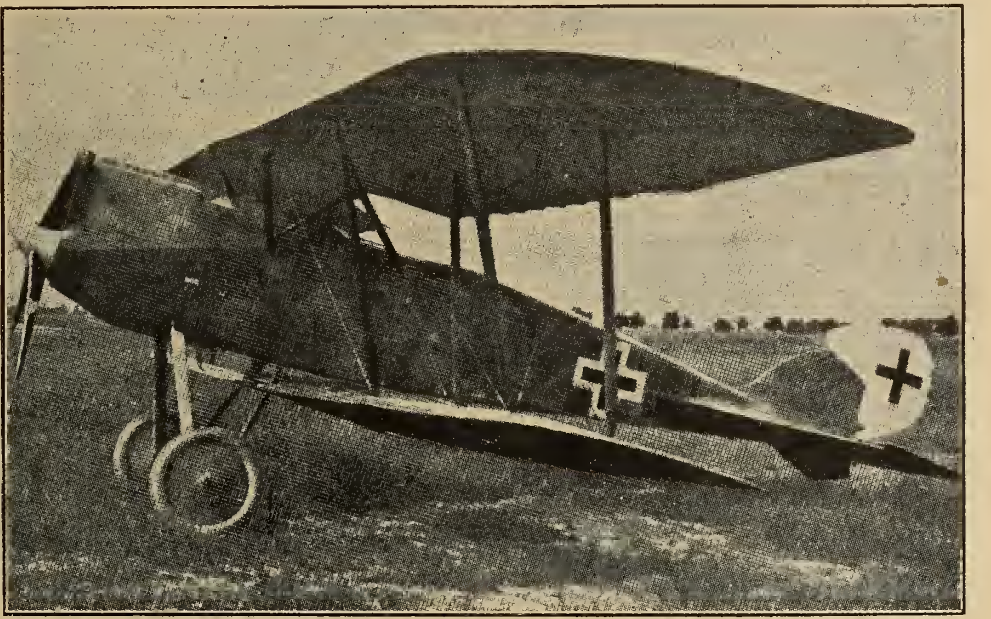
160 h.p. Mercédès engine, and the radiator mounted on the front struts of the *cabane*. The gunner occupied the front seat, two straight gun rails being mounted on the sides of the *fuselage*. The machine had a speed of 142 km./hour.

The Aviatik, Type C III

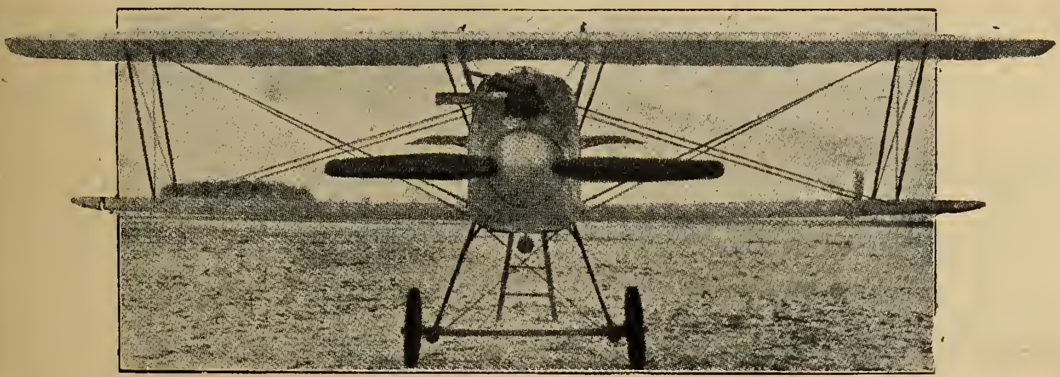
was built in 1916, and also had a 160 h.p. Mercédès engine. It was designed to meet the demand for better performance, and although the engine remained the same, the speed of this type was increased from 142 to 160 km./hour. This was accomplished mainly by a general "cleaning up," such as placing the radiator in the top plane, giving the body a better streamline shape, and last, but not least, by employing a different wing section. The next machine in the series which is of interest is

The Aviatik, Type C V

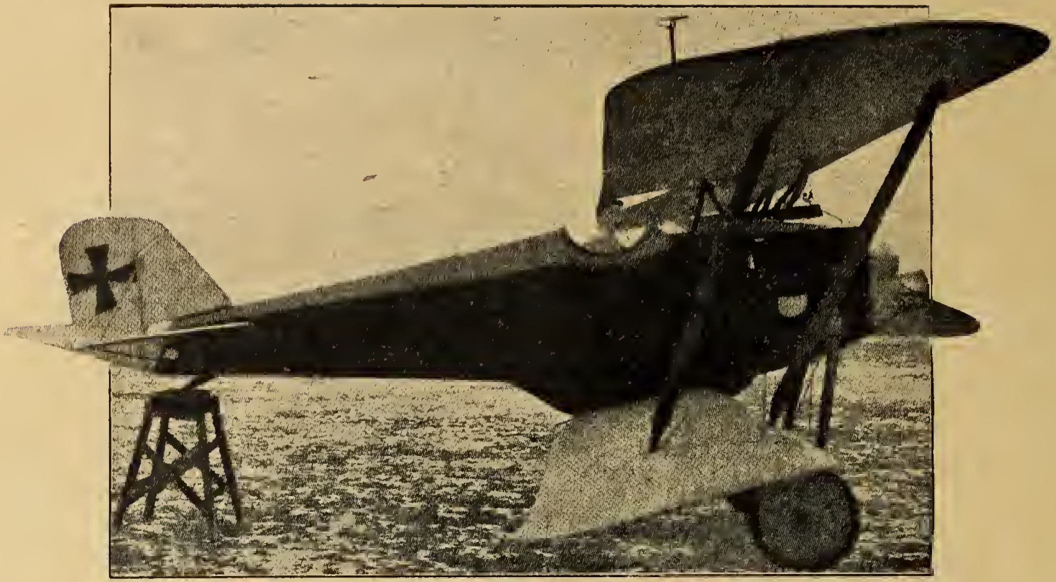
This machine, which was constructed in 1917, had an Argus engine of 180 h.p. The type C V departed from usual practice in several respects. Thus the wing bracing was unusual in that no lift-wires were employed. As the accompanying illustration shows, the outer pair of inter-plane struts were arranged in the form of a Vee, the bottom plane being of smaller chord than the top. The innermost pair



The Aviatik, Type C IX: This machine has a four-bladed airscrew.

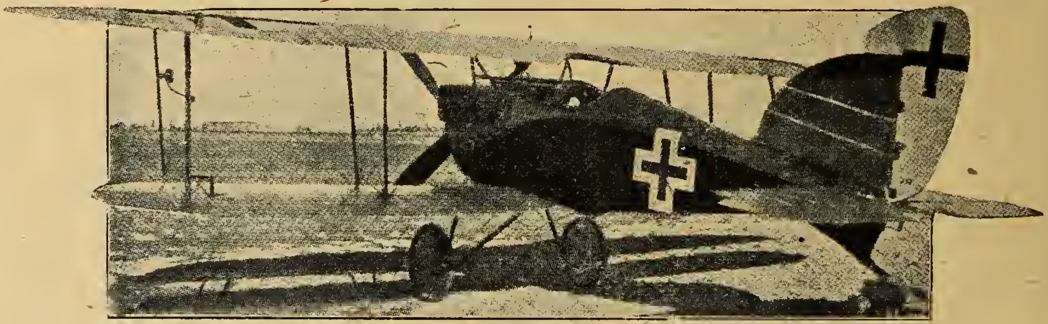


The Aviatik, Type D II.



The Aviatik, Type D III

of struts ran from the upper ends of the next pair to points near the bottom of the *fuselage*, while a third strut sloped aft from the rear strut and was anchored at its lower end to the *fuselage* some distance aft. Another feature of this type was that the centre section of the top plane was dropped, in a manner not unlike that employed on the latest Boulton and Paul "Bourges." The object of this arrangement undoubtedly was to provide a better view and a freer field of fire for the gunner. For some reason or other the type was not a success, and was not, we believe, built in large quantities. No figures of performance are available.



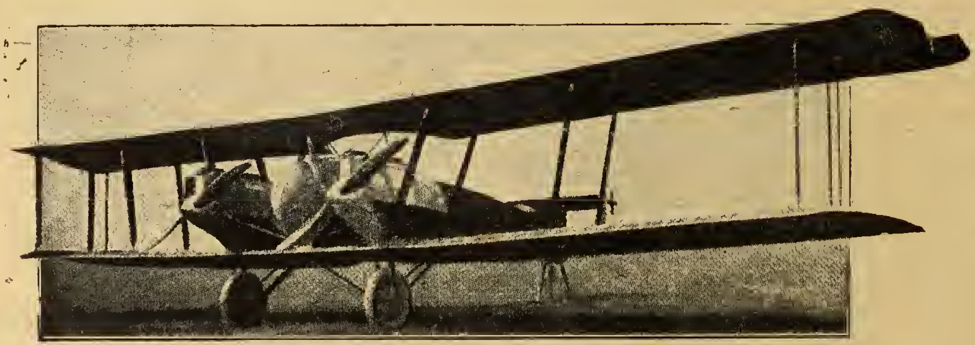
The Aviatik, Type D VII

The Aviatik, Type C VIII

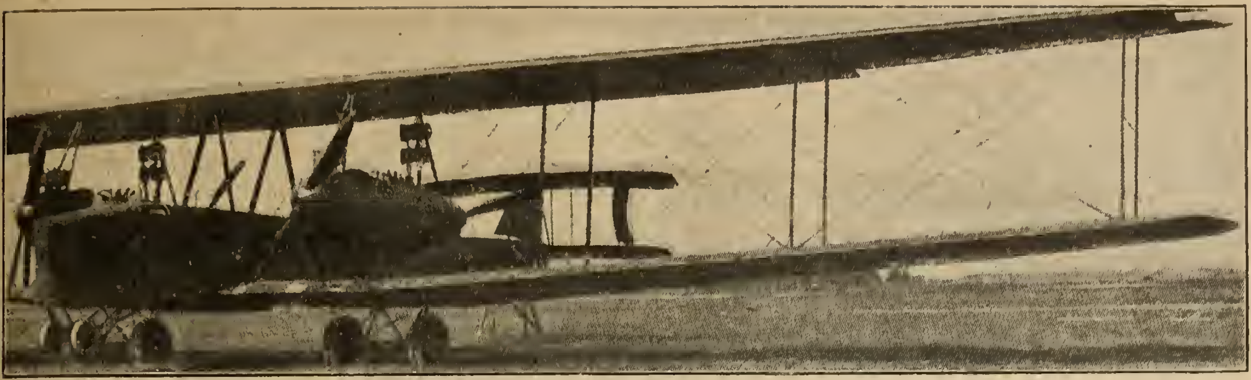
This machine was also built in 1917. It had a 160 h.p. Mércedès engine, and the radiator placed in front of the leading edge of the top plane. To reduce resistance, and thus increase speed, only one pair of inter-plane struts was fitted on each side, while the body was kept of the smallest possible cross section. In order to provide sufficient gap for aerodynamical efficiency, which was not possible with direct attachment of the lower plane to the body, a form of keel was provided, growing out of the bottom of the *fuselage* and to this were attached the two halves of the bottom plane. The *fuselage* was covered with ply-wood, and was of good streamline form. The gun-ring in the rear cockpit was accommodated in a coaming of three-ply, nicely rounded off, as will be seen from the photograph. The centre section struts were of N formation, and were raked outwards. A similar pair of struts provided diagonal bracing for the root attachment of the lower plane to the keel referred to above.

The Aviatik, Type C IX

In 1918 a somewhat different type, the C IX, was produced. This had a 200 h.p. Benz engine, and the radiator was placed in the nose of the *fuselage*, motor car fashion. The lower plane, which was of smaller chord than the top one, ran underneath the *fuselage*, much after the manner of the Bristol Fighter, which may quite possibly have inspired the Aviatik designer to adopt this feature. The fin and tail planes, three-ply covered, "grow" out of the body, while the rudder is fabric covered. There is a small fin underneath the *fuselage*, containing the tail skid.



The Aviatik, Type Go. G VII

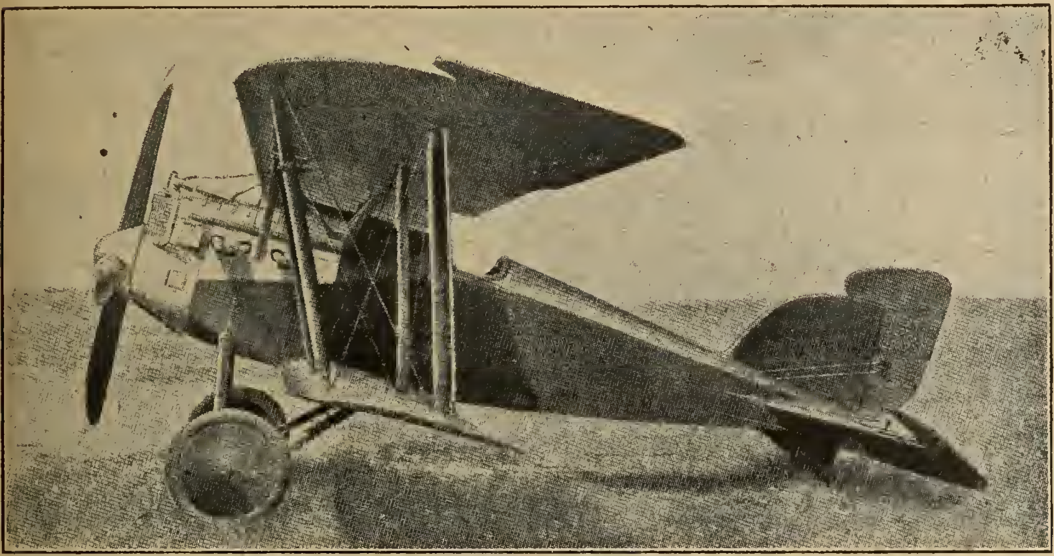


The Aviatik, Type R.

The foregoing types represent the development in the two-seater class. The Aviatik firm has, however, also produced some single-seaters, known in Germany as the D class. Of these mention may be made of a few.

The Aviatik, Type D II

This machine, which was built in 1916, is similar in general lay-out to the Albatross and other scouts. It had a 160 h.p. Mercedes engine, and the radiator was placed in the centre section of the top plane. Although the body construction was the usual German one of a light framework covered with ply-wood, steel was used for the inter-plane and centre-section struts, and also for the undercarriage and engine-bearers. The pilot's seat was carried on a rearward extension of the channel section steel engine-bearers.

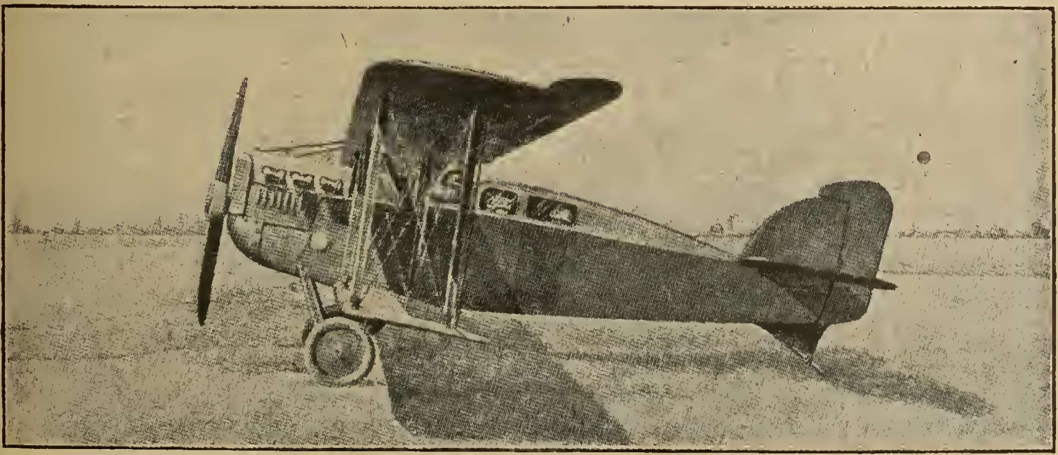


The Aviatik, Type D VII, Sporting machine.

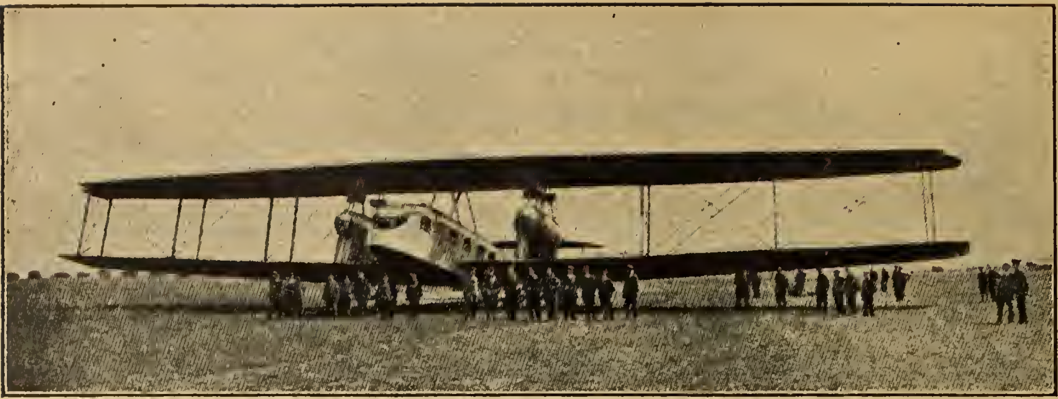
The Aviatik, Type D III

In 1918 another single-seater type was brought out. This machine, which had the series number D III, was fitted with a Vee type 195 h.p. eight-cylindered high-speed Benz engine. As other machines of the D type it had one pair of struts aside, and it was similar to the type C VIII, in that it had a keel structure projecting down from the bottom of the *fuselage*, to which was attached the bottom plane. The planes were heavily staggered, so as to give the pilot a better view. The radiator was placed in the top plane.

As in the case of our own machines, there came a time when engines became of such increased size and the evolutions to be carried out during fights in the air of so strenuous a nature that the single-pair-of-struts-aside type of single-seater was no longer equal to it. Consequently, it became



The Aviatik Limousine, Type F.



The Aviatik passenger-carrier, Type R III

usual to fit two pairs of struts, and generally to strengthen-up this type of machine. The Aviatik firm did this in their next single-seater:

The Aviatik, Type D VII

which was built in 1918. The engine fitted in this type was also a 195 h.p. Benz eight-cylindered Vee, driving a four-bladed airscrew through reduction gearing. Probably owing to the fact that the engine was of the Vee type, and that, therefore, it was difficult in any case to provide a pointed nose to the machine, a front radiator was fitted. The machine is of slightly greater dimensions than the D III, and in a somewhat modified form is intended for use as a sporting biplane, to which reference will be made later.

In addition to their single-seaters and two-seaters, the Aviatik firm have also built several large machines (Riesenflugzeug), illustrations of three of which are published herewith.

The Aviatik, Type Go. G VII

built in 1918, is a twin-engined machine of the bomber type. It was fitted with two 200 h.p. Benz engines placed on the wings in short engine *nacelles*. The radiators were in the nose of these *nacelles*. From the photograph it will be noticed that the two engine *nacelles* are placed comparatively close to the main *fuselage*, the nose of which is very short, allowing the tractor airscrew blades to pass in front of it. This arrangement of the engines has brought about a somewhat unusual strutting arrangement, as regards the inner *cellule*, at any rate. The tail is of the biplane type, with three rudders.

The Aviatik, Type R (Riesenflugzeug)

was a four-engined machine, following more on the lines of the Staaken type. It was built towards the end of 1918, and was fitted with four Benz engines, the two front ones being of the 200 h.p. six-cylindered type, and the two pushers of the 500 h.p. twelve-cylindered Vee type, fitted with reduction gearing. As will be seen from the photograph, this machine was of very large dimensions, with its engines placed end to end in *nacelles* between the planes. It had a biplane tail.

The Aviatik Commercial Machines

For post-War commercial use the Aviatik firm has several types in course of construction. These include machines of 200, 350, 1,000, and 1,500 h.p., the latter types carrying from 18 to 26 passengers.

The Aviatik Sporting Machine

This, as already mentioned, is a development of the Type D VII. It has a Benz engine (eight-cylindered Vee type) of 240 h.p., and is stated to develop a speed of 192 km./hour at 3.000 m. It is claimed to climb to 6,000 m. in 24 mins., and to have a ceiling of about 7,400 m. The machine, as shown in the accompanying illustration, has a four-bladed airscrew, probably driven through reduction gearing. The following is the specification of the Aviatik sporting machine: Span, 9 m. 66; length overall, 6 m. 100; height overall, 2 m. 50; weight, empty, 745 kg.; fuel and pilot, 150 kg.; other load, 50 kg.; total weight about 945 kg. Sufficient fuel for 1½ hours. (About 280-300 km.)

For mail and passenger carrying the firm has produced a limousine to be known as

The Aviatik, Type F

This machine, a sketch of which is published herewith, has the following dimensions; Span, 15 m.; Length overall, 7 m. 90; height, 3 m. 100; weight empty, 1,050 kg.; fuel and occupants, 315 kg.; other load, 250 kg.; total weight, 1,615 kg. Sufficient fuel is carried for a flight of 3 hours, so that the range is approximately 525 km. The power plane is a twelve-cylindered Vee engine of 300 h.p. The speed is estimated at 175 km./hour at 2,000 m., and climb the 5,000 m. in 35 mins. The ceiling will be about 6,500 m.

For Peace-time passenger-carrying the Giant is being adapted as a passenger or mail carrier. This machine,

The Aviatik, Type R III

is to be fitted with four Benz engines of 250 h.p. each. The specification is as follows: Span, 43 m. 500; length overall, 22 m. 500; height, 6 m. 500; weight empty, 9,000 kg.; fuel and occupants, 1,800 kg.; other load, 1,800 kg.; total weight, 12,600 kg. The crew will consist of one captain, two pilots, two engineers, and one steward. The useful load may consist of 18 passengers with their luggage or of 1,800 kg. of goods. Fuel is carried for a seven-hours flight (about 875 km.). The speed is expected to be about 125 km./hour at 2,500 m. A climb of 3,500 m. in 1 hour 40 mins. is anticipated, and the ceiling has been estimated at about 4,000 m. All the comfort to which passengers of a railway-coach are accustomed to will be provided. A diagram of the cabin arrangement is published herewith, and shows the seating, etc.

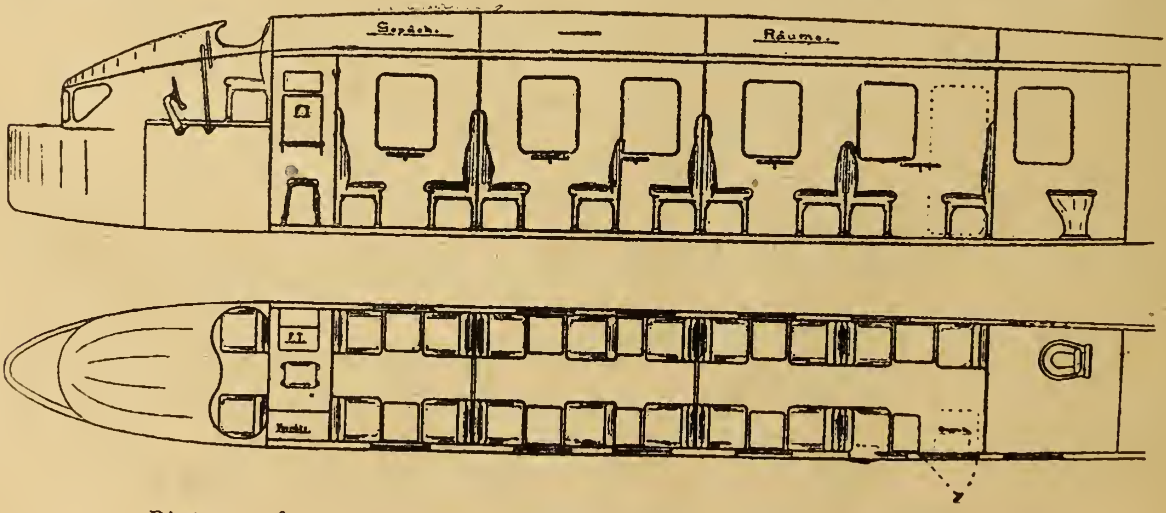


Diagram of passenger accommodation, etc., in the Aviatik, Type R III

AIRISMS FROM THE FOUR WINDS

WHAT a distributing centre for up-to-date information, 186, Fleet Street, must be. Starting from that address for London *via* Dundee, "our own (London) correspondent" of the *Advertiser* of the city of cakes tells us that "the Board of Trade Committee is at present considering a comprehensive scheme for the establishment this coming winter of an extensive landing ground for aircraft in the heart of London. This aerodrome, the only one of its kind in the world, will be situated on the roof of a large central clearing house in Clerkenwell, which is now being built for London's goods traffic. Sheltered on all sides by tall buildings, equipped with powerful searchlights, and covering some quarter mile square of level surface, aircraft will be able to depart for and arrive from all parts of the world by night and by day, and in all sorts of weather, in safety . . . The new scheme will fulfil a long-felt want, and will entail the saving of an hour on every flight made to and from the Metropolis. Several of the more important aircraft companies will share in the use of the new aerodrome, and steps are to be taken to amend the existing rule of the Air Ministry that aircraft must not fly over London at a low altitude." We are indeed delighted to hear of this enterprise, which looks like going one better even than the suggestion of roofing in the Green Park for a similar purpose. Unfortunately the "affaire" is merely the putting into words a vision of the future, *à la* Gattie, as an additional inducement to the Government to put into operation Mr. A. W. Gattie's great and admirable clearing house scheme. This, irrespective of the utter inadequacy of the 'drome space which the roof of Mr. Gattie's building would afford, according to the latter's own figures. No, we fancy "our own correspondent" will have to hedge presently over that "this coming winter" creation of his. Gracious to goodness, but such a scheme as Gattie's if successful, would knock out half to threequarters of the Geddes bureaucrats which are now in the process of creation !

Some R.A.F. Impressions

Squadron-Leader McCrindle, M.C., of the H.P. Communication Squadron, who, at the time of the Peace Conference, flew many celebrities across to Versailles.

- - -

FOLLOWING is a letter from Sir Charles Bright on "Airship Economy" which he has sent to the Press under date September 2 :—

"Today's announcement that the Air Ministry have decided to stop airship construction will come as a shock to all who rightly recognise (1) that the Air Force is going to be the most essential weapon of national defence, and (2) that airships are capable of becoming a highly efficient factor in transport and communication betwixt the Mother Country and the outlying portions of the Empire. The same applies, of course, to international trade. Let us, by all means, work for a closely restricted expenditure in directions where, owing to bad organisation expensive contracts, and much overlapping between Departments, money has been ill-spent — literally poured out indeed. But if our economy is either at the cost of Imperial security or acting as a check to inter-Imperial commerce, our position will surely become worse than ever."

- - -

TRACKING Sinn Fein murderers by aeroplane is the latest airy item. Following the murder of the military at Fermoy by the Sinn Feiners, a hunt by car and otherwise for the criminals was at once set up, but the murderers having got through on their motor car, accomplices blocked the way for the authorities' vehicles by means of felled trees across the road. Delay thus gained enabled, at least temporarily, the fugitives to escape. Under the circumstances aeroplanes from the flying station were then sent up, 18 machines, it being stated, taking up the chase. Unfortunately these were brought into action a bit late, and it is hardly surprising to learn that they failed to find any trace of the fleeing motor cars.

- - -

SYNCHRONISING with our aircraft downing policy, from Germany it is announced that the Prussian Ministry of Trade has sanctioned the formation of a limited liability company for air traffic in Frankfort-on-the-Main, with a share capital of 15,000,000 marks (nominally £750,000). The company will begin with a post and passenger service of some 200 aeroplanes, which will fly between Cologne and Frankfort, Stuttgart, Basel, Berlin, Breslau and Hamburg.

- - -

A COMPLAINT from Bradford in connection with air defence waste will take a lot of explaining away. It is stated that a station established in that city at Beacon Hill during the Zeppelin raids still exists, with an anti-aircraft gun mounted and 17 men in charge. It is hardly surprising to hear that this is denounced as wasteful extravagance. It is now announced, after a public outburst of indignation, that steps are being taken to dismantle the station and release the men. But what about it ?

- - -

AT Dover last Sunday night a novel open-air service was held within the walls of the Wesley Memorial Hall, which was one of the "hits" of the bombing season, it being unroofed and blown to pieces by German eggs, well and truly laid. It has since been cleared inside and rendered safe, but it is still open to the sky.

- - -

FROM Maj. C. H. R. Johnston (late R.A.F.) the following interesting communication from Barkarby, Sweden, is to hand :—

"Your numerous readers may perhaps be interested to have some news of aviation in this country, and I, therefore, write of what we and others are doing. I came out here in June with two 110 Le Rhône Avros and an 80 Renault D.H. 6, to do anything whereby money might be made. So far the success of the expedition has far exceeded our expectations, and we are now enlarging the show considerably and importing more machines from England, including a Rolls seaplane and an A.W. We have formed the P.O. Flygkompani in conjunction with Lieut. Herrström of the Swedish Flying Corps Reserve, and Capt. Saunders, late of the R.N.A.S., is the other pilot. Scandinavia in general and Sweden in particular is taking very kindly to aviation, and it behoves English aircraft firms not wishing to have the Scandinavian market captured by Germany and Austria to wake up to the great possibilities of civil aviation here. So far our work has been to fly to the larger towns and cities where all advertising is done for us by the newspapers, and give demonstrations of War flying and stunting, and then take up passengers, enclosing the flying field and charging for admission, and also, of course, for the passenger flights. The results, as previously stated, have been more than satisfactory, our average daily takings since we began work being just over 1,000 kr., which is about £55 to £60. Unlike England, there are no vexatious restrictions on civilian aviation, and apart from one inspection of the machine before beginning work and the medical examination of the pilot, one is not interfered with as long as no dangerous flying is indulged in. The climate has been very good for flying during June, July and this month, never any fog and very little rain. Unfortunately, the almost total absence of good fields for forced landings and the large amount of forest and water everywhere, makes it very important to be able to rely implicitly on one's engine. Our 110 Le Rhônes are standing up to the work well, but one cannot get any spares in the country, and when wired from England often take several weeks to arrive. It is very important for anybody bringing machines here to be very certain that they are complete in every respect to the last split pin and nut, as everything missing has to be made. A turnbuckle, for instance, costs 18 kr.—£1—to make in Stockholm. If anyone contemplating flying in this country is unfortunate enough to acquire his machines from the same source as we obtained ours, he may find, as we did, the following articles, extracted from a very long list, deficient :—No driving wheel for magneto, no carburettor on engine, planes of a different type to *fuselage*, with, therefore, wrong length interplane and drift wires and turnbuckles with one end larger than the other, no oil or petrol pipes either in machine or engine, machine *minus* Class I modifications, five ribs broken in tail plane owing to bad packing in crate, literally hundreds of nuts, bolts, pins and washers missing. This is bad enough, but when, to crown all, one assembles an engine straight from its packing case in a machine, and on turning it round hears a rattling, and then discovers when the nose-plate is removed that someone has kindly left a 2-in. brass wood screw in the engine, then one almose believes that someone has a grudge against Sweden. I will leave your readers to guess where these machines were purchased, and the exact cost of bits

"Flight" Copyright

Bournemouth, the scene of the competition for the Schneider seaplane race on Wednesday last, as seen from 2,000 ft.

An interesting souvenir of the Atlantic flight: Filling the petrol tanks of Capt. Sir John Alcock's Vickers-Vimy aeroplane with Shell spirit, in readiness for the now historic flight across the Atlantic. As will be seen, the photograph is autographed by Capt. Alcock.

which it has been necessary to buy before they could leave the ground.

"So far, we are the only English flying people in this country, but the Danish Luftraffik Co. inform me that they have got Capt. Faber and someone else either at Copenhagen or on the way to Iceland, where they are sending an expedition. There are two German flying seaplanes here in Stockholm, which purpose doing the traffic to Malmö and other places. Dr. Sablatnig is in charge, and rumour hath it that one of his two pilots has been requested to leave the country already for the second time of asking. The four-engined Handley is expected at Malmslatt, the Flying Corps headquarters, any day now, and then it is to come on here, but where it will rest its weary head, or rather its little wheels, remains to be seen. Personally I haven't seen a field where I should care to land anything bigger than a Bristol Fighter round here. I shall be only too glad to give anyone information on civilian flying in this country if they will communicate with me here. I may add that the general public are very enthusiastic about flying, and we have no difficulty in getting 100 kr. for a 10-min. flight and 150 kr. for a 20-min. flight. When the ice comes we shall fit skids to the machines, and try and persuade the Swedes to join our flying school, which is just starting."

* * *

International Air Traffic

Brief reference was made in our last issue to the formation at the Hague of the International Air Traffic Association, to facilitate the commercial operation of long-distance "airways," especially in the north of Europe. The conference was called at the instance of Mr. G. Holt Thomas, Chairman of Aircraft Transport and Travel, Ltd., and Major-General Sir W. S. Brancker presided over the meeting, which were attended by representatives of aerial transport companies of Norway, Sweden, Denmark and Germany. By permission of the Dutch Government the meetings were held at the Ministry of Agriculture, Industry and Trade.

The London-Paris Air Express

The Airco express aeroplanes between London and Paris completed on Saturday last a second week of regular daily service. The machine which left London at 12.30 p.m. with passengers and parcels reached Paris at 2.50 p.m., and the machine flying the other way, leaving Paris at 12.30 p.m., landed at Hounslow at 2.30 p.m.—a quarter of an hour before time—having made its 250-miles journey at a speed of 125 miles an hour.

During the fortnight the service has been running daily, thirty flights have been made. Only once, when there was a hurricane, with sheets of rain at Hounslow, did a machine fail to get away; and even on that day, despite squalls of more than 100 miles an hour velocity in the Channel, the machine from Paris fought its way through. On only one flight has there been a forced landing, and in that case the pilot, after a ten-minutes' halt at an aerodrome *en route*, was in the air again, and duly completed his journey.

As the service is mainly an express parcels and goods service, it is interesting to note from the waybills the actual contents of the parcels which during the first twelve days' flying—and at rates ranging from 7s. 6d. to 3s. 9d. per pound —were carried by air between London and Paris. The list comprises: Bankers' script, leather, films, photo plates, champagne, sweetmeats, grouse, bills of lading, plans and drawings, dress material, newspapers, millinery, samples of clothing, Devonshire cream.

There is now a greatly-increased interest in the service on both sides of the Channel. Within the last few days the agents in Paris have been negotiating for the regular carriage, in consignments spread over various days of the week, of as much as 600 lb. and 1,000 lb. of goods. It is now proposed also that certain vaccines, which must be used within 24 hours or their potency is lost, should be consigned to Aircraft Transport and Travel for aerial transport.

A Fast Trip to Holland

On a new Airco 9a, fitted with a 450 h.p. Napier aero engine, Capt. Gathergood, on September 5, flew from Hounslow to Soesterberg, in 2 hrs. 10 mins., which it is believed is the fastest journey to Holland so far accomplished. Capt. Gathergood states that he travelled at a speed of 134-5 m.p.h., and had to land at Soesterberg owing to shortage of petrol.

Flying to Rome from Paris.

On a Morane parasol monoplane, the French pilot, Maneyrol, set out from Paris, on September 2, to fly to Rome and back in a day. He left Villacoublay at 5.51 a.m., and landed at the Santocelli aerodrome, at Rome, at 11.50 a.m., having covered the 1,250 kiloms. in 5 hours 59 mins. After resting for two hours, he set out on the return journey to the French capital, but, owing to the mist and the clouds, he was obliged to land at Pisa, having covered 300 miles in an hour and a half.

The monoplane, which is fitted with a 160 h.p. Le Rhône motor, is characterised by its *haubannage rigide*.

From Spain to Italy

A Nieuport Macchi machine, piloted by the aviators Busio and Caratti, landed at Varese (Italy) on September 4, having made a non-stop flight from Barcelona in 5 hours 50 mins.

AEROPLANE OR AIRSHIP?

IN the course of his Presidential Address at the Bournemouth meeting of the British Association on Tuesday, the Hon. Sir C. A. Parsons, K.C.B., D.Sc., F.R.S., said :—

"In August, 1914, the British Air Services possessed a total of 272 machines, whereas in October, 1918, just prior to the Armistice, the R.A.F. possessed over 22,000 effective machines. During the first 12 months of the War the average monthly delivery of aeroplanes to our Flying Service was 50, while during the last 12 months of the War the average deliveries were 2,700 per month. So far as aero-engines are concerned, our position in 1914 was by no means satisfactory. We depended for a large proportion of our supplies on other countries. In the Aerial Derby of 1913, of the 11 machines that started, not one had a British engine. By the end of the War, however, British aero-engines had gained the foremost place in design and manufacture, and were well up to requirements as regards supply. The total horse-power produced in the last 12 months of the War approximated to 8,000,000 of brake horse-power, a figure quite comparable with the total horse-power of the marine engine output of the country.

"In view of the recent Transatlantic flights, I feel that it may be opportune to make the following observations on the comparative utility of aeroplanes and airships for commercial purposes. In the case of the aeroplane, the weight per horse-power increases with the size, other things being equal. This increase, however, is met to some extent by a multiplicity of engines, though in the *fuselage* the increase remains.

"On the other hand, with the airship the advantage increases with the size, as in all ships. The tractive effort per ton of displacement diminishes in inverse proportion to the dimensions, other things, including the speed, being the same. Thus, an airship of 750 ft. length and 60 tons displacement may require a tractive force of 5 per cent., or 3 tons, at 60 miles per hour; and one of 1,500 ft. in length and $8 \times 60 = 480$ tons displacement would only require $2\frac{1}{2}$ per cent. $\times 480 = 12$ tons at the same speed, and would carry fuel for double the distance.

"With the same proportion of weight of hull to displacement, the larger airship would stand double the wind pressure, and would weather storms of greater violence and hailstones of greater size. It would be more durable, the proportional upkeep would be less, and the proportional loss of gas considerably less. In other words, it would lose a less proportion of its buoyancy per day.

"The airship appears to have a great future for special commerce where time is a dominant factor and the demand is sufficient to justify a large airship. It has also a great field in the opening up of new countries where other means of communication are difficult. The only limitation to size will be the cost of the airship and its sheds, just as in steam vessels it is the cost of the vessels and the cost of deepening the harbours that limit the size of Atlantic liners.

"Such developments generally take place slowly, otherwise failures occur—as in the case of the Great Eastern—and it may be many years before the airship is increased from the present maximum of 750 ft. to 1,500 ft. with success, but it will assuredly come. If, however, the development is subsidised or assisted by Government, incidental failures may be faced with equanimity and very rapid development accomplished. In peace time the seaplane, aeroplane and airship will most certainly have their uses. But, except for special services of high utility, it is questionable whether they will play more than a minor part as compared with the steamship, railway and motor transport."

* * * *

Douglas-Pennant Inquiry

THE inquiry into the dismissal of Miss Violet Douglas-Pennant from the position of commandant of the Women's Royal Air Force will be opened at the House of Lords on October 14. The chairman will be Lord Wrenbury, and the proceedings will be open to the public.

Miss Douglas-Pennant's statement of the case was filed at the House of Lords last week. Other persons interested are permitted to lodge statements up to September 23, having an opportunity in the interval of seeing the exact nature of Miss Douglax-Pennant's complaints.

An Appeal to Ex-R.N.A.S. Members

IN connection with the exhibition "Airships in Peace and War," opening at the Prince's Galleries on September 15, Lady Sybil Grant has addressed an appeal to members of the original R.N.A.S. It is hoped to make 10,000 shillings clear of expenses towards an airship bed at St. Dunstan's. The sum represents the total number of in-patients and out-patients at Lady Sybil's hospital during the War.

Lady Sybil asks the R.N.A.S. members to help their late Hospital Commandant by sending something to be sold at the gift stall in the exhibition or the sum of 1*s*. It should be addressed to Lady Sybil Grant, at Primrose House, Roehampton, S.W. 15.

R.A.F. on the Dwina River

AMONGST the various British units employed in fighting the forces of Bolshevism in North Russia is the R.A.F. seaplane flight on the Dwina River. This unit has been continuously engaged since early June in co-operation with the river craft despatched by the Admiralty to take action against the Bolshevik river gunboats.

The duties of this flight have been arduous. A constant watch has been kept on the enemy vessels, not only by day, but throughout the semi-darkness of the Arctic summer nights; enemy vessels have been effectively bombed and machine-gunned; spotting for the guns of our river flotilla has been directed by wireless, and photographic surveys regularly carried out.

The conditions under which this flight lives are somewhat novel. Their home consists of a barge, which moves up or down the river according to the situation; the difficulties consequent on a moving base have been cheerfully met by all ranks of this unit to whose co-operation a considerable share of the success of the river expedition is due.

Air Work in Russia

IT was announced by the War Office on September 2, that the R.A.F. had co-operated in an attack on Rimkaya on Lake Onega, and in their report of September 3, the Bolshevists announced that they had captured an aeroplane and taken the pilot, an Englishman, prisoner.

Kronstadt was bombarded on August 30 by some 18 machines, which were given a hot reception.

Where Air Raids still Continue

THE *Kurjer Warszawski* reports that on August 27 Sosnovitz, in the Dombrowa coal district of Poland, was three times attacked by German aeroplanes. At 6.40 a.m. a German aeroplane, flying low over the town, shot at passers-by in the streets from a machine-gun. At 9.35 the same manœuvre was repeated, the most crowded streets of Sosnovitz being especially attacked. Two persons were seriously wounded and about 30 slightly wounded.

At 7. p.m., when there was a considerable traffic, a third German aeroplane shot at the streets of the town. Three other German aeroplanes afterwards came up. Bombs were thrown by the aeroplanes at the Polish outposts on the frontier and on the bridge at Szopienice.

The Bombardments of Calais

ON the occasion of the formal presentation of the Croix de Guerre on August 31 it was announced that Calais sustained 60 bombardments by Zeppelins, aeroplanes and warships. Some 2,000 bombs were dropped in the town, more than 150 houses were destroyed, 230 persons were killed and 400 injured, while the material damage amounted to £1,200,000. Yet, in spite of this, the population, normally 75,000, never fell below 60,000.

A Mexican Border Incident

FROM the Mexican border it is reported that an American army aeroplane while patrolling over the Rio Grande has been heavily fired on by Mexican Federals, and the pilot, Capt. Macnabb, severely wounded in the head. The matter has been brought to the notice of President Wilson.

The Fate of the Farman Goliath

THE following is a note published in Paris, which briefly sets forth the facts concerning the fate of the Farman Goliath in the desert.

"The Goliath made a forced descent owing to the loss of a propeller on August 16 at 7.30 a.m., on the beach 115 miles north of St. Louis. The machine was broken up, but the crew were uninjured.

"They endeavoured to walk to St. Louis, but were forced to return to the machine owing to thirst, and lived for six days on reserve provisions and on shell-fish, and satisfied their thirst by means of distilled sea-water.

"Their machine was observed by natives on August 21, and relief reached them the following day. They arrived at Medirdra on August 27.

THE ROYAL AIR FORCE

London Gazette, September 2

The following temporary appointments are made at the Air Ministry :—

Staff Officer, 2nd Class (P.).—Sqdn. Ldr. J. H. Liddendale, from (S.O.), 1st Class ; Sept. 1.

Staff Officer, 3rd Class (Air).—Lieut. R. V. Bramwell-Davis ; Sept. 1, vice Lieut. R. C. Cox.

Staff Officer, 1st Class (P.).—Lieut.-Col. C. T. Maclean, D.S.O., M.C. ; Aug. 19 (substituted for the notification in *Gazettes* of Aug. 19 and 26).

The following temporary appointment is made (graded for purposes of pay at Air Ministry rates) :—

Staff Officer, 2nd Class (T.).—Capt. R. G. Parry, D.S.O., and to be actg. Maj. whilst so employed ; Aug. 9.

The notification in *Gazette* of Aug. 15 concerning Capt. V. Buxton is cancelled.

Flying Branch

Maj. (actg. Lieut.-Col.) F. W. Lucas to be Maj. (A ship.) and relinquishes the actg. rank of Lieut.-Col. on ceasing to be employed as Lieut.-Col. ; Aug. 2.

Lieut. R. H. Stocken is graded for purposes of pay and allowances as Capt. whilst employed as Capt. (A.) ; May 1.

Lieut. G. H. Langley is graded for purposes of pay and allowances as Capt. (without flying pay) whilst employed as Capt. (A.) ; May 1.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in rank as Sec. Lieuts. (A.) :—C. W. Kerr ; July 5, 1918. G. E. Leaman ; Aug. 31, 1918. G. L. Ross ; Sept. 1, 1918.

P.F.O. R. H. Barker (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A.) ; July 18, 1918).

The following relinquish their commns. on reversion to I.A.R.O. :—Lieut. E. A. Floyer, M.C. ; March 17. Lieut. F. C. C. Yeats-Brown ; Aug. 13.

The following relinquish their commns. on ceasing to be employed :—Sec. Lieut. C. F. Williams (Sec. Lieut., R. Highrs.) ; April 1. Lieut. (Hon. Capt.) W. T. Wood (Capt., Nova Scotia R.) ; April 14. Lieut. F. C. J. Whigham (Lieut., Sask. R.) ; April 27. Sec. Lieut. W. W. Honywood (Lieut., Lrs.) ; June 6. Lieut. D. W. Davis (Capt., Sask. R.) ; June 11. Lieut. F. J. Gill (Lieut., K.R.R.C.) ; June 30. Lieut. G. L. Shephard (Lieut., E. Ont. R.) ; July 9. Lieut. J. V. Bowring (Sec. Lieut., S. Lancs. R.) ; July 30. Sec. Lieut. T. S. Duddy, M.C., D.C.M. (Sec. Lieut., Durh. L.I.) ; Aug. 11. Sec. Lieut. (Hon. Lieut.) H. W. Pearson (Lieut., Can. M.G.C.) ; Aug. 12. Maj. C. H. Stringer (Capt., R. Irish Lrs.) ; Aug. 13. Lieut. F. A. Garwood (Lieut., Bedf. R.) ; Aug. 19. Lieut. F. Hotrum (Lieut., Can. M.G.C.) ; Aug. 22.

(Then follow the names of four officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—C. Kennard (contracted on active service) ; March 30 (substituted for notification in *Gazette* Jan. 7). A. R. Metelerkamp ; June 22 (substituted for notification in *Gazette* May 23). R. M. Tate (contracted on active service) ; Aug. 22. G. H. Jacob (caused by wounds) ; Aug. 27.

The following relinquish their commns. on account of ill-health :—Lieut. C. Geen (Lond. R.) ; July 28 (substituted for notification in *Gazette* March 11). Sec. Lieut. R. H. Harlow.

Sec. Lieut. W. V. Wright resigns his commn. ; Jan. 27 (substituted for notification in *Gazette* Nov. 8, 1918).

Sec. Lieut. (Hon. Lieut.) C. M. Moore to take rank and prec. as if his appointment as Sec. Lieut. bore date Feb. 7.

The surname of Sec. Lieut. L. P. Boudler is as now described, and not "Boulder," as stated in *Gazette* May 30.

The surname of Sec. Lieut. (Hon. Lieut.) R. S. Blucke is as now described, and not "Blacke," as stated in *Gazette* April 15.

The initials of Sec. Lieut. W. Long is as now described, and not "L. W., as stated in *Gazette* April 15.

The surname of Sec. Lieut. F. Gouthro is as now described, and not "Guthro," as stated in *Gazette* April 15.

The initials of Lieut. (Hon. Capt.) A. W. B. S. F. Bloy are as now described, and not as stated in *Gazette* July 29.

The initials of Lieut. H. G. Lomberg are as now described and not as stated in *Gazette* July 29.

The initials of Lieut. W. T. S. Lewis are as now described, and not "W. T.," as stated in *Gazette* April 1.

The initials of Sec. Lieut. K. H. Ashton are as now described, and not "K.," as stated in *Gazette* April 29.

The notification in *Gazette* Jan. 31 concerning Sec. Lieut. W. J. Griffiths is cancelled.

The notification in *Gazette* April 1 concerning Lieut. E. C. Hoar is cancelled.

The notification in *Gazette* April 15 concerning Lieut. (Hon. Capt.) W. T. Wood is cancelled.

The notification in *Gazette* April 18 concerning Sec. Lieut. J. Hamilton is cancelled.

The notification in *Gazette* May 1 concerning Lieut. H. A. Hannay is cancelled.

The notification in *Gazette* June 6 concerning Lieut. F. C. J. Whigham is cancelled.

The notification in *Gazette* July 11 concerning Lieut. F. Adams is cancelled.

The notification in *Gazette* July 15 concerning Sec. Lieut. J. G. Crossley is cancelled.

The surname of Lieut. C. M. Holhrook is as now described, and not "Holbrooks," as stated in the *Gazette* of Aug. 19.

The notification in the *Gazette* of July 18 concerning Lieut. G. L. Shepherd (Lieut., W. Ont. R.) is cancelled.

The notification in the *Gazette* of Aug. 5 concerning Sec. Lieut. C. R. Fraser is cancelled.

Administrative Branch

Lieut.-Col. (actg. Col.) F. H. G. Playfair relinquishes the actg. rank of Col. on ceasing to be employed as Col. ; Aug. 1.

Capt. H. C. Jones is graded for pay and allowances as Maj. whilst employed as Maj. ; May 1.

Capt. R. L. S. Raffles to be Capt., from (S.O.) ; Aug. 16.

Lieut. A. W. Rouse to be actg. Capt. whilst employed as Capt., from March 9 to April 30.

The following Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts. :—A. W. Rouse ; May 1. H. L. McNaughton ; July 2.

The following Sec. Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts. :—C. W. Probets ; May 1. W. R. Castings ; May 11.

Lieut. T. T. Pickup to be Lieut., from (S.O.) ; Aug. 14.

Sec. Lieut. T. F. Aitchison to be actg. Lieut. whilst employed as Lieut., from Nov. 2, 1918, to April 30.

The following Sec. Lieuts. are graded for pay and allowances as Lieuts. whilst employed as Lieuts. :—T. F. Aitchison, C. W. Braddy ; May 1.

Sec. Lieut. (Hon. Lieut.) L. S. Dell (Lieut., R.F.A.) relinquishes his commn. on ceasing to be employed ; July 2 (substituted for notification in the *Gazette* of June 27).

(Then follow the names of four officers who are transfd. to the Unemployed List under various dates.)

Lieut. P. A. Kattc is dismissed the Service by sentence of a General Court-Martial ; Aug. 13. Sec. Lieut. (Hon. Maj.) J. L. McLean (R.A.S.C.), (T.F.), relinquishes his commn. on account of ill-health ; Aug. 31.

The initials of Lieut. W. B. Maitland, D.S.O., are as now described, and not "D. B.," as stated in the *Gazette* of April 25.

The rank of Lieut. J. C. Bain is as now described, and not "Sec. Lieut. (Hon. Lieut.)," as stated in the *Gazette* of April 18.

The initials of Sec. Lieut. J. Mann is as now described, and not "T.," as stated in the *Gazette* of May 6.

The notification in the *Gazette* of July 15 concerning Sec. Lieut. W. H. Dibhen is cancelled.

Technical Branch

Lieut. R. J. Sladden, M.B.E., D.C.M., to be actg. Capt. whilst employed as Capt., Grade (A) (from Feb. 18 to April 30).

Lieut. W. S. Harms is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (B) ; May 1.

Lieut. H. E. Hazlehurst relinquishes the grading for purposes of pay and allowances as Capt. on ceasing to be employed as Capt. ; Aug. 21.

Lieut. H. Hoad to be Lieut., Grade (A), from Grade (B) ; Aug. 12.

Lieut. R. A. Knott to be Lieut., Grade (B), from (A'Shp.) ; Aug. 18.

The following Sec. Lieuts. are graded for purposes of pay and allowances as Lieuts. whilst employed as Lieuts., Grade (A) :—S. E. Castle ; Dec. 24, 1918. E. O. Brown ; Feb. 1.

Sec. Lieuts. to be Lieuts. :—(Hon. Lieut.) H. Allsehrook ; April 2, 1918 (without pay and allowances prior to June 21, 1918). J. Mytton ; March 27.

Sec. Lieut. E. W. Hootton-Smith relinquishes the grading for purposes of pay and allowances as Lieut. on ceasing to be employed as Lieut. ; Aug. 16.

Maj. S. J. Lacey, O.B.E. (Shipwright Lieut. Comdr., R.N.) relinquishes his commn. on ceasing to be employed ; March 29 (substituted for notification in the *Gazette* of May 6).

(Then follow the names of two officers who are transfd. to the Unemployed List under various dates.)

Physical Training Branch

Lieut. K. S. Hunter (Lieut., Dn. Gds.) resigns his commn. ; Sept. 3.

Medical Branch

Capt. (A./Maj.) A. P. Bowdler to be actg. Lieut.-Col. while so employed ; Aug. 1.

Lieuts. to be Capts. :—H. F. Squire ; June 18. J. J. O'Mullane ; July 15. E. H. L. Le Clezio ; July 29. N. Rumholl ; Aug. 14. V. A. T. Spong ; Aug. 19.

The following Capts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—T. E. Mulvany ; Aug. 13 (substituted for notification in the *Gazette* of Aug. 15). E. H. Hogg ; Aug. 22.

Capt. A. Gleeson (Capt., R.A.M.C.) relinquishes his commn. on account of ill-health contracted on active service ; June 5.

Chaplains' Branch

Rev. H. Beauchamp, M.C. (T./Chaplain to the Forces, 3rd Class, R.A.C.D.), is granted a temp. commn. as Chaplain with the relative rank of Capt. (R.C.) ; July 26.

Memoranda

(Then follow the names of 200 Cadets granted hon. commns. as Sec. Lieuts.

Lieut.-Col. E. H. Griffith, O.B.E. (Maj., (Lieut.-Col.) retd. pay), relinquishes his commn. on ceasing to be employed, and is permitted to retain his rank ; Aug. 19.

Capt. G. S. Ridgway (Lieut., R.N.) relinquishes his commn. on ceasing to to be employed ; July, 1.

Temp. Hon. Lieut. W. Bryson relinquishes his commn. on ceasing to be employed ; April 30.

London Gazette, Sept. 5.

Permanent Commissions.

The notification appearing in *Gazette* of Aug. 1 appointing the following officers to permanent commns., is cancelled :—Lieut.-Col. R. G. Cherry, M.C., Lieut.-Col. W. H. C. Mansfield, D.S.O., Maj. K. R. Binning, M.C. (A.), Maj. R. A. Chalmers, O.B.E., A.F.C. (A.), Maj. G. Henderson (A.), Maj. C. M. Murphy (A.), Maj. H. A. Van Ryneveld, D.S.O., M.C. (A.), Capt. F. E. P. Barrington (A,). Capt. C. Cooper (A.), Capt. R. B. C. M. T. de Prix (S.O.), Capt. E. de C. Hallifax, D.S.O. (A. and S.), Capt. D. R. Hanlon (A.), Capt. G. H. A. Hawkins (S.O.), Capt. F. P. Holliday, D.S.O., M.C. (A.), Capt. H. W. G. Jones, M.C. (A.), Capt. E. L. Oliver, M.C. (A.), Lieut. E. O. L. Bell (Ad.), Lieut. M. A. Benjamin, M.C. (S.O.), Lieut. G. B. Booth (Ad.), Lieut. C. S. Fulton (S.O.), Lieut. G. W. N. R. Haynes (A.), Lieut. C. H. Nohle-Camphell, A.F.C. (A.), Lieut. C. D. Skinner (A.), Lieut. B. S. Wilcox, D.F.C. (A.).

The initials of Lieut. W. J. King are as now described, and not W. J. N., as in the *Gazette* of Aug. 1 ; and his classification is "T," and not "S.O.," as in the *Gazette* of Aug. 1.

The surname of Capt. W. R. D. Acland (A.) is as now described, and not Ackland as in the *Gazette* of Aug. 1.,

The surname of Lieut. C. F. B. Bassil (T.) is as now described, and not Basil, as in the *Gazette* of Aug. 1.

The surname of Capt. E. A. Beaulah (S.O.) is as now described, and not Beulah, as in the *Gazette* of Aug. 1.

The surname of Capt. H. F. Delarue (A. and S.) is as now described, and not Delarne, as in the *Gazette* of Aug. 1.

The surname of Lieut. M. H. Findlay, D.S.C., D.F.C. (A.) is as now described, and not Findley, as in the *Gazette* of Aug. 1.

The surname of Lieut. L. E. M. Gillman (S.O.) is as now described, and not Gilman, as in the *Gazette* of Aug. 1.

The surname of Capt. E. J. Hodsoll (S.) is as now described, and not Hodsell, as in the *Gazette* of Aug. 1.

The surname of Lieut. R. E. Keys, D.F.C. (A.) is as now described, and not Keyes, as in the *Gazette of* Aug. 1.

The initial of Lieut. J. McBain, D.F.C. (A.) is as now described, and not "I.," as in the *Gazette* of Aug. 1.

The initials of Lieut. A. B. Raymond-Barker (A.) are as now described, and not "B.," as in the *Gazette* of Aug. 1.

The initials of Capt. C. S. Richardson M.B.E. (Ad.) are as now described, and not as in the *Gazette* of Aug. 1

The classification of Lieut. D. S. Robertson is "O.," and not "A.," as in the *Gazette* of Aug. 1.

The initials of Maj. R. P. Whitehead (A. and S.) are as now described, and not "R.," as in the *Gazette* of Aug. 1.

The initial of Lieut. J. Whitford (A.) is as now described, and not "I.," as in the *Gazette* of Aug. 1.

The surname of Lieut. A. T. Wynyard-Wright (S.O.) is as now described, and not "Wynward Wright," as in the *Gazette* of Aug. 1.

The surname of Lieut. W. J. Millen (A.) is as now described, and not "Millan," as in the *Gazette* of Aug. 1.

The surname of Lieut. A. G. Peace (A.) is as now described, and not "Pearce," as in the *Gazette* of Aug. 1.

The surname of Maj. E. L. Millar, M.B.E. (A.) is as now described, and not "Miller," as in the *Gazette* of Aug. 1.

The following temp. appt. is made at the Air Ministry :—

Staff Officer, 3rd Class.—(P.).—Flight.-Lieut. G. W. Dobson, O.B.E.; Aug. 31, from S.O. 2, vice Flight-Lieut. H. S. Neville.

The following temp. appt. is made :—

Staff Officer, 3rd Class (Q.).—Flying Officer C. E. Hodgson, M.B.E., from S.O. 2 (Aug. 15).

The surname of Sqdn. Ldr. J. H. Lidderdale is as now described, and not "Liddendale," as stated in the *Gazette* of Sept. 2.

Flying Branch

Sec. Lieuts. to he Lieuts.—H. F. Griffith; (May 8, 1918). P. Segrave (since killed); (Oct. 26, 1918). Hon. Lieut. T. S. Campbell; (Nov. 9, 1918).

The following relinquish their commns. on ceasing to be employed :—Lieut. F. R. McCall, D.S.O., M.C., D.F.C. (Capt., Alberta R.); (June 23). Sec. Lieut. (Hon. Lieut.) G. F. Antell (Lieut., Can. Ord. Corps); (June 30). Sec. Lieut. A. Woolsey (Lieut., Northants R.); (July 16). Sec. Lieut. (Hon. Lieut.) P. W. Fox (Lieut., Brit. Columbia R.); (Aug. 28).

(Then follow the names of 162 officers who are transfd. to the Unemployed List under various dates.)

Lieut.-Col. G. Wellesley, M.C. (G. Gds.), relinquishes his commn. on acct. of ill-health (Sept. 3).

Lieut.-Col. J. E. Tennant, D.S.O., M.C. (Capt., Brev. Maj., Scots Gds.), resigns his commn.; (Sept. 6).

Capt. J. C. L. Barnett, M.C. (Oxf. and Bucks L.I., T.F.), relinquishes his commn. on acct. of ill-health; (Sept. 3).

Lieut. R. T. Percival relinquishes his commn. on acct. of ill-health contracted on active service, and is permitted to retain his rank; (Aug. 23).

Lieut. Lord C. C. Douglas (K.O.S.B.), relinquishes his commn. on acct. of ill-health caused by wounds; (Sept. 4).

The following Lieuts. resign their commns.:—Hon. Capt. F. W. Hartridge (Capt., R.A.S.C.), A. M. Bennett (Lieut., R.W. Surr. R.); (Sept. 6).

The surname of Lieut. T. M. Johns is as now described, and not "Jones," as stated in the *Gazette* of Aug. 8.

The notification in *Gazette*, Feb. 18, concerning Lieut. J. Freman (Lieut., Brit. Col. R.) is cancelled.

The notification in *Gazette*, May 20, concerning Sec. Lieut. A. K. Barter is cancelled. The notification in *Gazette*, June 3, to stand.

The notification in *Gazette*, June 6, concerning Sec. Lieut. J. H. Yalden is cancelled. The notification in *Gazette*, April 29, to stand.

Administrative Branch

Lieut. R. Kane is granted the hon. rank of Capt.; (Sept. 23, 1918).

Sec. Lieut. H. B. Brown to be Lieut.; (Nov. 24, 1918).

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in rank :—C. R. Campbell; (Aug. 24, 1918). W. Simmonds; (Nov. 1, 1918). L. F. Joyner; (April 17).

Sec. Lieut. J. Cameron to be Sec. Lieut., from (A.); (July 15, 1918).

Sec. Lieut. W. Knight to be Sec. Lieut., from (K.B.); (April 17).

(Then follow the names of 30 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. (actg. Capt.) C. W. Probets resigns his commn. and is permitted to retain his rank; (Sept. 4). (Substituted for notification in *Gazette* July 22.)

The notification in *Gazette* Nov. 8, 1918, concerning Sec. Lieut. F. Moss is cancelled.

The notification in *Gazette*, July 18, concerning Sec. Lieut. C. W. Sutcliffe is cancelled.

Technical Branch

Sec. Lieut. (Hon. Lieut.) V. H. Tait to be Lieut., without pay and allces. prior to July 1, 1918; (April 2, 1918) (substituted for the notification in the *Gazette* of Feb. 18).

Sec. Lieut. E. L. M. Emtage to be Lieut.; (July 12, 1918) (substituted for the notifications in the *Gazettes* of Jan. 3 and Aug. 19).

Sec. Lieut. W. J. Scott to be Lieut.; (April 29).

Sec. Lieuts. to be Lieuts. without pay and allces. of that rank :—Hon. Lieut. J. Robertson; (April 2, 1918). A. W. Mansfield; (June 1).

Sec. Lieut. H. B. Brown to be Sec. Lieut., Grade (A.) from (Ad.); (Aug. 17, 1918).

Sec. Lieut. J. L. Irving to be Sec. Lieut. Grade (A.) from (O.); (Jan. 20).

Sec. Lieuts. (Ad.) to be Sec. Lieuts., Grade (B) :—J. E. Neary; (Feb. 20). W. Hawksworth; (May 30).

Pilot Offr. J. S. Ferguson to be Pilot Offr., Grade (B) from (Ad.); (Aug. 6).

Sec. Lieut. F. C. Rayson to be Sec. Lieut., Grade (B) from (A'ship); (July 17).

(Then follow the names of 31 officers who are transfd. to the Unemployed List under various dates.)

The initials of Capt. R. P. J. McCoy are as now described, and not "R. P. T." as stated in *Gazette*, Aug. 22.

The surname of Capt. A. A. Bryce-Buchanan is as now described, and not "Bryce-Burdon," as stated in *Gazette* April 1.

The notification in *Gazette* May 23 concerning Sec. Lieut. R. E. Pudney is cancelled.

The notification in *Gazette* June 3 concerning Sec. Lieut. (Hon. Capt.) E. R. Loder is cancelled.

Medical Branch

Temp. Capt. A. E. Panter is granted the actg. rank of Maj. whilst specially empld.; (Aug. 1).

Flying Offr. G. Hughes is transfd. to the Unempld. List (Aug. 13).;

The initial of Capt. O. Gleeson (Capt., R.A.M.C.) is as now described, and not "A.," as stated in *Gazette* Sept. 2.

Dental Branch

T. H. Jones is granted a temp. commn, as Flying Offr.; (Aug. 30).

Lieut. G. H. W. Randall is transfd. to the Unempld. List; (April 2).

Chaplains' Branch

Rev. M. J. Dunne (late temp. Chapln. to the Forces, 4th Cl., R.A.C.D.) is granted a temp. commn. as Chapln. with the relative rank of Capt. (Roman Catholic); (Aug. 2).

Asst. Principal Chapln. (Wesleyan).—The Rev. A. S. Bishop is granted a temp. commn. as Chapln. with the relative rank of Capt.; (April 26, seny. Jan 1), and is granted the relative rank of Maj. whilst empld. as Asst. Principal Chapln. (Wesleyan).

Memoranda

Then follow the names of three Overseas Cadets granted temp. commns. as Sec. Lieuts., and 169 Cadets granted hon. commns. as Sec. Lieuts.

Lieut.-Col. (actg. Brig.Gen.) C. C. Marindin, C.B.E., D.S.O. (Maj. (Bt. Lieut.-Col.), R.G.A.), relinquishes his commn. on ceasing to be empld.; (Sept. 1).

(Then follow the names of 16 officers who are transfd. to the Unemployed List under various dates.)

* * *

New France-Morocco Line

AFTER trying for two years, the "Compagnie Francaise France-Maroc," has secured permission to run an air service between France and Morocco via Spain, the Spanish Government having withdrawn its main objections.

The first machine of the intended regular service left Toulouse on September 1, and reached Barcelona (150 miles) in 105 mins. From Barcelona the aeroplane flew to Alicante (270 miles), where the mails were transferred to another machine for conveyance across the Mediterranean to Casablanca, on the west coast of Morocco (550 miles).

There will be branch lines to Rabat (also on the Atlantic coast of Morocco), and to Oran in Algeria.

Passengers or mails will leave Paris by the night train for Toulouse, and proceed thence by aeroplane, reaching Rabat in about 16 hours' flying from Toulouse, thus bringing Rabat within two days' journey of Paris.

Fast Flying in France

IN a successful attempt to win the Coupe H. Deutsch on September 2, Sadi Lecointe, on a Spad-Herbemont, fitted with a 300 h.p. Hispano motor, succeeded in completing the 200 km. (125 miles) course in 48 min. 8 secs., his average speed working out to 249'307 km. (155¾ miles) per hour. The start was from St. Germain, and the course was over Senlis, Meaux and Melun.

It may be recalled that one of the conditions of this competition is that to secure the cup a competitor must improve on the previous winner's speed by at least 10 per cent. The previous holder was Eugene Gilbert, whose speed, on a Deperdussin, was 175 km. per hour. To take the cup from Lecointe, the next contestant must attain an average speed of 274.23 km. per hour.

Aerial Services in Germany

ACCORDING to the *Kreuz Zeitung*, the Prussian Ministry of Trade has sanctioned the formation of a limited liability company for air traffic in Frankfort-on-the-Main, with a share capital of 15,000,000 marks (nominally £750,000). The company will begin with a post and passenger service of some 200 aeroplanes, which will fly between Cologne and Frankfort, Stuttgart, Basel, Berlin, Breslau, and Hamburg.

That Zeppelin Story

From a statement published in the *Tägliche Rundschau* it appears that the report that German airships had been destroyed by their crews is not correct.

Not only is it stated that there was no wilful destruction of the seven airships, but it is pointed out that this was not possible, if only for the reason that in accordance with the Armistice terms all airships and aeroplanes had to be dismantled (*Abgerüstet*).

A German Giant

WHAT is claimed to be the largest aeroplane in the world, manufactured by the Aviatik works of Leipzig, has just carried out its first flights, according to a message from Berlin. The dimensions of the machine are approximately 130 ft. in span, 73 ft. in length, and 20 ft. in height. It is fitted with two 500 h.p. and two 250 h.p. Benz engines, and is capable of carrying, besides the commander, two navigators, two mechanics, one steward, and 18 passengers with luggage.

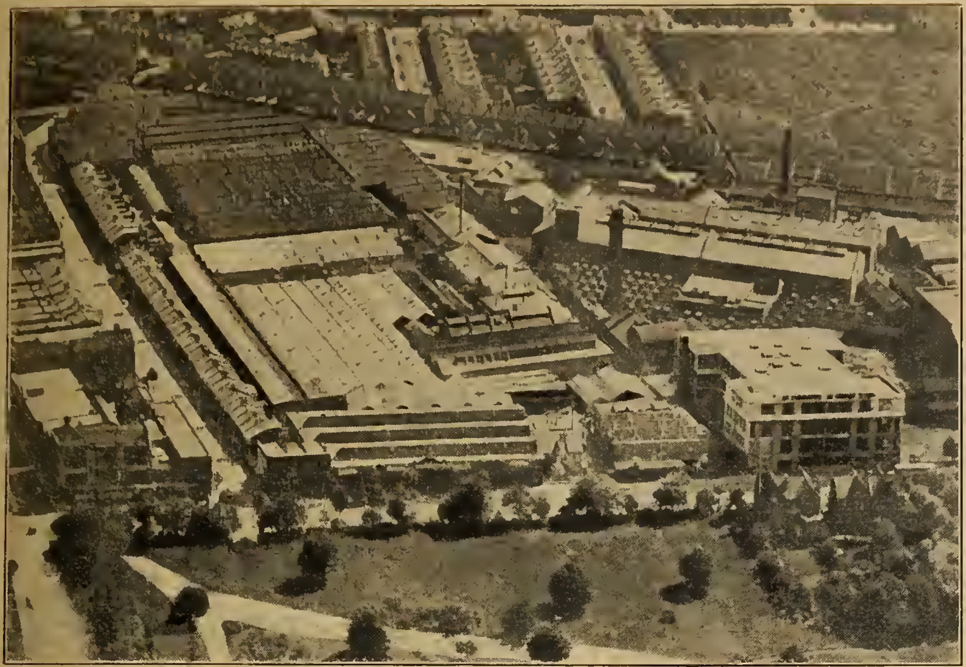
Aeroplanes for Forest Patrols

THE effective work which can be done by aeroplane patrols in promptly detecting forest fires, has been demonstrated in California. During the six weeks ended August 2, the patrols organised for this purpose from the flying stations at Sacramento, Alessandro and San Diego, discovered 56 fires, which owing to their being promptly reported and dealt with, caused only nominal damage. The patrols made 373 flights, the aggregate distance covered being 45,376 miles.

Glidden Trophy for Aerial Touring

WITH a view to encouraging the production and development of flying machines for touring and commercial purposes, Mr. Chas. J. Glidden has offered to the Aerial League of America a trophy which is to be competed for under somewhat similar rules to those which governed the award of the Glidden Trophy in motor-car competitions some ten years ago. The rules are now being drawn up, and the competition will take the form of a reliability and efficiency trial.

SIDE-WINDS



The Napier Works at Acton, snapped from Capt. Gathergood's Airco (De H. 9), with 450 h.p. Napier Aero Engine.

To their range of mascots Messrs. S. Smith and Sons (M.A.), Ltd., have recently added one of "Old Bill," Capt. Bairnsfather's embodiment of that cheery, never-say-die spirit of the British fighting man. Strongly made, beautifully chased and finished old bronze. "Old Bill" can be had at £3 3*s*. a time. Each mascot bears the signature of Capt. Bruce Bairnsfather. Orders can be sent to 179-185, Gt. Portland Street, or any one of the Smiths' depôts.

- - -

An opportunity for aircraft firms and others to replenish their stock of fittings, etc., occurs in connection with the sale of the assets of the Motor and Aircraft Supplies Co., Ltd. As set forth in an announcement elsewhere, the liquidators are desirous of disposing of all the remaining stock, both at Long Acre and also at the works, as quickly as possible. It is a comprehensive stock, and apart from the supplies which are of interest to the aircraft industry, there are many items which could be utilised in other trades. With the past reputation of Ascol House, there should be no doubt as to the workmanship and quality of the goods, most of which were, prior to the Armistice, passed by the A.I.D. to meet the ready demand of contractors all over the country, who were requiring deliveries, ex stock, without going through full formalities and routine. Full particulars of the stock can be obtained from 125, Long Acre.

- - -

We have received from Mr. Charles Longley, M.P.S., chemist, formerly Senior Dispenser at the Apothecaries' Hall, Blackfriars, E.C., a tin of menthol and cinnamon lung and throat pastilles for motorists, airmen, industrial workers, and all engaged in dust-laden air, due to road transport or mechanical operations, atmospheres charged with obnoxious gases, or rapid changes of temperature. We understand that Mr. Longley, whose headquarters are at 52, Ivanhoe Road, London, S.E.5, is the original maker of menthol and cinnamon pastilles, and the price is 1*s*. per box.

- - -

Of great interest as proving the period of serviceability of a properly-constructed aeroplane, and incidentally one of the most noteworthy tributes to the unrivalled position of British design and construction, has been brought to the notice of visitors to the Amsterdam Aeronautical Exhibition. In a near-by aerodrome is a "Bristol" fighter, delivered by the constructors in September, 1917. It was immediately put into commission under active service conditions, and after doing considerable work in this direction, unfortunately landed in Holland. The pilot was naturally interned, and the machine was soon after bought by the Dutch Government. Though it has been continuously flown by Dutch officers it has never been repaired or renovated in any way, and every unit is exactly as when it left the "Bristol" works. Even the "Cellon" dope has never been renewed. The machine is still in service, and in great favour with the Dutch pilots.

AT THE AMSTERDAM EXHIBITION.
Two views of the stand of the British Emaillite Co., and the General Aeronautical Co., on which a comprehensive range of products of these firms are displayed.

CORRESPONDENCE

STUNT FLYING AND THE COMMERCIAL PILOT

[ ] I consider that a pilot who has never stunted at all, but has managed to come through unscathed, after, say, two years flying on heavy machines, is certainly qualified to act as a commercial pilot. If he has managed to combat the elements and other countless obstructions, such as engine failure low down, buildings, etc., for two years or more, if he has got himself out of the many tight corners he is bound to have been in, then, in my opinion, at the critical moment, he could certainly protect his passengers as well as the finest stunt pilot in existence.

S. Dixon,
late R.N.A.S., R.A.F.

Newcastle-on-Tyne.
September 5.

* * * *

IMPORTS AND EXPORTS, 1918-1919.

Aeroplanes, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "Flight" for January 25, 1912; for 1912 and 1913, see "Flight" for January 17, 1914; for 1914, see "Flight" for January 15, 1915; for 1915, see "Flight" for January 13, 1916; for 1916. see "Flight" for January 11, 1917; for 1917, see "Flight" for January 24, 1918; and for 1918, see "Flight" for January 16, 1919.

	Imports.		Exports.		Re-Exportation	
	1918.	1919.	1918.	1919.	1918.	1919.
	£	£	£	£	£	£
January ...	49,402	555,989	24,765	57,571	—	—
February	51,941	453,822	13,545	57,972	—	—
March ...	47,930	704,424	11,451	72,716	1,000	400
April ...	33,342	97,662	10,815	25,433	—	—
May ...	942,866	136,631	67,224	38,428	—	—
June ...	864,296	1,410	35,658	41,526	—	—
August	566,137	67,292	71,503	60,581	—	—
	4,390,207	2,153,693	245,761	395,517	1,000	400

* * * *

NEW COMPANY REGISTERED

BEARDMORE MOTORS, LTD.—Capital £100,000, in £1 shares. Acquiring the business carried on by Aidee Motor and Engineering Co., Ltd., manufacturers of, and dealers in, motor cars, aero engines, aeroplanes, etc. First directors: Sir Wm. Beardmore, Bt., J. G. Girdwood, F. M. Luther and G. H. Allsworth. The two first-named are nominees of William Beardmore and Co., Ltd., and the two last-named are nominees of the Aidee Motor and Engineering Co., Ltd. Solicitors: Nicholson, Graham and Jones, 24, Coleman Street, E.C.

* * * *

A Double Fatality near Lincoln

When two machines were returning from overseas to the aerodrome, between Sleaford and Lincoln, on September 5, owing to darkness setting in the pilots decided to land. The first machine came down safely, but the other, at a height of about 80 ft., suddenly nose-dived and crashed to the ground, killing both occupants instantly and smashing the machine beyond recognition. At the inquest on Lieut. W. E. Coulson and Engineer J. R. Taylor, both belonging to the 11th Squadron, on Saturday afternoon, a verdict of accidental death was returned.

Air Services in Argentina

Word comes from Buenos Ayres that an Anglo-Argentine aviation company has been formed, at the head of which is Major S. G. Kingsley, R.A.F., of the Aircraft Manufacturing Co., who has recently been making some record flights on a Airco (De H) aeroplane. Major Kingsley states that he expects aeroplanes will become a common sight throughout South America.

Frightening the Ex-Kaiser

I learn from Amerongen that at 11 o'clock this morning an aeroplane appeared above Château Bentinck at Amerongen while the ex-Kaiser was walking in the gardens, writes *The Times* correspondent at Amsterdam, on September 1. The airman made a steep descent till he was 60 ft. above the ex-Kaiser's head.

The ex-Kaiser made a nervous movement of surprise and then fled. The airman, who was probably a Dutch airman, turned round and disappeared in a westerly direction.

From Prague to Paris.

Starting from Prague on a Breguet machine, Lieut. Story and Lieut. Blizence, of the Czecho-Slovak Aviation Service flew to Mayence, where they stayed for the night. The following morning they flew on to France, landing at Le Bourget 3¾ hours after leaving Mayence.

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl.=cylinder; I.C.=internal combustion; m.=motors.

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published September 11, 1919

12,980. Leyland Motors and J. G. P. Thomas. Electric starting and ignition of aeroplane engines. (131,005.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published September 11, 1919

5,012. D. J. Mooney. Metal spars, girders, longerons, etc. (131,019.)
5,247. E. R. Calthrop. Parachutes. (131,027.)
5,471. Nieuport and General Aircraft Co., H. L. Hall and C. A. Sharp. Application of dope to aircraft surfaces. (131,035.)
5,642. A. Q. Cooper. Aircraft control. (131,043.)
5,679. H. O. Short. Aeroplanes having multiple or twin engines. (131,044.)
5,680. H. O. Short. Hydro-aeroplanes. (131,045.)
5,709. S. O. Cowper-Coles. Door for aircraft sheds. (131,046.)
5,710. S. O. Comper-Coles. Process for rendering aluminium and its alloys more durable. (131,047.)
5,711. S. O. Cowper-Coles. Metallic propellers. (131,048.)
6,206. D. J. Mooney. Spars for aircraft. (131,065.)
6,359 and 6,360. R. F. Power. Brakes for aircraft. (131,068 and 131,069.)
6,455. J. F. Verner. Aeroplane controls. (131,071.)
6,533. Vickers, Ltd., Sir J. McKechnie and B. N. Wallis. Mooring of lighter-than-air craft. (131,072.)
6,766. L. Janoir. Flying-boats or water-planes. (131,075.)
6,898. D. J. Mooney. Metal spars. (131,080.)
6,907. K. D. Doyle. Apparatus for teaching bomb-dropping. (131,081.)
6,909. D. M. Sutherland and Wall Paper Manufacturers, Ltd. Varnishes or dopes for aircraft fabrics. (131,082.)
7,177. S. E. Groves and T. W. H. Ward. Dopes or varnishes. (131,093.)
8,101. W. Green. Indicating strains produced in bracing-wires, etc. (131,099.)
8,659. R. Allen. Gun mountings for aeroplanes. (131,101.)
12,947. T. P. Leaman. Control of aeroplanes. (131,121.)
13,066. T. W. Saxton. Inclination or deviation indicator. (131,133.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published September 11, 1919

1,435. J. H. Delattre. Wheels for aeroplanes, etc. (122,644.)
8,197. A. G. Leigh. Aeroplanes. (131,252.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlvii, xlviii, xlix and l)

NOTICE TO ADVERTISERS.

In order that "Flight" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates*:—

United Kingdom.	s.	d.	Abroad.	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 " " ..	14	1	6 " " ..	16	6
12 " " ..	28	2	12 " " ..	33	0

These rates are subject to any alteration found necessary under war conditions.

Cheques and Post Office Orders should be made payable to the Proprietors of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "Flight" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 560 (No. 38, Vol. XI.) SEPTEMBER 18, 1919 [**Weekly. Price 6d. Post Free, 7d.**

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**

These rates are subject to any alteration found necessary under war conditions

*European subscriptions must be remitted in British currency.

CONTENTS

Editorial Comment: PAGE
- The Government and Civil Aviation .. 1239
- The Ministry of Transport and Civil Aviation .. 1240
- The Navy and the Air .. 1240
- Some Lessons from the Schneider "Race" .. 1242

Flight—and the Men: Lieut.-Col. Frank McClean .. 1241
A Sopwith Triplane Double Event .. 1243
Schneider Cup Contest .. 1244
Commercial Air Transport .. 1254
The Dornier Machine .. 1258
Airships .. 1259
Airisms .. 1263
Personals .. 1265
Royal Air Force .. 1266
Resettlement .. 1268

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Sept. 26 ...	**No. 40 Squadron R.A.F. Dinner.**
Oct. 5 ...	**Aviation Meeting at Barcelona.**
Nov. ...	**Entrance Examination for R.A.F. College.**
Dec. 19 to... Jan. 4, 1920.	**Paris Aero Show.**

EDITORIAL COMMENT

The Government and Civil Aviation

THERE is reason to think that the Government as a whole and the Air Ministry in particular are suffering at the moment from infirmity of purpose. The word has gone forth that there is to be inaugurated an era of ruthless economy and that Estimates are to be cut down to a shadow of their War-time dimensions. Apparently the Ministry has been taken by surprise, and is hard put to it to know where to begin. Those responsible for its policy appear to have maintained the impression that the R.A.F. was to keep something approximating its war establishment in readiness for another great conflict, and it has only just dawned upon them that we have but lately emerged from the greatest war in history which was waged to end war. If that is a correct interpretation of the intentions which led us to make that War, then it should logically follow that to visualise a military air arm approximating in strength to that existing at the time of the Armistice, is an obvious error into which no responsible person should have fallen. However, that need not be further discussed now. The point at issue is of what is to happen to aviation at large and of what exactly is to be the policy of the Government in regard to it.

Two or three weeks ago we pointed out that if commercial aviation is developed along the right lines there is no need for us to maintain more than a practical nucleus of a military air force, since by a well-thought-out scheme of a Flying Reserve, attractive enough to bring in all the desirable civilian pilots, we should have all the *personnel* necessary for defence in case of a sudden outbreak of war. All we should need in the shape of an active force would be the limited number of squadrons necessary as a complement to the expeditionary force which must be maintained for the purposes of the "little wars," in which a far-flung Empire like our own must almost always be engaged, with the necessary complement of aircraft for the use of the peace-time Navy. If that is adopted as the basis of the aerial defence scheme, it follows that there will be an enormous saving on the Air Estimates and a consequent economy to the nation. But economy to be real economy must not be too ruthless. There is such a thing as being penny wise and pound foolish. Commercial aviation must be considered. Not only is it essential to the scheme of defence we have outlined, but it is bound to play an enormously important part in transport development. In that development this country must take its full share. It cannot afford to do otherwise, but to do it we must recognise that in the initial stages a large amount of State encouragement must be forthcoming. Therefore, the Government and the Ministry must make up their minds that the next Air Estimates must show a considerable drop in the sums required for the military branch, and a corresponding increase in those to be allocated to civil aviation. Nor need the public be startled at such a pronouncement. Whatever sums are allocated to civil aviation, there is more than the possibility that before long a substantial revenue will accrue. In this connection it may be remarked that the aeronautical correspondent of the *Observer* quotes an interesting calculation by a sound authority, based, it is said, upon good information. As a matter of fact, we have good reasons for believing that the source is an official one and that the information is indeed based upon the best data existent. What the authority in question says is this :—

"The maximum number of miles flown during one year of war was 245,000,000, and the average load carried during this time was not more than one-twentieth of a ton. The average number, therefore, of ton miles per year of war amounts to 13,000,000. The Empire's mail matter carried more than a distance of 500 miles in one year probably amounts to 10,000 tons. The ton miles per year therefore amount to 5,000,000. Taking the probability of war as occurring once in fifty years, we get comparative figures for military and civil aviation in the future as follows :—

"Military Flying.—260,000 ton miles per year.

"Civil Aviation, State Mail.—5,000,000 ton miles per year.

"It will therefore be seen that civil flying, by which is meant the carriage of the Empire's mails, represents twenty times the ton mileage of military aviation. From this conclusion the general trend of air policy may be foreseen : the organisation should provide for State mail service as compared to military service in a proportion of roughly 20 to 1. From this it follows obviously and definitely that the whole organisation should be mainly a civil one."

Assuming the correctness of the figures—and we believe them to be so—the argument set forth in the concluding paragraph, viz., that the whole organisation of the Air Ministry should be mainly a civil one, is irresistible.

◆ ◆ ◆

The Ministry of Transport and Civil Aviation The oft-repeated statement that the Ministry of Transport is to take over the care of civil aviation has been going the rounds again, but has met with a somewhat qualified official denial. Asked as to the accuracy or otherwise of the rumour, a high official of the Ministry stated that nothing was known of it, and added : "Even if the rumour were true, the transfer could not be carried out unless an Act of Parliament were passed." We do not think there would be any particular difficulty in getting such an Act through the present Parliament. The Government need only threaten to resign and they could get any sort of Act they liked through both Houses ! That, however, is not the point. We do not like these constantly recurring rumours about the control of aviation, and still less do we like the prospect, however remote, of its passing into the hands of the Transport Ministry, which already has enough to do to keep it quite busy for a very long time to come. Nor has aviation developed so far yet that it can take its place alongside other means of transport and be subjected to the same species of routine regulation. It still requires to be nurtured and fostered through a trying time, and that can obviously be better done by the Air Ministry which, with all its faults, at least consists of men who know the subject, who have given considerable time and thought to the problems besetting the future, and who believe in the possibilities which lie ahead. To take it away from them and place it in the hands of Sir Eric Geddes and his men, who know nothing at all about aviation or its needs, and who would be entirely out of sympathy with its aims, would be absolutely fatal to its future. It is one of the things which cannot be done, even in the sacred name of "economy."

◆ ◆ ◆

The Navy and the Air It is becoming increasingly clear that the higher naval thought is unable to take kindly to the idea of an Air Service over which the Admiralty has no administrative control. The latest to enter the lists in favour of the reversion of control of naval air units to the sea command is Rear-Admiral Adair, who sets forth his views in a long letter to the *Morning Post*. We need not follow his arguments right through, particularly as he advances no new reasons for the change he advocates. He gives his case away, as we think, when he says that "every Air Force officer who has performed both naval and military work in the late War knows how different they are and what peculiar knowledge is essential to each."

Admitted that he is attempting to prove that work in the air in conjunction with the Fleet is so highly specialised that it can only be performed by the officer who has received a naval training, it would be equally true to predicate that every naval officer who has performed both naval and Air Force work in the late War knows how different they are and what peculiar knowledge is essential to each ! The answer to all such arguments as Admiral Adair brings to bear on the subject is that the system of control of the Air Services by the Admiralty and the War Office was given a thorough trial during the War and failed egregiously. It was not until we got a completely separate Air Force that we gained command of the air and kept it. As nothing succeeds like success, it must be conceded that the present system has stood the test and been proved to be in advance of the other.

Admiral Adair also brings to bear the argument that a separate Air Force is unsound economically, since it means the existence of a superfluous spending department of State. With all submission we regard this as a shallow reason. If that were all, why not group the whole of the fighting Services under a single Board and wipe out the rest ? As to who or what should control the Services, we might suggest that the Board of Admiralty and the Army Council should meet and decide the point by tossing for it ! Presumably the administrative cost of each is about the same so that, economically, it would not matter which won. The country would save money in either case. Whether the idea of the Navy being administered by the Army Council would appeal to the gallant Admiral is another matter. No doubt he would say it is impossible, owing to the difference of work and training, and the peculiar knowledge essential to each ! And therein we should agree, as would every sensible person with more than a superficial knowledge of these matters. It seems to us that those who are agitating for the return of the Air Services to War Office and Admiralty control have yet to grasp the fundamental fact that war in the air is as highly specialised as either sea or land warfare. Even the lessons of the War do not seem to have adequately driven it home, and until it is appreciated we shall always have with us the demand for a return to conditions which were proved by the War to be utterly wrong. Fortunately, there is no discernible intent on the part of the Government to revert to the bad old conditions, but a careful watch will have to be kept on events if the reactionaries are not ultimately to gain their desires.

Flight—And the Men

"Flight" Copyright.

Lieutenant-Colonel FRANK K. McCLEAN, a prominent member of the Royal Aero Club Committee, who did valuable work in the R.N.A.S. and later in the R.A.F.

Some Lessons from the Schneider "Race"

L'affaire Schneider of September 10 has not, after all, taught us much. Had the race been run in proper fashion there would at least have been some concrete proof of speeds attainable with modern seaplanes and flying boats. As it is, there are no official figures available of the speeds actually attained by the different machines. That great increases have been made since the last Schneider Cup Race in 1914 was obvious to all who saw last Wednesday's event and who had the opportunity of seeing the 1914 racers. When, however, it comes down to hard figures and facts, these are absent. The only machine which was timed at all was the Savoia flying boat, which did the laps in somewhere in the neighbourhood of 10 minutes. As the course was approximately 20 sea miles—or about 23 land miles—the speed would work out at close on 140 m.p.h., which is very fast for a machine of the flying boat type, fitted with an engine of 250 h.p. Since, however, the Savoia was not seen from the mark boat, it is really impossible to state what was her actual speed. If the view advanced from one quarter—that the Savoia flew wide so as to make sure of rounding the boat—is the correct one, then her speed would work out at considerably more than 140 m.p.h. If, on the other hand, the opposite view—that she rounded the wrong boat—is taken as being correct, then, according to whether this second boat was nearer or farther away from the starting point, the speed works out at more or less, respectively, than the 140 m.p.h. So, not even in this single instance have we the satisfaction of having reliable figures of the speed actually attained.

In the case of some of the other competitors the only figures we have are those of the speeds indicated on the respective air speed indicators. Thus, the Sopwith Seaplane has reached an indicated level speed of 165 m.p.h.,, while the Supermarine "Sea Lion" has done close on 140 m.p.h., indicated. As the Sopwith was patently the fastest machine at Bournemouth, she may be taken as representing the high water mark of seaplane speed. As to the rest, it would be merely guess work to attempt to arrive at their speeds. Without being very wide of the mark it may, however, be assumed that with machines now in existence the seaplane type is capable of a speed of somewhere about 160 to 165 m.p.h., while the flying boat type can be assumed with fair certainty to be capable of 140 m.p.h. Both these figures show an enormous increase on any hitherto obtained, and as pure speed figures may therefore be considered eminently satisfactory.

When, however, the question arises of the utility of such speeds, last Wednesday s events tell a rather different story. Out of the four seaplanes that actually turned up at Bournemouth two were unable to start on account of their floats having sprung a leak, while a third, also with leaky floats, did start, although it landed again. It should be pointed out that its landing was *not* necessitated by the leaky floats, however, but by the fog. It is quite evident that at present it is not possible to attain these high speeds while at the same time retaining the seaplane as a seaworthy craft. A race like the Scheidner tends to produce, indeed is intended to produce, speed machines pure and simple, although the two alightings asked for in the first lap form in some measure a check on the speeds by insisting that the machines must at any rate be sufficiently far removed from the freak to be able to alight twice during the race. Now, the 10th of September brought an absolutely calm sea at Bournemouth, and if, in spite of this, three competitors of the seaplane type had float troubles, this is rather an indication that the makers had cut the limits too fine, leaving no margin whatever for a rough sea.

On the other hand, the flying boats did well, as one would expect them to do, in such a calm sea. We are not taking into account the damage caused to the hull of the Supermarine boat through striking an object on the water. No hull structure at present known to man, and light enough to be lifted into the air, would stand up to hitting a solid object while travelling at 80 m.p.h. or so. Up till that time, however, neither of the two flying boats had had any trouble from leaks. It therefore looks as if, for seaworthiness, the boat is the better type, especially since it has been demonstrated that it can be made quite reasonably fast, although possibly not quite so fast as the seaplane type.

* * * *

An Adventurous Voyage

Setting out from Hounslow on September 6 on a visit by air to Italy, with a view to arranging a settlement of certain outstanding points regarding civil aerial communication, Lieut.-Col. W. D. Beatty and Lieut.-Col. W. O. Raikes had an exciting termination to their trip. Their machine, a Bristol fighter adapted for commercial use, dropped its propeller about 50 miles from Rome, but they made an excellent landing in the middle of the Campagna, north of Civita Vecchia.

The machine left London at 11.30 a.m., reached Lyons at 5.50 p.m.. Starting again at 6.30 a.m. on the following day, it was at Fréjus at 8.50, and arrived at Pisa at 1.50, leaving again at 3.15.

After the machine had been anchored out all night and while awaiting the arrival of a car from Rome one of those sudden and rapid fires common after the drought of summer swept over the Campagna and caught and destroyed the machine.

Launch of H.M.S. "Hermes"

The aeroplane-carrier, *Hermes*, was launched from the yard of Messrs. Sir W. G. Armstrong, Whitworth & Co., Ltd., on the Tyne on the 11th inst., but it is stated that she will not be proceeded with at present.

The *Hermes* has a length of 548 ft. and 70 ft. beam, with a displacement of 10,950 tons and a speed of 26 knots. The whole length of the flying deck of the *Hermes* will be available for starting and landing the planes, the funnels being arranged horizontally.

The armament of the *Hermes* will consist of a number of light guns for anti-aircraft protection and several 6-in. guns for heavier work.

FLIGHT "MILESTONES" IN AMERICAN NEWSPAPERS

Our "Milestones" are being reproduced in American aeronautical publications without a single word of acknowledgment. We would say that these greatly lose the value of the originals in Flight, as our scale drawings, prepared at great trouble and expense, are ALL of uniform scale, relatively to one another, whereas the copyists reproduce from our drawings at any old size, so that direct comparison is impossible. We issue this note of warning, as, irrespective of the discourtesy, if nothing worse, of annexing without acknowledgment the result of the work of Flight's technical staff, those to whom this series appeals, should understand they are unable through foreign publications to appreciate the full value which attaches to the original Flight series..—Ed.

By J. McGilchrist.

A SOPWITH TRIPLANE ON THE WAY FOR A DOUBLE EVENT.

Schneider Cup Contest

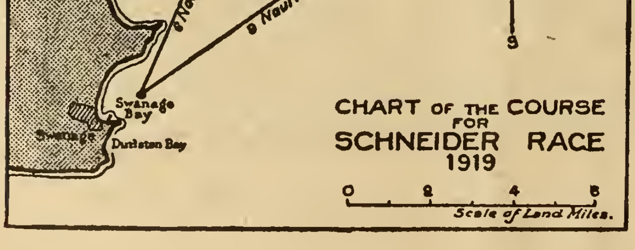
"Flight" Copyright

Note the Fairey, the Spad and Nieuport machines on the beach.

[It cannot be said that the Schneider "Race" at Bournemouth on September 10th was a success. In fact, in modern slang, it would undoubtedly be termed a "wash-out." The general public, gathered at Bournemouth in tens of thousands, will unfortunately take the results as proof of unreliability on the part of seaplanes and flying boats. And it can scarcely be blamed for such a view, not realising that the Schneider Race is purely a speed contest, to stand a chance in which competing machines must sacrifice other qualities. In view of the importance to the British Empire of a successful development of the seaplane or flying boat, such a result is to be deplored, and as the same holds true to a great extent in other countries, it is a question whether it is not time that the rules were reconsidered. Quite apart from this side of the question, however, and taking the rules as they stand at present, this year's contest was a much greater fiasco than it need have been, even making allowances for the unfavourable weather conditions. With proper management, and in spite of, or perhaps on account of, the number of officials engaged in "organising" the race, the management was anything but satisfactory, there need certainly not have been the confusion and uncertainty which was the main feature of the day. We need not here go into details. Our special commissioner refers to some of the criticisms levelled by general opinion at various happenings during the day. And elsewhere we publish specific instances from people concerned in the race. Numerous as were the sins of omission which were alleged during the day, it was, we think, a sin of commission which formed the chief count against the organisers, namely, that of ever allowing the race to start with the weather as it was.—Ed.]

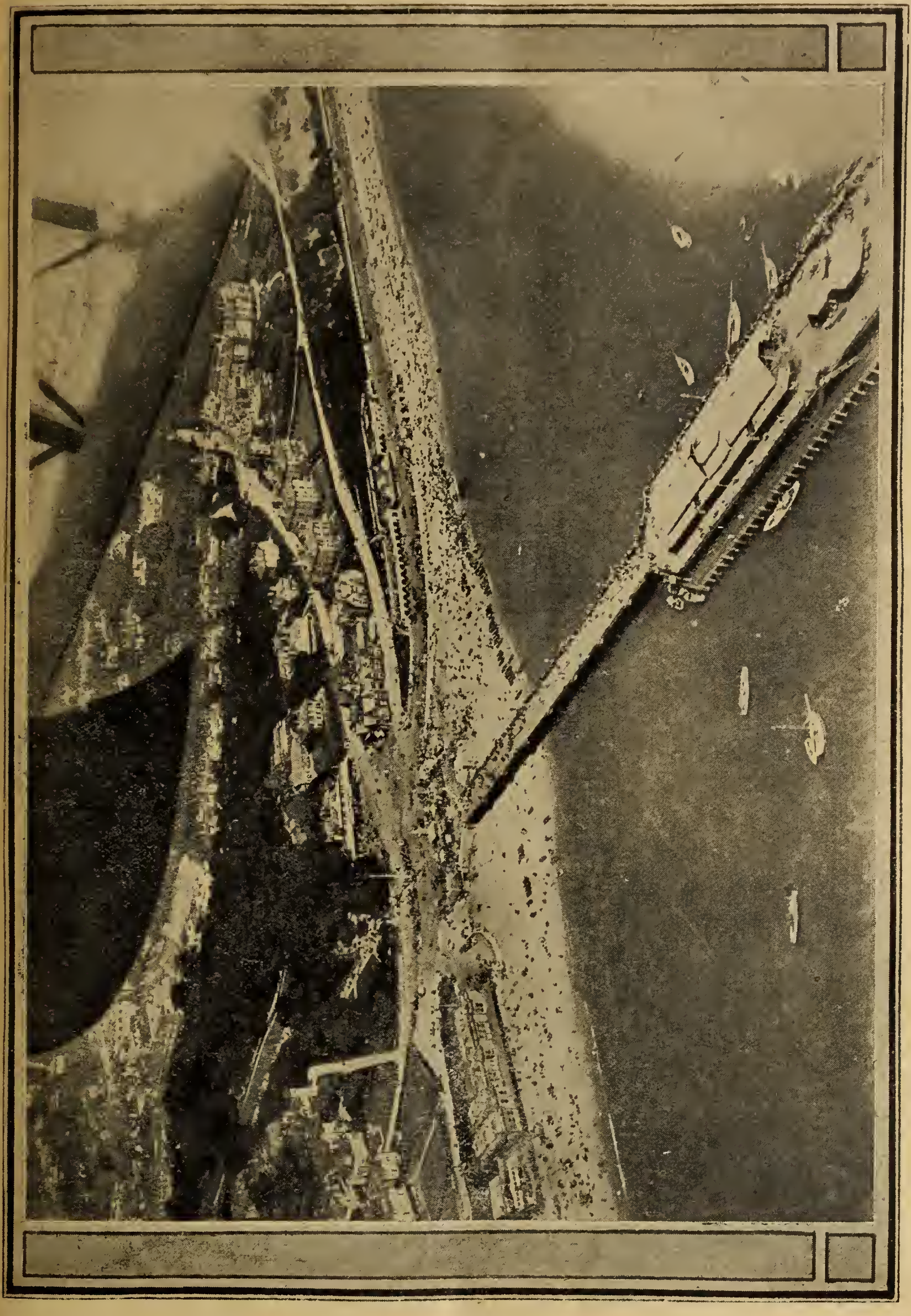
BY OUR SPECIAL COMMISSIONER.

Bournemouth, September 10th, 1919.—The mist is hanging low over the cliffs and sea. From the platform above the lifts at the foot of Meyrick Road no trace is to be seen of the Pier. One knows it to be somewhere off on the right, but it is obscured by the mist. From seawards a band is heard faintly, but it is impossible to determine exactly from which direction the sound comes. However, the lift attendant volunteers the information that it comes from a couple of warships lying at anchor about a mile and a half out to sea. The beach is deserted. The good people of Bournemouth are late risers, and certainly one does not feel inclined to blame them to-day. The fog-enveloped beach does not look particularly inviting. Near the foot of the Pier, the watermen are scrubbing their boats and getting ready for another day's holiday-making crowd. They express the opinion that the fog will lift towards mid-day, and towards 11 o'clock this optimistic view begins to be justified. The warships at anchor are seen faintly through the mist, as is also Boscombe Pier. Gradually, a very slight breeze springs up, and in a surprisingly short time it is possible to see several miles out to sea, while towards the East, Hengistbury Head becomes faintly visible. As this is to be one of the turning-points in the race, one begins to hope that perhaps the fog will clear after all. There is still no sign of Handfast Point and the "Old Harry" rocks, past which the second mark boat is to be moored in Swanage Bay.



We have a walk out on the Pier to see what arrangements have been made for the coming contest. A few rows of seats, which are not usually found here, have been placed on the pier head, and slightly on one side is a large scoring board on which later the times for the 10 laps are to be chalked up. The Pier is gradually filling up with the ordinary seaside visitors, who have come out to promenade up and down to the strains of a band playing in the Pier Pavilion. Craft of all descriptions are lying at anchor on both sides of the Pier. There are fast motor boats from Southampton, among which one recognises "Tiddleywinks," which is to act as tender to the Supermarine flying boat, graceful yachts out of Poole Harbour, fishing smacks from Swanage which have taken a day off to come and see the seaplane race, and innumerable rowing boats, local and otherwise. The tenders and steam pinnaces from the warships run to and fro, fetching mail and carrying visitors. A few M.L.'s flying the White Ensign are cruising round, serving as a reminder of the late War and its submarine hunts. Later in the day they will assist in policing the course and lend a hand in any odd job connected with the race.

Just after 11 o'clock the sound of an aero engine is heard, and everybody is agog, expecting the approaching machine to be one of the racers. Suddenly it is seen approaching from the East. It is a flying boat, but looks too large and too slow to be one of the competitors. As it comes nearer it can be identified as one of the Supermarine passenger carriers, which are now so familiar to Bournemouth visitors. It alights between the two piers and comes taxying up to a buoy near "Tiddleywinks." In addition to its pilot, the Supermarine carries Mr. Scott-Paine and two of his associates from the Supermarine Works. Mr. Scott-Paine goes on board "Tiddleywinks" to see that everything is in order for her coming duty as tender to the flying-boat racer, and the passenger carrier fills up again to get in a couple of hours of "flipping" before the race. Yachts and motor-boats continue to arrive, among them the T.S.Y. *Ombra*, which has been loaned to the Royal Aero Club, and will mark the starting and finishing point. The weather is now fairly clear, both Hengistbury Head and "Old Harry" being visible. Just



"Flight" Copyright

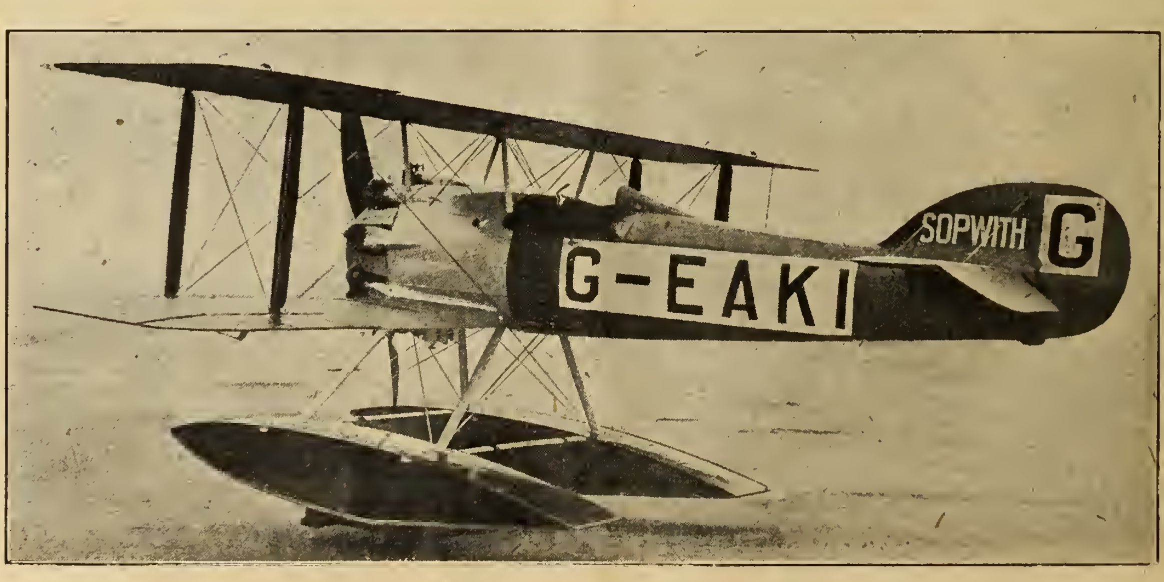
ABOVE THE STARTING POINT FOR THE SCHNEIDER CUP: Bournemouth pier snapped from a Supermarine flying-boat on the morning of the race. To the right of the pier, sitting on the beach, may be seen the Fairey seaplane. At one o'clock the public were cleared off the pier, and then re-admitted upon payment of a special fee.

"Flight" Copyright.

SCHNEIDER CUP : Starting up. The Fairey seaplane is here seen just before getting away from the beach.

after 12, another aero engine is heard, and shortly the Fairey seaplane, piloted by Lieut.-Col. Vincent Nicholl, D.S.O., roars across the Pier. The machine appears to be fairly fast, but one can imagine Mr. Fairey praying for a bit of a breeze, so that the general sturdiness of his machine may be taken advantage of for negotiating a sea. At present, Bournemouth Bay is as smooth as a mill pond. The Fairey proceeds towards Swanage, presumably to make a trial tour of the course. In a few minutes she appears again, and is run on to the beach just east of the Pier, where her tanks are replenished. In the meantime, about 20 minutes past 12, two machines approach at a good pace. They are soon identified as the Spad seaplane and the Savoia flying boat, piloted by Le Cointe and Janello respectively. Racing neck and neck, they pass the Pier, the Spad just outside the pierhead and the Savoia close to the beach. They also disappear towards Swanage, and a little later return and alight, the Savoia having to swerve to avoid a rowing boat whose occupants do not appear to realise the risk they are running, nor the danger they are to the pilots. The Spad alights between the two piers and for a time appears to be tail-chasing on the surface, affording in the meantime a good opportunity for the bathers in the vicinity of the lifts to have a look at her. Presently, however, the pilot opens his throttle and comes taxying along at a fairly high speed. In a few minutes the Spad is moored to one of the buoys just east of the Pier, where usually the Supermarine passenger-carriers are anchored. The Savoia is taken in tow by a motor boat, and after a visit to the *Ombra*, is also brought to rest near the Pier.

The next machine to arrive is the Supermarine "Sea Lion," which comes along at a great pace and disappears in the direction of Swanage. As the French Nieuport which was expected at Cowes on Tuesday is now known to have come to grief in the Channel and to have been taken back to Havre, only two more competitors are yet to come: the Sopwith and the second Nieuport. Just before one o'clock a machine is seen in the direction of Hengistbury Head. From its great speed, it is generally thought to be the Sopwith, but as it crosses the Pier, one can see the name "Avro.". It is Captain Hamersley, who has come over to see the race, and to stand by in case any of the British competitors are unable to start. Considering its comparatively low power, the Avro appears to be extremely fast. After a few evolutions the machine makes a landing just beyond the *Ombra*. The heels of the very long floats touch first, and the machine is jerked to a horizontal position, commencing a short series of longitudinal undulations that somehow are reminiscent of a buck-jumping Texas pony. However, there does not seem to be any tendency for the machine to turn over on her nose, and she is soon taxying along, being apparently quite easy to steer on the water. It is noticeable that of the seaplanes the Fairey, with its short floats, tail float and water rudder, is able to steer on the sea at lower speeds than the others. At 1 o'clock the Supermarine boat comes to rest east of the Pier, having made an excellent landing. This splendid little flying boat appears to handle equally well in the air and on the sea, and for a flying boat she is certainly very fast. Five machines are now at rest just to the East of the Pier: the



"Flight" Copyright.

THE SCHNEIDER CONTEST : The Sopwith seaplane.

Fairey is sitting on the beach, the Supermarine, the Savoia, the Spad, and the Avro being moored to buoys. One notices that the Spad appears to have a slight list to starboard, as if her float on that side is leaking.

In another half-hour the race is due to start, and some doubt, not altogether unmixed with a little anxiety, is beginning to be felt as to whether or not the Sopwith and Nieuport will arrive in time. Just then another machine is seen to be coming along at a tremendous speed. It is probably the Sopwith, although one cannot yet be quite sure, as the Nieuport is also said to be very fast. The machine crosses the Pier. Yes, it is Hawker without a doubt. The pace is prodigious, and even to the uninitiated the Sopwith is obviously very much faster than any of the other competitors seen so far. The difference is such as to be unmistakable. Those who had heard with a certain amount of scepticism rumours of a speed in the neighbourhood of 165 m.p.h., are beginning to think that it may be true after all. Hawker makes a perfect "landing," in spite of the great speed at which the landing is made. The perfectly calm sea favours him. Taxying along, apparently steering very well on the surface, the Sopwith is beached to the west of the Pier, where it is soon surrounded by an admiring crowd.

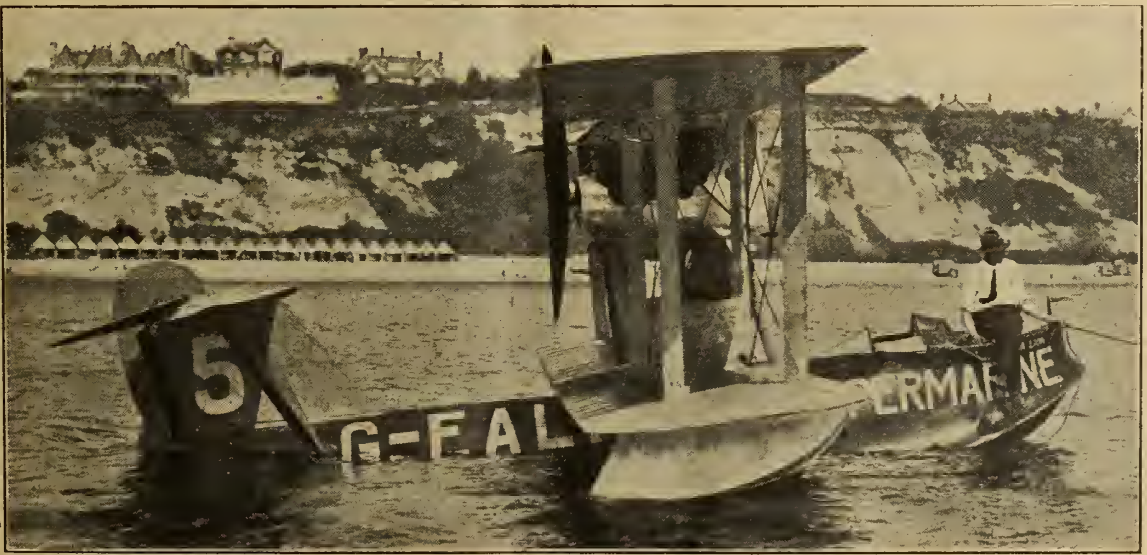
There is still the Nieuport to come. Knowing the amount of work to be done on it when last seen on the night previous, one begins to wonder if, in spite of the heroic efforts made at Cowes, it will be ready in time. It is now 2.30, and, according to schedule, the race should start. The Fairey seaplane has got going, and is cruising about near the starting line, ready on the tick of the clock. The other machines are still at their anchorages, and much to the disappointment of the visitors, a motor boat goes out to the Fairey, one of the crew shouts some instruction, and the Fairey returns to the shore. Apparently, the race will not start yet. At 2.50, the Nieuport arrives at great speed, and is brought to rest east of the Pier. There is still no indication of a start being made, and the thousands of onlookers who literally line the coast from Poole Head to Hengistbury Head are watching the weather with misgivings. The fog is getting denser. Not only are Hengistbury Head and "Old Harry" enveloped in the fog, but the two warships at anchor are entirely blotted out from view. It is evident that with weather conditions as they are at present it is quite impossible to run the race. The Supermarine is cruising about near the starting line, but has to return to her moorings.

For a time it looks as if the race will certainly have to be postponed to another day, as it is getting rather late, and local experts give little hope of improvement in the weather. In the meantime the Spad and Nieuport seem to be in trouble with their floats, and are beached to the East of the Pier. Nobody appears to worry much what becomes of them. From the yacht word comes that the race is postponed till six o'clock, and the general opinion is that it is "off." However, the French crews are tinkering with their floats, hoping to put matters right in time for the postponed start.

"Flight" Copyright.

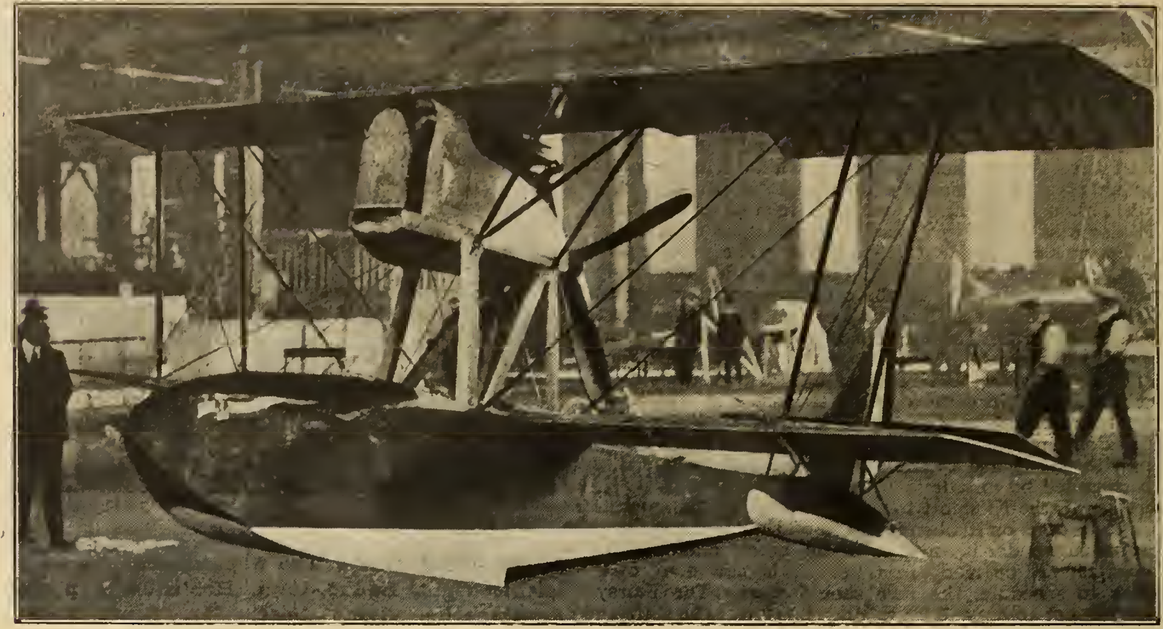
SCHNEIDER CUP : The Supermarine Team. From left to right, Squad.-Com. Hobbs, who piloted the Supermarine flying-boat, Mr. Scott-Paine and Com. Bird.

Suddenly, there are indications of a slight breeze, and in a very short time the warships are visible once more. Is it possible that it will clear after all? For a time it looks probable. Then the fog settles again. On the Pier people are beginning to give up hope. In the Royal Aero Club enclosure at the head of the Pier, members are discussing the outlook. The general impression is that things look pretty hopeless. Messrs. Reynolds and Ebblewhite, the official timekeepers, have another "smoke" while waiting for a decision. People are beginning to wonder whether it will be possible to hold the race tomorrow instead, but many maintain that the arrangements cannot be made in time, and that, if the race is postponed, it must be for at least another week. Others think it might be done, and the talk turns to the prospects of obtaining rooms in already overcrowded Bournemouth. With all these speculations, time passes, and it is getting on for 5 o'clock. Many have now given up hope, and are getting ready to leave the Pier. Then, quite suddenly, the fog can be seen to drift, and in a short time one finds that Hengistbury Head is visible, and there is blue sky overhead. Swanage Bay is still shrouded in mist, but the fog is undoubtedly rolling inland. So far as can be gathered, the "authorities" on board the *Ombra* are trying to reach a decision



"Flight" Copyright.

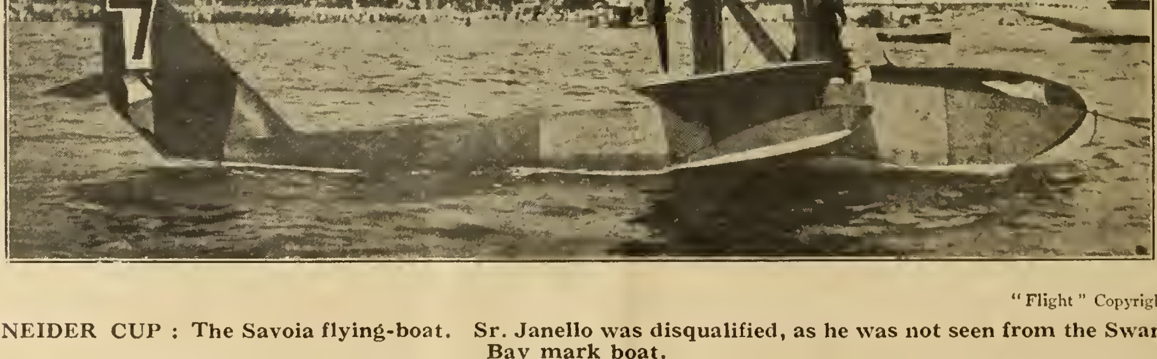
SCHNEIDER CUP : Before the start. The Supermarine "Sea Lion" at her moorings.



"Flight" Copyright.
SCHNEIDER CUP : The Savoia flying-boat at the Saunders sheds at Cowes on the day before the race.

as to whether or not to make a start. Presently, word goes round that a start will be made. Many are of the opinion that it is not really fit for flying. However, it is now decided that the start is to be made. It is rumoured that the two French entrants—the Spad and Nieuport—have, under the impression that the start has been postponed until six, been repairing their floats, and will not now be able to get them in shape with such short notice. In the Club enclosure there is some doubt as to whether or not those on the yacht are aware of this. However, there is no time for speculation. Some of the engines have been started, and on a motor launch in front of the yacht the starter's red flag can be seen. The Fairey seaplane, which as it is numbered one is due to start first, is cruising about just East of the starting line. It gets into position, and about 10 minutes to 5 the red flag drops and the Fairey is away. According to numbering, the Nieuport is next, but it is not ready. Hawker should follow, but he is still sitting on the beach, and has not even started his engine. Some say he has refused to start until the last moment, as he is afraid his sparking plugs will soot up if he has to cruise around with the engine throttled down. Others maintain that his floats are leaking, and that if he has to wait any time he will fill up. Nobody knows for certain what is actually going on, but the Supermarine flying boat is on the starting line and is allowed to take off as second, apparently without any flag dropping. In the meantime, the Sopwith has got her engine going, and she and the Savoia are getting ready. It is now clear to everybody that the two French machines are non-starters. The Sopwith gets into position, but the starter appears undecided. The red flag is raised, but is lowered again in an apparently undecided fashion. It then looks as if Hawker gets impatient and comes to the conclusion that if the starters cannot make up their mind he will do it for them, and away he roars. Shortly afterwards the only remaining machine, the Savoia flying boat, is "sitting" in position, waiting for the flag to drop. This it does, and then—not until then—Janello gives his engine full throttle and gets away. "The most fair start of the lot," one hears someone say.

As it will now be some little time before the first machine passes on its first lap, there is time to discuss the start. There is not the slightest doubt that the general impression in the



"Flight" Copyright.
SCHNEIDER CUP : The Savoia flying-boat. Sr. Janello was disqualified, as he was not seen from the Swanage Bay mark boat.

Club enclosure is that the start has been badly bungled. Most are of the opinion that the only way to have started the machines would have been, having given reasonable intimation of the start of the race to the competitors, to consider the start of the Fairey as the official time, and then to have dropped the flag at minute intervals after that, irrespective of whether or not the machine in question was ready. If it were not—well, then the delay should be counted against it as flying time. To this it might be objected that it is difficult to get a seaplane into position and keep it there in readiness for the flag. While this is admitted, the conditions are alike for all, and if the mode of starting indicated was known beforehand, it would be up to competitors to so design their machines that they would steer and generally handle easily on the sea. The discussion of this point was getting quite heated when it was cut short by a machine appearing overhead, apparently coming from somewhere inland. It proved to be the Fairey, which lost no time in getting on to the sea. Evidently, he had "chucked it," as one onlooker put it. A few minutes afterwards the Sopwith appeared coming straight in from the sea. After circling around for a few minutes, the engine spluttering as if missing or running throttled down, Hawker opened out again, and it was thought that his engine had been missing, but had picked up again. However, in a few more minutes he also made a landing. Obviously, he and Lieut.-Col. Vincent Nicholl had found the weather too thick in Swanage Bay.

There were still no signs of the Supermarine, which should really, as it started second, be making its two landings by then. The Savoia was, however, seen to make a landing near Boscombe Pier, as prescribed for the first lap. It got off again and approached Bournemouth Pier, touching the sea again before reaching the Pier. Evidently, Janello was not quite certain whether, as he saw the Fairey and Sopwith down, the race had been abandoned or not. And small blame to him. On the Pier nobody seemed quite certain on this point, and even on the yacht the officials were, it was stated, in heated argument. However, the upshot was that someone, one does not know who, waved Janello on, and once more the Savoia took the air. We began to look for the Supermarine, but for a time nothing was seen of it. Then, suddenly, someone discovered it somewhere between Boscombe Pier and Hengistbury Head. The machine was seen to touch the sea, a faint white streak indicating a normal landing. Then, suddenly, the machine was seen to turn on its nose, the tail swinging into the air and going slightly past the vertical. In this position it stuck, and grave anxiety was felt for the safety of Commander Hobbs. However, motor launches were soon on the spot, and one could only hope that the pilot had been able to extricate himself, in which case he should be safe as he was wearing a floating suit.

By this time several aerial visitors had made an appearance over the Pier. A Sopwith Snipe went through a series of evolutions, and then disappeared again. A Sopwith triplane, carrying no identification marks of any kind, also came over and proceeded along the beach, immediately above the crowds of spectators. One hesitated to stop to think what would happen in case of engine failure. A Westland Limousine appeared from inland, and circled around the two warships lying at anchor. Its altitude varied from about 50 ft. to 150 ft. It was difficult quickly to think what prompted a pilot to take passengers out to sea in an enclosed land machine at such a ridiculously low altitude. During the Savoia's flight, an old F.E. came along, and appeared to take a "seat" some 500 ft. above Hengistbury Head, where she kept sitting, looking for all the world like an old hen frightened to death because her brood of ducklings has taken to the water. The Avro racer also took a hand, making several circuits of the course at a good speed, *hors de concours*, of course.

It was now clear that the "Race" had turned into a one-man show, and those wearied spectators who had not already left, began to take an interest in Janello, who stuck to it like a sportsman, lapping consistently in the neighbourhood of 10 minutes, sometimes a little more and sometimes a little less. The question now was whether or not he would be able to finish before dark. Finally, his last lap was completed, the onlookers appreciating the plucky way in which he had gone through with the job. Naturally, everybody concluded that as his laps were so consistent, he had rounded the mark boats in good order. Then came disillusion. From the mark boat in Swanage Bay came word that they had seen no signs of the Savoia.

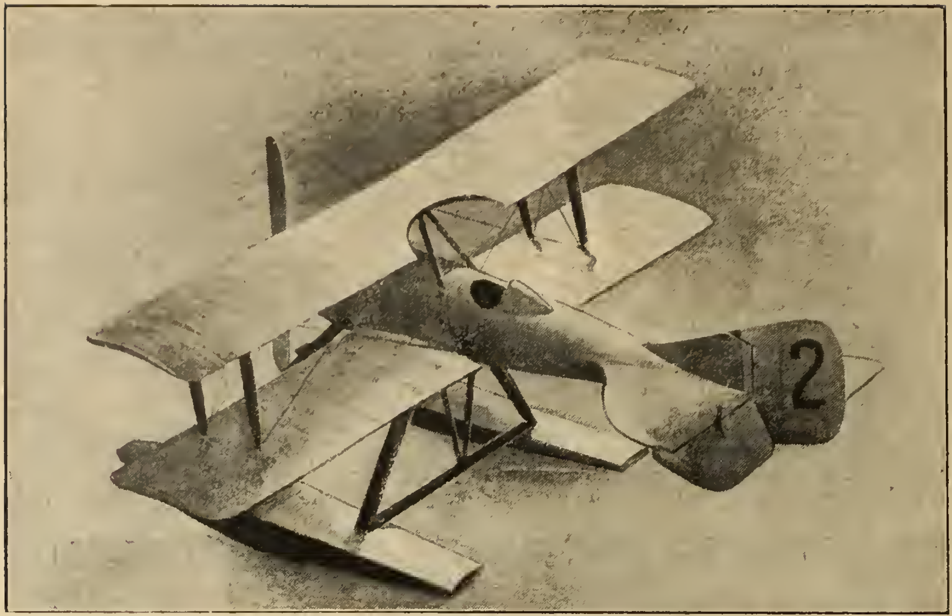
That the Italian had been rounding a boat is fairly certain from the regularity with which he reached "home" each lap, but it now seems that he must have been passing the wrong boat.

The disappointment was keen, as all had been of the opinion that Janello thoroughly deserved the Cup and Prize.

It is now announced that the "Race" is declared void. What looked at one time like becoming a very good race has passed through a stage in which everything became chaos and a fiasco. I have had a talk with some of the people concerned, and the views and opinions expressed are naturally somewhat contradictory. However, the impression which prevails is undoubtedly that the whole thing was mismanaged, although it must be admitted that the fog, which in the first place caused the race to be postponed, was mainly responsible for the confusion. There is also general regret with the way in which the French competitors are alleged to have been left to get out of their difficulties without any semblance of help, and, in addition, the start itself, which, in the opinion of many, including a number of pilots, should never have been made under the weather conditions prevailing, was sadly bungled.

"Flight" Copyright.

SCHNEIDER CUP : The Italian representatives. From left to right : R. Conflenti, the designer of the Savoia ; in the centre Mr. Lawrence Santoni, the constructor of the Savoia, and, on the right, Sr. Janello, the pilot.



Schneider Cup: A view of the Nieuport seaplane.

"Flight" Copyright.

In connection with the Schneider Cup Contest we have received the following communications:—

Re SCHNEIDER CUP RACE

Sir,—We beg to thank you for your kind notice of our flying in the race for the Schneider Cup yesterday.

After our pilot had won the race, having complied with every rule and condition, the race was declared void for reasons which you will gather from the enclosed letter which we have written to the Committee of the Royal Aero Club, protesting against their decision to disqualify our machine.

Societa Idrovolanti Alta Italia,
D. Lorenzo Santoni, *President.*

Gloster Hotel, West Cowes, Isle of Wight.
September 11, 1919.

(Enclosure,)

Gloster Hotel, West Cowes,
Isle of Wight.
September 11, 1919.

The Committee, Royal Aero Club,
3, Clifford Street, W.

Re Schneider Cup Race.

Gentlemen,—We confirm our telegram of even date herewith as follows:—"Schneider Cup please note we appeal against the decision of Committee declaring race void on account of Mark-boat observe Swanage end. Statement that he did not see Savoia machine, our pilot saw distinctly at that end of course, a boat with same mark as boat at Christchurch. We understand that a third mark-boat was on the course and we request investigation and enquiry as to whereabouts of this boat. We request revision of decision against which we formally appeal to the Committee of Aero Club.

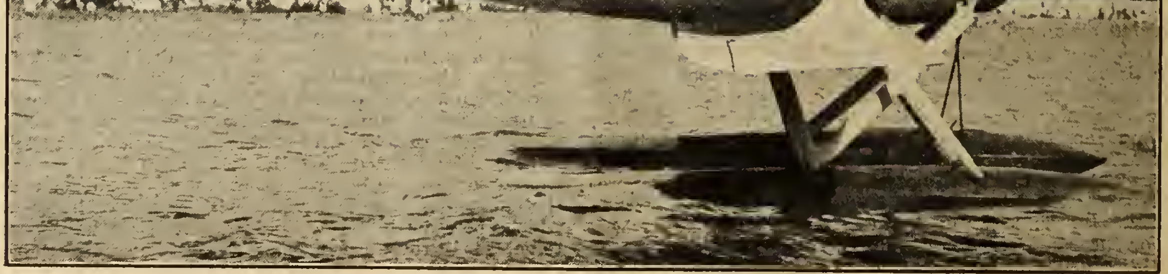
D. Lawrence Santoni, *President,*
Societa Idrovolanti Alta Italia.

We beg formally to appeal against the decision of the Race Committee declaring the race void and disqualifying Savoia seaplane on the statement that the observer on the mark-boat situated at the Swanage end of the course, that he had not observed our machine.

We appeal on the following grounds and we demand an enquiry into the facts mentioned below:—

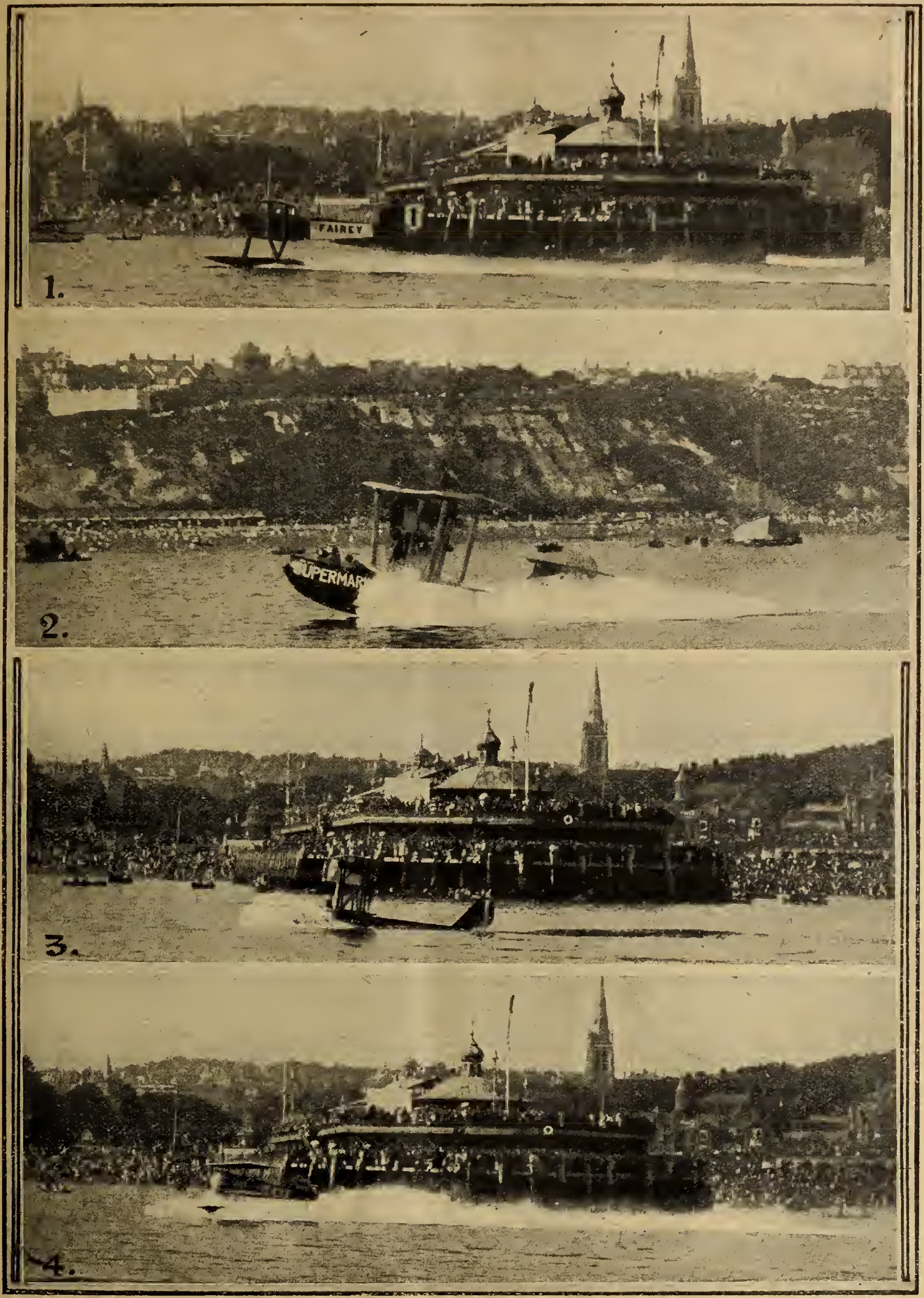
1. Our pilot made the circuit 11 times complete. On each circuit he distinctly recognised the mark-boat with the red and white sign at the Swanage end of the course, exactly similar to the boat situated at the Christchurch end.

2. Observation from below may have been obscured by the mist.



"Flight" Copyright.

SCHNEIDER CUP: The Spad at anchor. This machine looks very business-like, and should have put up a good performance but for a leaky float. The top plane is swept back, and is of shorter span than the bottom one.



"Flight" Copyright

THE START FOR THE SCHNEIDER CUP RACE : 1, The Fairey seaplane getting away. 2, The Supermarine flying-boat. 3, The Savoia flying-boat. 4, The Sopwith seaplane.

"Flight" Copyright.

SCHNEIDER CUP : The French team. The Spad pilot, M. Lecointe, and the Nieuport pilot, M. Casale.

3. We have been informed that there were three mark-boats and as our pilot distinctly saw, during the whole of the race, at the Swanage end a boat exactly similar to that at Christchurch with the same marks, he evidently took this boat as the turning point, and if this is the case, the error is due entirely to bad organisation on the part of the arrangement of the committee for which we are naturally not responsible.

We also protest against the manner in which the race was managed and against the absence of proper indication to the pilots of the change in the time and in the order of starting.

The rules hereon laid down by the Committee were not adhered to. Proper and definite notice of such change was not intimated to our pilot, who received his information from a source outside the official one. No proper and effective provision was made to enable the mechanics attached to the foreign seaplanes to approach their respective pilots, in order to supply them with petrol or to enquire as to their wants. Nevertheless, we had been assured by the Secretary of the Club that a special motor boat would be at the service of each competitor at Bournemouth in order to bring mechanics and petrol, etc., to the pilots.

We say we complied with all the rules and conditions of the race, our pilot having as a precaution completed more than the 200 miles prescribed by the rules, and we claim to have won the cup and the pilot's prize, and we request you to revise the decision of the Race Committee and to make a searching enquiry into the points above mentioned.

We are, Gentlemen,
For the Societa Idrovolanti Alta Italia,
D. Lorenzo Santoni, *President.*

Sir,—Owing to the number of conflicting reports which have been circulated regarding this race held on Wednesday last, I have made careful examination to ascertain the cause of the British competitors, and particularly the two fitted with 450-h.p. Napier aero engines, not completing even one lap of the course.

I understand that the trouble was due to the bad visibility in the neighbourhood of the Swanage mark-boat, which the competitors had to circle, and which could not be found by any of them.

The Supermarine Flying Boat, which was fitted with a 450-h.p. Napier aero engine, ran into a mist over Swanage Bay; the pilot lost his bearings and made a landing in Swanage Bay in order to ascertain his position. Upon taking off, the machine hit some wreckage, and the pilot did not know the extent of the damage until landing near Boscombe, where he tried to beach his machine.

It is regrettable in the interests of aviation generally, and particularly British aviation, that this race was allowed to commence without ascertaining the extent of the mist over the whole course, and thus turned the race, which should have been of great assistance to aviation, into a fiasco, which might do incalculable harm to the progress of the British seaplane industry.

I understand that both Napier engines were running perfectly in the British machines when on their trials.

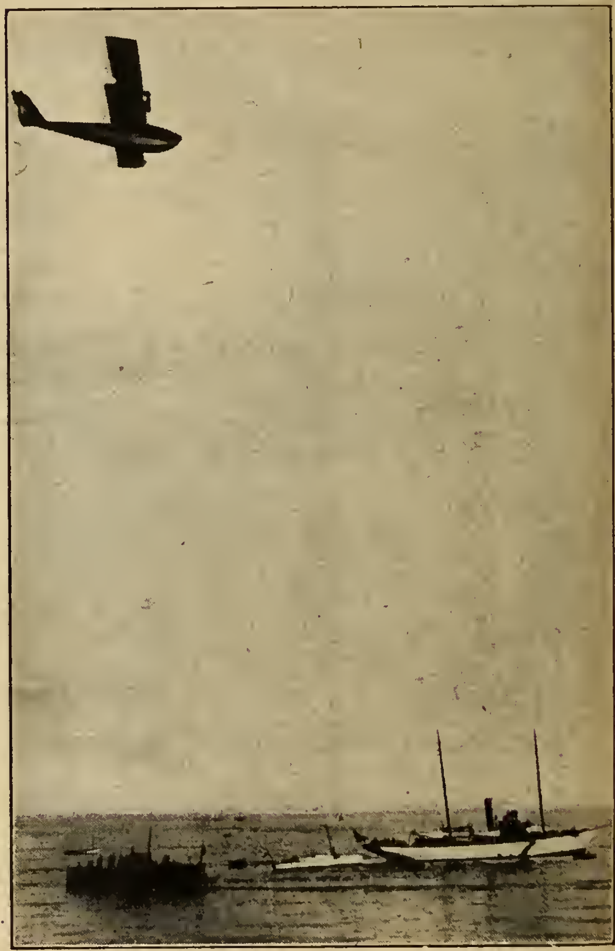
H. T. Vane, *Managing Director,*
D. Napier and Son, Ltd.

14, New Burlington Street, W.
September 13, 1919.

Sir,—In regard to the "race" for the Jacques Schneider Cup, I should like to state clearly exactly what happened to our machine, which was as follows :—

Com. Hobbs, as soon as he approached Swanage Bay, ran into a fog the same as the other machines, and it was so dense that it was quite impossible to see anything at all except for a few yards round the machine. Almost before he realised the conditions he got a momentary sight of the Fairey machine, and only by great good luck succeeded in avoiding colliding with it. He then thought that possibly the fog might be less dense close to the sea, and accordingly descended right down to the surface, where, however, he found the conditions just as bad.

Realising that he must be somewhere in the vicinity of Swanage Bay and the danger of running into the cliffs, and having quite lost his sense of direction in the fog, he decided to land and so give himself the opportunity of trying to work out his position, which, of course, was extremely difficult to do whilst flying in the fog at something like 120 knots.



"Flight" Copyright.

SCHNEIDER CUP : Avanti Savoia. A snap of the Italian representative passing between the pier and the committee yacht on his fourth lap.

Having landed and tried to locate himself without success, he decided to take off and return in the direction of Bournemouth in order to get out of the fog and then make a fresh attempt to find the Swanage mark boat. Unfortunately, in taking off in the fog, just at the moment of leaving the water, he felt a terrific crash caused by striking some unseen object. From a flying point of view his machine was not damaged, but he could not see exactly what had happened to the hull, and decided to continue his previous plan of clearing out of the fog, and continuing the race at a greater height. This he did, but never actually saw the Swanage mark, though from the position of the Purbeck Hills he was able to satisfy himself that he had at least gone inside the mark. From there he proceeded to Hengistbury Head, by means of his compass course, which was clear of the fog, and after rounding made his first alighting to the east of Boscombe Pier alongside the M.L. acting as a mark.

"Flight" Copyright.

SCHNEIDER CUP : Planning the campaign. Two of the French pilots, Lecointe on the left and Casale on the right, studying a chart of Bournemouth Bay at Cowes the day before the race.

"Flight" Copyright.

SCHNEIDER CUP : On board the "Ombra." Left to right, Mr. T. O. M. Sopwith, Mr. H. G. Hawker, A.F.C., Com. Perrin, and Lieut.-Col. F. K. McClean discussing matters.

His landing was a perfect one, but the hole in the bottom of the machine was, unfortunately, so large that she immediately filled with water, and although every effort was made to beach the machine she filled before this could be done, and turned half over with her tail standing in the air.

The M.L. picked up Hobbs, and Mr. Scott-Paine and myself arrived shortly after with a launch, and were able to secure the tail of the machine just before she sank. We then towed her into shallow water, where with the help of rigging-up tackle, etc., to Boscombe Pier, we were able to complete salvage and bring the machine back to the works.

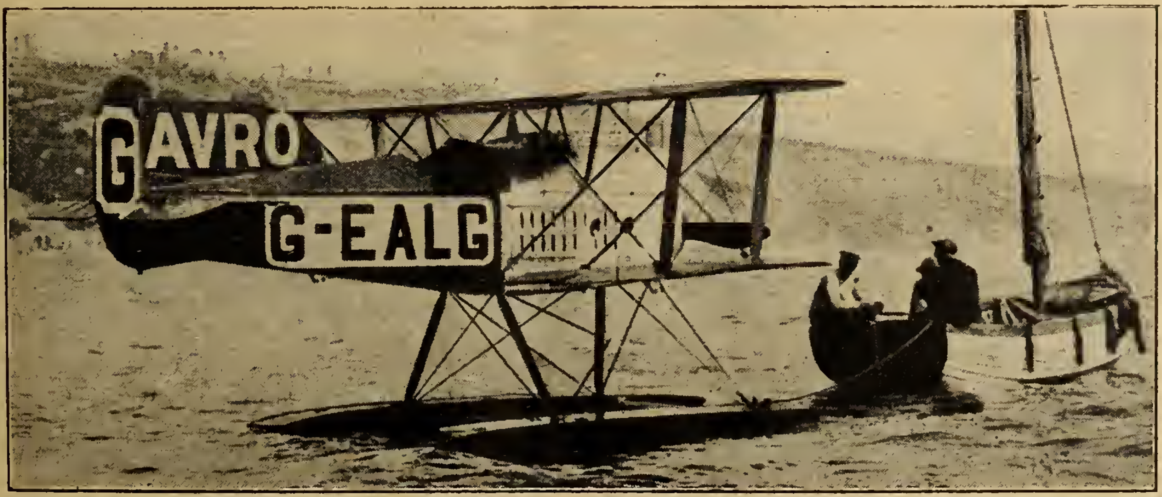
This explains exactly what happened, and in regard to the landing being east of Boscombe Pier, this is explained by the fact that the two landings had to be made alongside two boats acting as mark boats ; the first of which was stationed well east of Boscombe, so that Hobbs's landing was in exactly the correct place.

I believe it had at some time been mentioned that the landings were to be between the two piers, but after further consideration it was decided that probably some of the machines could not pull up and take off twice in the limited distance.

I should now like to make a few remarks regarding the organisation generally.

Of organisation, as we know it, there was, as must have been seen, absolutely nil.

I may mention that when I was at Cowes on the previous Monday after our tests with the Avro machine had been carried out, I was given by Com. Perrin typed instructions for the race at Bournemouth, and the only statement regarding starting was as follows : "Each competitor will be given the official order to start by the official starter, when



"Auto." Copyright.

HORS DE CONCOURS : The Avro seaplane was not allowed to start in the race, but Capt. Hamersley brought her down and went round the course a few times by way of a demonstration.

his starting time for the race will be taken." On asking how the starting signal would be given, I was informed that it would be given from the Committee boat, and each machine would start at one minute intervals, but details would be explained on the day of the race.

On the day of the race at about 1 p.m. I went on board the Committee boat, and was informed that the starting arrangements had been altered, and that the official starter would come alongside each machine in a launch, instructing them when to start, and that his actual time would be taken from the time he crossed the line, and the interval between the machines would be increased. This was all the information I could get, and nothing whatever was given in writing.

At 2.30 p.m. we were ready to start, but the fog coming down over Bournemouth a postponement was made, after some time the fog at Bournemouth lifting, a motor launch with no distinguishing marks on it whatever, came round and somebody shouted to me that we were to start in a quarter of an hour's time. On my asking whether this meant that the race would start or our machine would start in a quarter of an hour, the only answer I could get was a shrug of the shoulders. This launch had not gone a minute before another launch also without any distinguishing marks came alongside and said we were to start in half an hour; again I asked the same question, whether it meant the race or our machine, and the answer was they did not know.

Owing to the conflicting instructions, Mr. Scott-Paine, in one of our launches, went over to the Committee boat, and shortly returned with the information that all starting arrangements had again been altered, and that as far as he could gather the new procedure was to be as follows :—

Five minutes before the start of the first machine, a red flag was to be raised, after 4 mins. 45 secs. it would be dipped, and at the end of the five minutes would be raised again, thus giving the signal to start; this was to be repeated for each machine.

Naturally, I expected that this signal would be given from the Committee boat; but actually, as I subsequently found out, it was given from a motor launch with the official starter on board. As far as Hobbs was concerned, he saw nothing whatever of any of the red flags, and it was only through Mr. Scott-Paine being alongside the starting launch in his own launch, and obtaining from them permission to start, and his then waving his cap to Hobbs indicating that he could come, that any start was made by us at all.

Incidentally, Mr. Scott-Paine tells me that the start was just as complete a fiasco for the other machines as it was for us; the Fairey apparently started when the red flag first went up instead of waiting for his five minute flag, and owing to the second and third machines not being there, and the Sopwith not being up to time, we were sent off at some odd time as a result of Mr. Scott-Paine asking the starter whether we might go.

Now to come to another point, viz., the discourtesy to the foreign machines. Whether the Committee had or had not made any arrangements to look after them I do not know; what I do know is that on their arrival at Bournemouth they were simply left to drift about without having anybody moving a hand to help them. Seeing the S.P.A.D. just on the point of drifting on to a boat at anchor, I got hold of him and secured a boat which I got to tow him, and make him fast to one of our own moorings. After this I was unable to do anything more, as Hobbs had just arrived, but I went over to the Committee boat and informed them of what was happening, and you can judge my surprise when I was informed by one of the Committee that it was nothing to do with him.

[After making some very strong remarks in regard to starting the race at all under the conditions, Com. Bird continues :]

I myself and Com. Hobbs had both warned members of the Committee early in the day that the mark boat at Swanage could not be seen, and that the fog in that locality was very dangerous, and furthermore, Mr. Scott-Paine, when the instructions for the race were given, strongly protested that conditions were unsafe, and that from our long experience of flying and sailing in the locality, we all knew that there was no chance of the fog lifting under the weather conditions prevailing.

JAMES BIRD.

The Supermarine Aviation Works, Ltd.
Southampton, September 15.

◆ ◆ ◆ ◆

Aerodromes for Civil Use

THE following lists of aerodromes are issued as an addition to the lists recently published. It may be seen that in the majority of cases the aerodromes referred to below can only be considered as possible emergency landing grounds.

Attention is again drawn to the fact that these lists are purely provisional and subject to alteration or amendment from time to time.

LIST D (c).—*Aerodromes licenced as suitable for "Avro (504 K) and similar types of aircraft" only. Except in very few instances accommodation does not exist. The licences have also been issued for limited periods only.*

Aerodrome.	Nearest railway station.	Nearest town.
Aylesbury (Race Meadow)	Aylesbury	Aylesbury.
Conway (The Morfa)	Conway	Conway.
Ashgate (Caushouse Farm)	Chesterfield	Chesterfield.
Leicester (Aylestone Lane)	Leicester	Leicester.
Derby (Race Course)	Derby	Derby.
Marden	Cullercoats	Newcastle-on-Tyne.
Stratford-on-Avon	Stratford-on-Avon	Stratford-on-Avon.
Lochee Park	Dundee	Dundee.
Perth (North Inch)	Perth	Perth.
Warrington	Warrington	Warrington.
Stoke-on-Trent (Sparrow Terrace)	Stoke-on-Trent	Stoke-on-Trent.

LIST E (a).—*Stations no longer in use by the R.A.F.*

These stations have been passed to the Government Surplus Property Disposal Board. They will be relinquished as soon as the Government property thereon has been disposed of. In many cases the aerodromes are now under cultivation, but it is probable that the sites still form the best emergency landing grounds in the immediate neighbourhood.

Aerodrome.	Nearest railway station.	Nearest town.
Hickling Broad (s)	Catfield	Yarmouth.
Killingholme	Habrough	Grimsby.
London Colney	Radlett	St. Albans.
Shoreham	Shoreham	Shoreham-by-Sea.
Seaton Carew	Seaton Carew	West Hartlepool.

References: (s) Seaplane station. (c) Known to be under cultivation or otherwise unsuitable for landing.

Relinquishment of R.A.F. Stations

IT has been decided to relinquish and dispose of the following R.A.F. stations, and arrangements are being made accordingly :—

Wight, Cowes (aerodrome), London Colney (aerodrome), Beaulieu (aerodrome), Lydd (Balloon School), Dover (seaplane station; temporarily transferred to Admiralty).

International Air Convention Approved

THE Air Ministry announce that the Convention relating to International Air Navigation was formally approved, subject to one or two minor reservations, by the Supreme Council of the Peace Conference, at a meeting held at St. Germains immediately after the signature of the Peace Treaty with Austria on September 10.

This document, which is one of the most interesting of the agreements made by the Powers taking part in the Peace Conference, is very comprehensive, and deals amongst other things with such subjects as sovereignty of the air, space above territory and territorial waters, international air law, nationality of aircraft, certificates of airworthiness, conditions of admission of air navigation above foreign territory, rules to be observed on departure, on landing and when under way, prohibited articles and the institution of an international commission for air navigation.

There was little or no precedent to guide the delegates in the framing of the Convention, and in its drafting it was essential that our Dominions, our Allies and as many as possible of the neutral States should participate. To secure agreement in 11 weeks as was done on a subject affecting so many different interests is no mean achievement.

The signatories to what may be regarded as the Charter for Civil Aviation throughout the world are as follows :—United States, Great Britain, France, Italy, Japan, Belgium, Brazil, Cuba, Greece, Portugal, Rumania, Serbia.

R.A.F. Pigeons to be Demobilised

IT is announced that the Air Ministry had decided to dispense with the R.A.F. pigeon service which, during the War, did splendid service in bringing assistance to stranded pilots. We believe that all the pigeons used during the War were presented by fanciers to the Government.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

SPECIAL COMMITTEE MEETING

A SPECIAL MEETING of The Committee was held on Friday, September 5, 1919, when there were present :—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Lieut.-Col. Spenser D. A. Grey, D.S.O., Mr. F. Handley Page and Mr. Harold E. Perrin, Secretary.

Honorary Membership.—The following were elected Honorary Members of the Club :—

Lieut.-Col. James E. Chaney (U.S. Air Service).
Capt. Harold M. McClelland (U.S. Air Service).

THE FLYING SERVICES FUND

A MEETING of the Flying Services Fund Committee was held on Friday, September 12, 1919, when there were present :—Group Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., in the Chair, Mr. Chester Fox, Squadron Leader T. O'B. Hubbard, M.C., R.A.F. and Mr. Harold E. Perrin, Secretary.

Grants and Allowances.—The following Grants and Allowances were made :—

(32) A Grant of £5 to the widow of an ex-1st Class Air Mechanic in the Royal Flying Corps who died as result of exposure whilst on active service.

(40) An allowance of £2 a month for six months to the widow of a Sergeant in the Royal Flying Corps killed on active service.

(70) An allowance of £1 a month for six months to the mother of a 2nd Class Air Mechanic in the Royal Flying Corps who died on active service.

(91) An allowance of £4 a month for six months to the widow of a Sergeant in the Royal Flying Corps killed on active service.

(109) An allowance of £2 a month for six months to the widow of a Private in the Royal Flying Corps who died on active service.

(118) An allowance of £4 a month for three months to the mother of a 3rd Class Air Mechanic in the Royal Air Force killed on active service.

(126) An allowance of £2 a month for six months to the widow of a 2nd Class Air Mechanic in the Royal Flying Corps who died on active service.

(128) An allowance of £2 a month for six months to the mother of a Sergeant in the Royal Flying Corps killed on active service.

(130) An allowance of £2 a month for six months to the mother of a Private in the Royal Flying Corps who died on active service.

(139) An allowance of £3 a month for six months to the widow of a 3rd Class Air Mechanic in the Royal Air Force who died on active service.

(146) An allowance of £2 a month for six months to the widow of a 1st Class Air Mechanic in the Royal Air Force who died on active service.

(150) A Grant of £5 to the widow of a Private in the Royal Flying Corps killed on active service.

(152) An allowance of £2 a month for three months to the widow of a 2nd Class Air Mechanic in the Royal Flying Corps killed on active service.

(155) An allowance of £2 a month for six months to the widow of a 1st Class Air Mechanic in the Royal Air Force killed on active service.

(160) An allowance of £2 a month for six months to the sister of a 3rd Class Air Mechanic in the Royal Naval Air Service killed on active service.

(176) An allowance of £2 a month for six months to the widow of a Driver in the Royal Air Force who died on active service.

(208) An allowance of £4 a month for six months to the mother of a Cadet in the Royal Air Force who died on active service.

(228) An allowance of £3 a month for six months to the widow of a 1st Class Air Mechanic in the Royal Naval Air Service who died on active service.

(244) A Grant of £10 and an allowance of £1 a month for six months to the widow of a Corporal in the Royal Air Force who died on active service.

(245) An allowance of £1 10s. a month for six months to the widow of a 1st Class Air Mechanic in the Royal Air Force who died on active service.

(246) An allowance of £2 a month for six months to the widow of a 1st Class Air Mechanic in the Royal Air Force who died on active service.

(247) An allowance of £2 a month for six months to the widow of a 2nd Class Air Mechanic in the Royal Air Force who died on active service.

(248) An allowance of £4 a month for six months to the widow of a 2nd Class Air Mechanic in the Royal Air Force who died on active service.

(249) An allowance of £2 a month for six months to the mother of a 2nd Class Air Mechanic in the Royal Air Force who died on active service.

(250) An allowance of £2 a month for six months to the widow of a Private in the Royal Air Force who died on active service.

(257) An allowance of £1 a month for six months to the widow of a 3rd Class Air Mechanic in the Royal Air Force who died on active service.

(260) An allowance of £2 a month for six months to the mother of a 1st Class Air Mechanic in the Royal Air Force who died on active service.

THE FLYING SERVICES FUND

(*Registered under the War Charities Act, 1916*)

Administered by the Royal Aero Club

For the benefit of *Officers, Non-Commissioned Officers and Men* of the ROYAL AIR FORCE who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

Honorary Treasurer:

The Right Hon. LORD KINNAIRD.

Committee:

H.R.H. PRINCE ALBERT, K.G. (*Chairman*).
Mr. CHESTER FOX.
Squad. Leader T. O'B. HUBBARD, M.C., R.A.F.
Wing Commander C. E. MAUDE, R.A.F.
Group Capt. C. R. SAMSON, C.M.G., D.S.O., R.A.F.

Secretary:

H. E. PERRIN.

Bankers:

Messrs. BARCLAYS BANK, LTD., 4, Pall Mall East, London, S.W. 1.

Subscriptions:

	£	s.	d.
Total subscriptions received to Sept. 9, 1919 ..	15,119	19	1
Squadron Leader P. Litherland Teed, R.A.F...	1	10	0
Squadron Leader P. Litherland Teed, R.A.F. (Second contribution)	3	3	0
Total, September 16, 1919	15,124	12	1

Offices: THE ROYAL AERO CLUB.
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

* * *

R.A.F. Cadet College

A LIMITED number of cadetships at the R.A.F. Cadet College will shortly be open to competition, and will be awarded to candidates who fulfil certain conditions laid down by the Air Ministry. Particulars may be obtained on application to the Secretary, Air Ministry, Kingsway, London, W.C. 2. A candidate who fulfils all the necessary conditions may compete for a cadetship at the R.A.F. Cadet College, and also for a cadetship at the Royal Military Academy or Royal Military College. Candidates desiring to do this must express definitely their order of preference before the examination begins. A candidate may say that if he is not among the first (so many) successful competitors for the Royal Military Academy or Royal Military College (as the case may be) he will elect for a cadetship at the R.A.F. Cadet College. Cases may, however, arise in which it would not be possible to give effect to such conditional preference.

COMMERCIAL AIR-TRANSPORT

BLACKPOOL, ETC.

THE Avro Northern Stations, of which Blackpool is the parent, including Southport, Manchester, Fleetwood, Morecambe, Waterloo Sands (Liverpool), Rhyl, Douglas and Windermere, have now taken up 20,000 passengers, a most remarkable figure. Preston has been licensed, and it is hoped that active operations will soon be undertaken there.

A "travelling circus" has now been established, which will tour various towns in turn, spending a few days at each, to give demonstrations and take up passengers. The dates arranged so far are:—

Barmouth	September 15 to 20.
Nottingham	September 22 to 24.
Derby	October 6 to 11.

BOURNEMOUTH AND THE ISLE OF WIGHT

AT the Bournemouth aerodrôme there were busy days last week. On Wednesday about 30 machines landed there and on Saturday a party of 250 members of the British Association paid a visit, many being taken up on the Avro and F.E. machines and the Westland Limousine. On the other days passenger flights were in great demand and school work proceeded as usual.

With the turn of the fine weather during the past week the Supermarine Flying Boat Service has resumed at Bournemouth and the Isle of Wight. The rough and heavy weather during the preceding fortnight has been all against comfortable flying for passengers, and on the resumption of the calm sea and fine period, many of the visitors availed themselves of sea and coastal flights, also trips over and round H.M. warships lying in Bournemouth Bay.

One machine, on September 12, on the journey from Southampton to Bournemouth, the pilot reported that about 4 miles off Hurst Castle he sighted a mine. Half a mile further on was one of the Government tugs from Yarmouth. The pilot circled his machine, passed low down near the tug, and pointed out to the captain the position of the mine. It was then observed that the course of the tug was altered, and on reaching the mine a boat was put out. Nothing has since been heard of the subsequent proceedings so far as the mine is concerned, as the pilot then headed to continue his journey into Bournemouth.

The Supermarine Flying Boat Passenger Service will be continued on every fine and suitable flying day for passengers, at Bournemouth, Isle of Wight, and Southsea.

BRIGHTON AND CHICHESTER

DURING the week ending September 13, 90 flights were made by the Avros at the Ladies' Mile Aerodrome, Brighton, and 185 passengers were carried.

Two cross-country flights were made to Chichester and return—one return journey was made in 15 minutes. Flying took place there on Thursday afternoon and 20 passengers were taken up; and, weather permitting, Thursday flying will continue to take place at Chichester.

HOUNSLOW

DURING the week 118 flights were made and 189 passengers were taken up. The total number of passengers taken up by the Avros at Hounslow since May 1 has now passed the figure of 6,400. During the week the following cross-country flights were made:—One to Hythe and back, one to Margate, one to Weston-super-Mare. Two new machines were flown down from Manchester and arrived safely.

Mrs. Atkey, of Chelsea, is learning to fly on an Avro at Hounslow, and made her first instructional flight a day or two ago. It is believed that she is the first lady to undergo a course of training for a pilot's ticket since the end of the War.

MARGATE

THE Avro flights at Manston have numbered 319 last week, and among the many passengers were Miss Currie, the Marquis de Ruvigney, Count de Ruvigney, and Dr. Sauer, all of whom most enthusiastic, taking flights on several days. A blind man waited many hours one day for his flight, determined to loop and experience every flying sensation. The weather has been perfect and everything is going with energy and success on the aerodrome.

PAIGNTON

THREE 3-seater seaplanes were in commission here during the week. There were 174 flights made and 264 passengers were taken up, the trip round the warships anchored in the bay being very popular indeed.

SWANSEA

ALTHOUGH no flying was possible on the 7th, 8th and 9th instants, owing to the weather, three Avros 3-seaters, made 204 flights and took up 244 passengers.

WESTON-SUPER-MARE

CAPT. D. G. WESTGARTH HESLAM is now in charge of the Avro Aerodrome at Weston, and has been flying with great energy and success since he took over. During the past week the one 3-seater at work made 81 flights and took up 161 passengers.

THE LONDON-PARIS SERVICE

THE third week of the London-Paris service run by Aircraft, Transport and Travel, was successfully completed on Saturday, by which time the Airco machines had flown more than 10,000 miles with passengers and parcels, and with only one 10 mins. delay, due to a forced landing. Out of 42 possible flights 41 had been carried out. On September 12 a special "Airco" express brought Gen. Sykes, Controller-General of Civil Aviation, from Paris to Hounslow in two hours. Gen. Sykes, with Gen. Seely, travelled to Paris on September 9 in an Airco 16, having been called urgently to the French capital in connection with the International Air Convention.

The Handley Page Transport, Ltd., state that during the week ending September 12 40 passengers have been carried, in addition to 1,200 lb. of freight between London and Paris. The average time for the journey has been 3 hours 29 mins. Arrangements are now complete for passengers to be conveyed in private landaulette motor-cars to and from the aerodromes.

On Tuesday a Breguet flew from Paris to London, inaugurating a new service which will alternate with the Handley Page. Thus from London the service will be on Monday Breguet, Tuesday Handley-Page, Wednesday, Breguet, Thursday, Handley Page, Friday, Breguet, Saturday, Handley Page; while the Paris–London service will be in the reverse order.

Fast Trip from Amsterdam

A VICKERS-VIMY commercial aeroplane, carrying eight persons, including passengers and crew, arrived at Hounslow from Amsterdam at 4.30 on Monday morning. The journey was made in 2 hours 50 mins. This was an improvement of 10 mins. on the previous time. Luncheon was served on board. Among the passengers were Mr. H. Steensma, chief technical officer of the Dutch Flying Corps, and two engineers of the Royal Dutch Aero-Dynamic Laboratory—Mr. Pigeau and Mr. Grase.

The St. Raphael Station

ST. RAPHAEL (Var) in the south-east of France is becoming quite an important point in the aviation world. It is a station on the British line from London to Bombay, and the French Government has decided to make a station there for passenger and postal services. The French aerodrome will be near the French naval air station and the British ground.

Air Attachés for Italian Embassies

ACCORDING to the *Giornale d'Italia*, the Italian Government has decided to follow the lead of Great Britain and the United States, and send to the capitals of the Great Powers a military attaché especially competent to deal with aviation questions.

From Maggiore to Amsterdam

ANOTHER fine performance by a Savoia seaplane was made on Monday, September 8, when Petty Officer Guarnieri, of the Royal Italian Navy, left Lake Maggiore with Lieut. Campacei, R.I.N., on board one of these machines and made a non-stop flight to Amsterdam. After flying over the Alpine chain of the St. Gothard region, and crossing Switzerland from south to north, Guarnieri followed the Rhine valley.

The Rome to Tokyo Flight

THE preparations being made for Gabriele d'Annunzio's flight from Rome to Tokyo provide for five machines taking part, and the principal points on the route will be Salonica, Adalia, Benares, Calcutta, Mandalay, Hanoi, Canton, Pekin, Fusan, and Osaka. The distance will be about 10,625 miles, and it is estimated that the flight will cost some £200,000.

"INTER-IMPERIAL COMMUNICATION"

In the course of an address, before the Economic Section of the British Association, on "Inter-Imperial Communication through Cable, Wireless and Air," Sir Charles Bright said that the welfare of the Empire was likely to be considerably influenced by the position we eventually took up in these matters, whether we were first in the field, and the actual value of the air routes which we controlled. In days to come air stations would be at least as important as coaling stations were now. There could be little doubt that Egypt was admirably situated to become the Clapham Junction of the air.

The ultimate success of inter-Imperial commercial aviation really resolved itself into closely thought-out organisation backed up by no stinting—without actual waste—of the wherewithal to carry things out. Lord Weir had become the chairman of a committee to advise on the main air routes of the British Empire. It would remain for the Air Ministry, in concert with the Foreign Office, to work out the aerial navigation treaties with other countries, prepare the necessary aerodromes, meteorological and wireless stations, and make trial cruises with different types of machines in the various routes.

The air stations—with wireless and meteorological equipment at each, will require to occur at intervals of something like every 500 miles along each of the main air routes of about £50,000 apiece. Emergency landing grounds at smaller intervals, at small cost, and airship sheds at distant intervals would have to be provided for.

Sir Charles Bright then went on to describe in detail the advantages of air travel, over comparatively short distances, from several points of view.

Turning to the subject of air mails and aerograms, he said that while the mail to Australia took over five weeks, an aeroplane of to-day could cover the distance in some 12 days. In those regions, which were practically immune from fog or gale, air mails should have a considerable future, both as entirely outstripping the mail ship over long journeys and as correspondingly beating any telegraph system over comparatively short distances.

The letters and parcels that had been carried in the "Airco" aeroplanes (as manufactured by the Aircraft Manufacturing Co.) between Folkestone and Cologne, went to prove what could be done in this direction under properly organised conditions. The letters could be sorted *en route*, sorting boxes being fitted to the aeroplane. As a matter of fact, all postal work that was done in a train could always be done with equal ease on aircraft.

Great developments would now undoubtedly take place in the transport of correspondence by aeroplanes. The principal problem was really that of reducing the weight of the correspondence to such dimensions as were consistent with economy. Various expedients to this end had been suggested, but if systems of scientific language condensation were employed, a lengthy business communication could easily be transmitted on a sheet of paper the size of an ordinary postcard.

◆ ◆ ◆ ◆

The Ageing of Duralumin

An important addition has just been made to the list of papers to be presented at the annual autumn meeting of the Institute of Metals in Sheffield on September 24 and 25. It is a note by an American metallurgical engineer, Dr. Zay Jeffries, of Cleveland, Ohio, on "The Micro-Mechanism of the Ageing of Duralumin," a subject of great interest to all concerned with the working or use of this aluminium alloy. Dr. Jeffries has come over to this country in order to be able to present his communication in person to members of the Institute.

Copies of the note are now in the press, and applications for copies should be made to the Secretary, Institute of Metals, 36, Victoria Street, S.W. 1.

A Flying Club for Cambridge

A scheme for the formation of a flying club for undergraduates and others in the University has been drawn up by the Cambridge School of Flying. It is proposed that one machine should be set apart for the use of members of the club and that the subscription of 15 guineas per term would cover a series of eight 15-minute flights. Those interested can obtain particulars from the Secretary, 2, Downing St., Cambridge.

Propeller Souvenirs

Those who want to have a relic of the Great War have still an opportunity to secure a propeller of either the two or four-bladed variety. They are made of the finest walnut and mahogany, and cost originally from £15 to £25 each. They can be adapted for many purposes, such as hat-racks, etc., a finishing touch being given if a barometer or clock is mounted in the centre of the boss. Two-bladed "props" are being sold at 25*s*., while four-bladers cost 30*s*. Enquiries should be addressed to the Controller, Aircraft Disposal Department, York House, Kingsway, W.C.

Commercial Flying in South Africa

From South Africa comes word of the projected formation of a syndicate, of which Col. Armes and Maj. Miller, both late of the R.A.F., are the leading spirits, for the development of commercial flying in South Africa.

Three machines have already been landed at Cape Town, and three more are expected before Christmas, and, to begin with, an attempt will be made to run a regular service between Johannesburg and Pretoria. The service is expected to be in full swing by October 1, and a landing place has been selected at Pretoria, close to Roberts Heights.

A Trans-American Competition

The Aerial League of America has announced that it is organising what is termed a Transcontinental Aerial Derby from New York to San Francisco, with prizes aggregating over $100,000. It is proposed to make it an international event, and the course will probably be divided into sections of about 250 miles each.

The Lawson "Aerial Transport"

From Milwaukee comes word that the Lawson "Aerial Transport," of which a description was given in our last issue on August 22, made a trial flight, lasting some 20 minutes. It came to a conclusion through one of the motors experiencing heating troubles, and the machine landed successfully in a wheat field.

High Climbing in America

While testing a Curtiss triplane, fitted with a 400 h.p. Curtiss engine, at Roosevelt Field, Long Island, on September 13, Roland Rohlfs succeeded in getting up to 34,200 ft. As the performance was not officially observed, it cannot be claimed as a record, but Mr. Rohlfs will endeavour to repeat the performance at the first favourable opportunity. It is stated that at 34,000 ft. Mr. Rohlfs found a temperature of 44 deg. below zero, while at 34,200 ft. the temperature was four degrees higher.

German Round-the-World Trip

The well-known German pilot Boehm is planning to make a trip round the world in an aeroplane of his own design, which is claimed to be non-capsizable and to combine great speed with low weight. Boehm, it may be remembered, holds the world's duration record, which he established in 1914 on an Albatros biplane with 70 h.p. Mercédès engine, when he stayed in the air for over 24 hours.

An American Mission in Germany

From Berlin it is reported that quite recently an American mission went from Berlin to Friedrichshafen in the German commercial airship "Bodensee," in order to discuss the question of commercial airships with the Zeppelin works and to consider the suitability of Zeppelin airships for America.

A German Aeroplane Shot Down

A German aeroplane which did not carry the prescribed identification marks was fired on by anti-aircraft guns and shot down in Upper Silesia. The pilot, Lieut. Rusch, was killed, as was also the observer, Sergt. Kieske.

First German Air-Chauffeur

The first German pilot to become an air-chauffeur in the full sense of the word is Herr Brunhuber, who is said to have accepted a position as air-chauffeur of two machines, a Fokker and an Albatros, belonging to two private individuals.

Zeppelins to Sweden

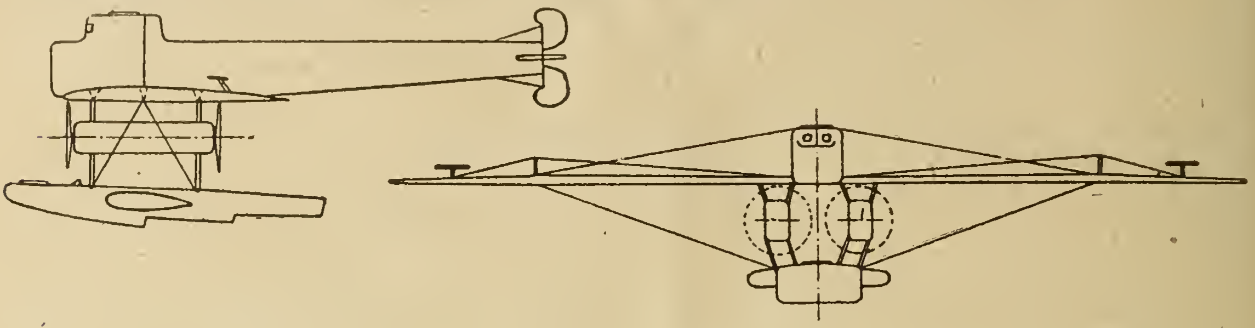
It has been arranged to open Zeppelin traffic between Berlin and Stockholm, reports the *Morning Post* correspondent at the latter place. The Swedish Air Traffic Co. will cooperate with the Deutsche Luftschiffarts Actiengesellschaft in arranging trips over Swedish territory by the German airship "Bodensee." The route from Berlin will be taken along the Swedish east coast, and the landing will be on the Stockholm training fields. The "Bodensee," which has a carrying capacity of 12,000 kilos., and accommodation for 25 passengers, is arriving shortly on her first trip.

THE (GERMAN) DORNIER "GIANT FLYING-BOAT"

FROM A CORRESPONDENT

In view of its unusual arrangement, a few notes concerning the Dornier monoplane flying-boat, which was under construction when the Armistice was signed, may not be without interest. The machine was built by the Zeppelin Works at Lindau on Lake Constance, and was designed by the chief designer of that firm, Herr Dornier, who is Swiss by birth. As the accompanying diagrams show, the machine is a monoplane, and is, in a sense, of the flying-boat type, although it might be better described as a single-float seaplane. An idea of the size of the machine may be formed when it is pointed out that the wing span is 36 m. (118 ft.). The power plant consists of four Maybach motors, each of 260 h.p., driving two tractors and two pushers.

The *fuselage* is placed above the wings, and in it are housed gunners and other crew. The pilots are seated down in the boat, or central float, which also accommodates gunners, one in the nose and one in the stern. In the boat, between the pilots and rear gunner, are placed the petrol tanks, which have a capacity sufficient for a 10 hours' flight. The machine carries a crew of nine, which may be constituted as follows: Two pilots, two gunners in the "hump" on top of the *fuselage*, one wireless operator in the nose of the *fuselage*, two gunners in the boat, and two engineers. With full load the machine has attained a speed of 145 km./hour (about 90 m.p.h.). One of the finest flights made by the Dornier was a non-stop trip from Lake Constance to Norderney, the Naval Air Station in the North Sea.



THE DORNIER MONOPLANE FLYING BOAT: Diagrammatic side and front elevations

With regard to construction, it should be pointed out that there is no wood in the machine, the wings, *fuselage*, boat and engine mountings being made of Duralumin. The Zeppelin firm have also during the War constructed all-Duralumin single-seaters and two-seaters of the twin-float type.

* * *

Under a Danube Bridge

A message from Pressburg states that the French pilot, Joe Pouliquen, on a Breguet (300 h.p. Renault), accompanied by his mechanic Vallières, has twice recently flown under the bridge which carries the railway from Prague to Budapest across the Danube.

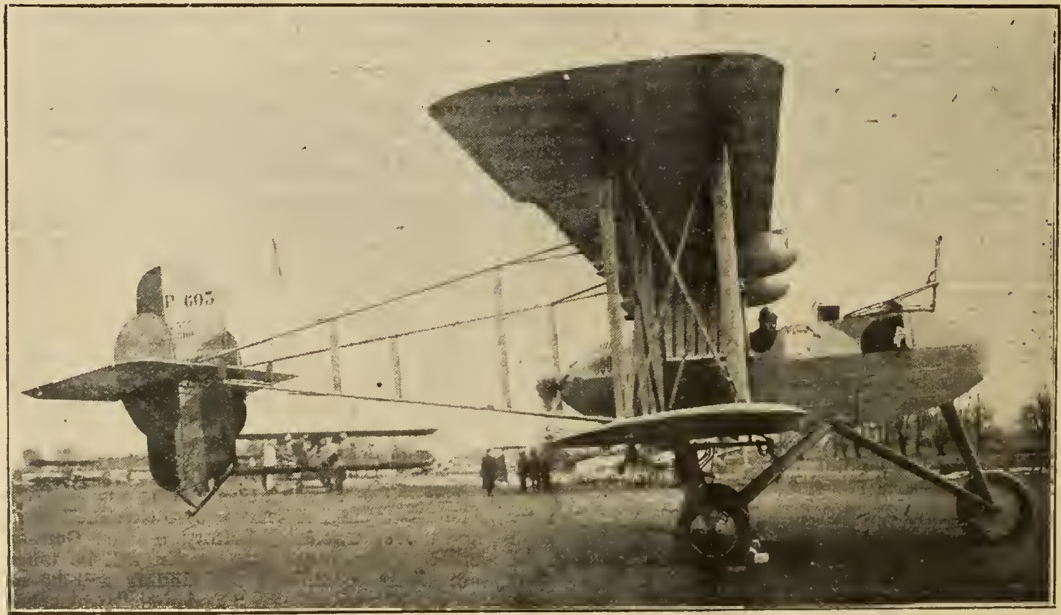
A German Squadron for Russia

From a story in the German *Freiheit* (Freedom) it appears that the flying squadron No. 426 went over to the Russian counter-revolutionaries some days ago with its entire material. The squadron remains in communication with the military departments in Germany, whence it receives stores. A dozen men were sent to Berlin recently commissioned to take aeroplanes to Courland.

Italian Airships for South America

"In the Ciampino, south-east of Rome, a large airship, called the Transatlantic, is nearly completed," says the *Daily Mail* correspondent at Milan. "Its construction is being undertaken with the idea of attempting a crossing from Italy to South America.

"The airship has four motors, giving a speed of 60 miles. I am informed that the first trial flight will take place at the end of the month."



A Breguet pusher biplane flown, during the War, by the Russians on the Roumanian front.

AIRSHIPS

R 33'S TRIP OVER THE LOW COUNTRIES

The R 33 returned to Pulham at 6.20 p.m. on September 12, after carrying out a demonstration flight over Holland and the French and Belgian battlefields. R 32 also took part in the demonstration, the two airships flying together over Amsterdam that morning. R 33 carried as passengers a number of prominent business men whose names are as follows: Mr. Sydney A. Boulton, of Lloyds; Mr. J. Dunn; Mr. Benjamin Guinness; Gen. Sir Sefton Brancker, of the Aircraft Manufacturing Co.; and in addition Com. Foakes, R.N., representing the General Post Office; Mr. E. A. Box, Secretary to High Commissioner of Australia; and Brig.-Gen. E. M. Maitland, D.S.O., C.M.G., C.B.E., were also on board. The following is the account of the voyage as issued by the Air Ministry:—

R 33 left Pulham at 9 p.m. on Wednesday evening. R 32 had started an hour earlier. Excellent weather conditions prevailed. After crossing the coast at Lowestoft R 33 set a course towards the mouth of the Thames, proceeding from the North Foreland to the Belgian coast at Ostend. This point was reached at about 4 a.m. Whilst off the North Foreland, R 33 spoke by flashlamp with the battleship *Revenge*, whose captain wished us "Bon Voyage." Shortly before 5 a.m. the coast of Holland was crossed at West Katelle, and The Hague was reached by 6 a.m. About the same time we on R 33 sighted the R 32, which was flying low down on our port side. A signal was sent to her by wireless asking her to keep in company with us as far as Amsterdam. We came upon Amsterdam at 7 a.m., when the city was scarcely astir. Nevertheless those people who were in the streets had a good view of the two ships as they circled around. A message of greeting from R 33 was dropped by R 32 in the centre of the exhibition, and shortly after a handsome welcome to the R 33 was received from Gen. Snyder. The Royal Aero Club of Holland also sent a message of goodwill, to which we were glad to respond. Leaving Amsterdam with some regret, as we had hoped to spend part of the forenoon above the city, we turned southwards over Rotterdam. Arriving at 8.15, a message attached to a loaded streamer addressed to the Mayor was dropped. We hoped that it reached him, but unfortunately the chances were against us as it fell into an open field. It now became apparent that the project of landing in Paris might, as a result of the large amount of water ballast discharged during the night, be a matter of some difficulty, and it was decided, therefore, that the visit to Paris should be abandoned, and that our voyage should proceed not further than the Flanders battlefields. Our passengers would, perhaps, have wished to view the three capitals, Amsterdam, Brussels and Paris from the air during one day; nevertheless the visit to the battlefields zone proved to be an event which few of us are likely to forget easily. Antwerp was reached at 10.40 a.m. The great moated fort which surrounds Antwerp looked most impressive, appearing from the air as a huge and ornate mosaic. Around each fortress the ground is pitted with shell-holes, otherwise the town looks remarkably well preserved. At Antwerp, as at Rotterdam, messages were dropped addressed to the Mayor. Whilst flying south of the town and over the district of Hoboken we were interested to observe one of what appeared to be German submarine shelters on the banks of the Scheldt. Near Brussels we observed the old German Aerodrome off Evere, where a Zeppelin shed still stands. After dropping a message into Brussels at 12.45, we made for Lille, including in our route Enghien, Ath and Leuze.

As we approached Lille the shadow of War could be more plainly seen; shell-holes became common and complete churches rare. This part of the country is, however, well inhabited. Lille, which we flew over at 2.40 p.m., is a curious blend of the effects of War and Peace.

For instance, in the heart of the town we could plainly see a circus with roundabouts operating by the side of a large block of ruined buildings.

It is beyond Lille, in the area between Lille and Nieuport, by way of Armentières and Ypres that one had the strongest impressions of the havoc of War. For miles the land is a shattered, desolate and waterlogged waste; scarcely a habitation may be seen in any direction. Across it all blows strong and long streaks of dirty smoke from the fires of salvage parties busy clearing the ground. One would certainly not like to be marooned there.

Leaving the Belgian coast at Nieuport, a course was set for England, and we made a rapid return passage over the sea to Suffolk. We landed safely at Pulham at 6.20 p.m., after a trip of about 20 hours.

The guests who were having their first experience of airship travel were delighted with the trip, with the accommodation provided and the simple but varied meals furnished by our competent *chef* and served tastefully by our excellent waiter. The luncheon menu, which may be given as a sample of the fare, was as follows:—

R 33 Luncheon Menu
Natives du Mer du Nord.
Terduan Jambon "R 33."
Haricots Verts.
Pommes Saute Trans-Atlantique
Biscuit Glacé Bruxellois.
Friandise "Ad Astra."
Café.

As evidence of the views of the passengers, one of them remarked on landing that when he accepted the invitation he did not dream for one moment that he would be provided with a comfortable sleeping-berth, a dining-room, oysters for lunch—amongst other good things, and electric light; nor did he expect to have complete freedom to roam all over the ship and from one gondola to another, or yet to have placed before him a copy of the first aerial newspaper containing a full summary of the home and foreign news of the day transmitted by wireless. The message dropped in the Amsterdam Exhibition reads:—

"Gen. Maitland and all on board R 33 unite in expressing their most cordial good wishes to Gen. Snyders and the general committee of the Exhibition by whose kind invitation a visit to Amsterdam is made. It is their firm belief that the Exhibition marks the opening of a new era in the international progress of aeronautics."

◆ ◆ ◆ ◆

That Zeppelin Story!

"Intentionally misleading" is the way the *Freiheit* describes the recent semi-official statement regarding the destruction of several Zeppelins. The *Freiheit* points out that the Bremen *Arbeiter Zeitung*, on June 28, published the following report, which has not hitherto been denied in any quarter:—

"It is reported to us from a reliable source that the airships L 14, L 41, L 42, L 63 and L 65, which according to the terms of the Peace Treaty had to be surrendered, were destroyed by officers and warrant officers on the night of June 23-24, in the Nordholz Zeppelin Hangars for the same motives as those for which the War Fleet was destroyed at Scapa Flow.

"In accordance with the Armistice conditions the motors and gondolas had been removed, and the airships had to rest on frames suspended by ropes. On the night of June 23, the frames were removed and the ropes severed, with the result that the airships dropped to the ground and were smashed to pieces."

The same paper also published a report that the airships at Ahrhorn Aerodrome, on the East Frisian Coast, had been destroyed.

AIRSHIPS*

By Wing-Commander T. R. CAVE-BROWNE-CAVE, C.B.E., R.A.F.

Fabrics

The principal difficulty which is experienced with the use of airships for long periods, more particularly in tropical countries, is the deterioration of the fabric under the action of sunlight. This deterioration takes two forms—firstly, the strength of the textile material is decreased, and, secondly, the gas-holding properties of the proofing material are destroyed.

The rigid airship contains a large number of gasbags formed of the lightest possible gastight material. This is usually a very light cotton cloth proofed with goldbeaters skin stuck to it by means of rubber solution. The skins are then varnished as a protection against moisture. The actual tensile strength of this fabric is only sufficient to prevent damage during the motion of the gasbags in the ship's framework.

The outer surface of the ship is formed by an outer cover of linen of much the same strength as that used for aeroplane wings. The duties which this outer cover has to perform are very important. It has to be stretched sufficiently tight to prevent any flapping or appreciable deformation during the passage of the ship through the air. It must be waterproof, and also water-repellant, in order to reduce the weight added to the ship by a shower of rain. A further function, and one very difficult to fulfil, is the protection that it has to afford to the internal gasbags.

The outer surface of non-rigid ships is made with a shining aluminium finish so that as much as possible of the heat and light is reflected. The rubber immediately under the surface is made to contain considerable more *litharge* than otherwise necessary as this material absorbs a large proportion of that light which passes the reflecting surface. A similar system is being followed with the outer covers of rigid airships, and judging by the excellent results obtained from somewhat similar methods employed on aeroplane fabric, the protection both to the fabric of the cover and to the internal bag, should be very good.

Experience with rigid outer covers is at present small, but it has been found that with non-rigid envelopes made by our latest methods of proofing, the deterioration of the outer surface becomes clearly visible before any serious loss of strength has taken place.

The envelope of a non-rigid ship is formed of layers of fabric which have to be of considerable strength in order to resist the small internal pressure necessary to maintain the rigidity of the ship. Between these layers of fabric is placed one or more layers of gas-tight rubber.

The Effect of Wounds

The strength of a fabric envelope can be calculated with considerable accuracy if it is assumed that the fabric is undamaged. The reduction of strength caused by a small local wound is, however, very considerable, because such a wound causes concentration of stress at the edges of the hole, and there is a tendency for the fabric to rip. This dangerous concentration of stress can be very largely avoided in a two-ply fabric if the threads of one ply are laid at 45 deg. to those of the other. The threads of the diagonal ply then form an effective means of distributing the stress, and also when tearing actually begins tend to form together into a bunch which exerts considerable concentrated resistance to the extension of the tear.

The following table shows the reduction of strength caused by a $\frac{1}{2}$-in. wound cut in a 6-in. strip in a direction at right angles to the direction of the stress :—

Fabric.	$\frac{\text{Strength wounded.}}{\text{Strength unwounded.}}$
Single-ply cotton	0·39
Single-ply linen	0·52
2-ply parallel CC	0·33
2-ply diagonal BD.	0·57
2-ply diagonal CC.	0·72
3-ply diagonal CCC.	0·68

The strength of the fabric used in the envelope of the "N.S." airships is 1,770 kilos per metre, *i.e.*, 100 lbs. per inch.

The stress in an airship envelope is very largely determined by the internal pressure which it is necessary to maintain in order to keep correct shape. The circumferential stress which this pressure produces in the fabric is, like that in an ordinary boiler shell, about twice that in the longitudinal direction. Ordinary fabric is usually of about equal strength in the warp and weft directions, and in order to resist the circumferential tension the envelope has to be made with a quite unnecessary longitudinal strength with a consequent increased weight.

It has been found possible to reinforce an envelope by means of flat bundles of string placed circumferentially round the envelope at suitable intervals, so that these strings contribute the difference between the circumferential and longitudinal tensions. The fabric, therefore, need only be made sufficiently strong to take the longitudinal tension. This system of re-inforcement has not at present been tried on a full-size envelope, but was found to give very satisfactory results when adopted on 20-ft. model envelopes which were tested to destruction.

In considering the best material for envelope reinforcement, very careful attention had to be directed to the tensile strength of a material compared with its weight for a given length. This was found to be most conveniently represented by the length of the strand which would hang vertically down without breaking under its own weight. This was termed the breaking length of the material. Values for some usual materials are given in the table :—

Material.	Breaking length in metres.
Thread, 3-strand cotton	12,600
Thread, 3-strand flax	15,900
Thread, 3-strand hemp	12,800
Pains light rocket cord	28,600
Best Italian hemp cord	27,500
Airship cotton fabric	10,000
Aeroplane linen fabric	14,000
Envelope fabric (proofed)	4,000
Re-inforcing string tape	12,600
Aluminium 10 tons/in.	6,400
Duralumin 24 ton/in.	14,400
Mild steel 30 tons/in.	6,200
H/T steel 100 tons/in.	20,600

Gas Tightness

The gastightness of fabrics and of seams formed in them is a matter which has been very thoroughly dealt with in papers to the Advisory Committee for Aeronautics, which it is understood will be published very shortly. It may, however, be said that the amount of hydrogen which leaks out through the fabric of an airship is a matter of purely nominal importance with fabrics of the excellence now available. The matter of real importance is the passage of air through the fabric into the gas space. This air reduces the purity of the gas, and unless very large quantities of gas are consumed by the ship by discharge through the valves, it is impossible to eliminate this air sufficiently to maintain the gas purity which is necessary to give the ship her required lift.

An interesting point which has been clearly established is that the air which diffuses into the gas space tends to collect at the bottom of the envelope, more particularly in trilobe ships where the circulation of gas is less free than in circular envelopes. Samples of gas taken from within 12 in. or so of the bottom of the envelope show a hydrogen purity of some 1 per cent. lower than that in the rest of the envelope. Further, the ratio of oxygen to nitrogen in this impurity shows that the air has come in by diffusion and not by mechanical leakage. This puddle of impure gas only collects while the ship is at rest in the shed, and is quickly dissipated as soon as flight is started.

Some of the chemical and physical changes which accompany the loss of gas-tightness of a rubber-proofed fabric are at present very obscure. Loss of gas-tightness appears to proceed very slowly for a considerable time, and then to become very rapid, almost in the nature of a sudden collapse. In some cases the gas-tightness is actually found to increase for a short time after the fabric has been made.

Temperature Effects.

The effect of the sun's radiation on the outer surface of the ship produces other important results. It raises the temperature of the gas and the air contained within the outer envelope to a point considerably above that of the surrounding air. This results in what is termed "false lift." Immediately the strength of the sun's rays decreases the superheat begins to disappear, and the false lift of the ship is reduced. The extent of this superheat sometimes amounts to 30 deg. F. to 35 deg. F., corresponding to a loss of some

---

* Lecture delivered to Engineering Section "G" British Association.

6 per cent. of the total lift of the ship. A rigid ship flying towards the sun superheats the gas in her forward compartments considerably more than that aft, and a change of trim results. Flow of air over the surface of the ship, and the circulation of air between the outer cover and the gasbags of a rigid ship tend to reduce superheat.

Changes of temperature, in which the gas and air readings remain equal to each other, do not involve change of lift unless the expansion of the gas is sufficient to involve discharge of gas from the ship. If the ship becomes light and is allowed to rise higher than is otherwise necessary, much gas may be discharged. If weight can be taken into the ship, so that she does not rise, the loss of gas may be avoided, and this may be of considerable value during the next night when the ship has cooled down, and possibly absorbed moisture.

There are several methods of taking weight into the ship. One is to condense the exhaust, and by this method a weight considerably in excess of the weight of fuel burnt can theoretically be obtained. It is found that the exhaust gas from a 260 h.p. engine can be cooled to within 10 deg. F. of the atmosphere temperature in a cooler weighing about 120 lbs. This would, in a rigid airship, take the place of a silencer weighing some 60 lbs., and the added weight is not, therefore, very great. The form of cooler used resembles a honeycomb radiator with 1-in. tubes through which the air passes, the exhaust passing through the space around the tubes. There is, however, difficulty in this condensation, because the cooling surfaces rapidly become fouled and conductivity very greatly reduced.

An alternative is to draw water direct from the sea, either by a propeller-driven pump contained in a body towed by the ship and discharging water up a hose, or by filling a specially-shaped fabric drogue and hoisting that weight of water into the ship by means of an ordinary winch. Both these operations involve considerable difficulty in handling the ship, more particularly because at the time she wants water she is seriously out of trim.

A further and possibly more promising alternative is to burn the hydrogen which would otherwise have to be discharged, and to condense the water of combustion. This is considerably easier than condensing the exhaust gas, because there will be no fouling of the cooling surfaces.

Hydrogen as Fuel

Experiments have been made on the use of hydrogen as fuel, and considerable success has been achieved. It is found that with very simple gear hydrogen can be burnt in an ordinary airship engine. When burning hydrogen alone it is not possible to develop more than 25 per cent. or 30 per cent. of the power which the same engine would give on petrol. If greater power is attempted serious detonation in the cylinder results. By providing a hydrogen-air mixing valve in parallel with the petrol carburettor it is possible to obtain any fraction up to the full power of the engine by suitably proportioning the relative amounts of hydrogen and petrol mixture burnt. The proportion of hydrogen which it is possible to burn depends upon the proportion of full power which is required from the engine. Under all ordinary circumstances a very considerable saving in fuel can be achieved.

The risk of fire in airships has considerably reduced the warlike operations which these aircraft have been allowed to undertake. For commercial purposes some small risk of fire also exists. The proportion of this risk which is due to the presence of hydrogen is, in the case of commercial craft especially, considerably smaller than is generally believed. The engines and other possible sources of ignition are carefully arranged at a considerable distance away from any point at which gas can possibly be discharged, and the speed with which gas when liberated rises clear of the ship, is such that only a very serious fire in one of the engine cars could possibly be communicated to the gas.

Although during the war British airships flew nearly 3,000,000 miles, the only ships which were destroyed by fire were, one, the first, "S.S." ship which ran into some telegraph wires and caught fire, the crew escaping; two, a coastal ship which landed on the water and caught fire for an unknown reason, and, lastly, an "S.S." ship which landed on top of another in a thick fog.

The petrol system is a source of danger which is probably at least as great as that due to the gas. Large quantities of petrol are stored in the keel of a rigid airship, and the petrol system is necessarily connected to the engine cars. The possibility of transmitting fire to the envelope of the ship would be very greatly reduced if paraffin or an equally safe fuel could be employed. The added safety which would be derived from a less inflammable fuel would probably justify some increase in the weight of machinery necessary to develop the required horse-power.

Weight of Engine, etc.

It may here be well to draw attention to the relative importance of the weight of the engine and the weight of the fuel consumed. This relation is very different from that which obtains in an aeroplane where the length of flight is considerably less. An aeroplane engine weighs some 3 lb. per horse-power, and may be expected to burn a weight of fuel equal to its own in six hours or eight hours. The machinery of an airship will, of course, during an ordinary passage, run for many times this duration of flight, and, further, a large proportion of the flight will be carried out at less than the full power of the engines. A "North Sea" airship carried out one patrol of 101 hours, while the flight of R 34 to New York involved a continuous flight of 106 hours. From this it will be clear that an airship engine must be one of the very highest fuel economy, not only at full power, but also at fractions down to 25 per cent. of the maximum power. The increase of weight of engine justified by a small improvement in fuel economy is, therefore, considerable.

The use of steam for airship propulsion has been considered, and although the convenience of such a system is very great, and the weight of machinery, including boiler and condenser, is not seriously in excess of the corresponding petrol engine, there appears at present no likelihood of reducing the fuel consumption to much less than 1 lb. per horse-power hour. This is clearly prohibitive when compared with the consumption by a petrol engine of less than 0.5 lb. per horse-power hour.

In addition to the requirement of high fuel economy, it is of the greatest importance that an airship engine should be able to run for very long periods without risk of breakdown. A further point is that the engine should be arranged in such a way that all its parts which are liable to failure during running, are made easily accessible, so that a repair can be carried out in the air. This is a very important difference from the aeroplane engine, which is normally inaccessible during flight. An airship engine can be stopped during flight, and must be regarded as at least as easily accessible as that of a motor-boat. The space round it is generally at least as ample, and it is only in exceptional circumstances that the motion of the ship will in any way interfere with the execution of repairs. Defective magnetos have frequently been replaced by others of a different type and the new ones correctly timed. One repair which involved the removal and replacement of one complete cylinder of a two-engined ship, was successfully carried out, and the engine used without trouble for the remainder of the flight. A satisfactory airship engine must, therefore, be one in which repairs, even of this magnitude, can be effected as easily and with as little delay as possible.

Propellers.

The variation of speed of an airship renders the design of her propellers one of very considerable difficulty. She may be required to run on one engine developing its full power and giving the ship a very low speed, or on all her five engines giving her full speed. Under these circumstances the efficiency of her propellers must necessarily be low in some conditions. A satisfactory means of varying the pitch of the propeller should, therefore, lead to a very considerable gain in the efficiency of the ship as a whole. A propeller in which the alteration of the blade angle is sufficient to give reverse thrust would be very convenient, and avoid the reverse gear-box now required.

One of the advantages which an airship possesses over an aeroplane is that her greater range will enable her to avoid atmospheric disturbances, and also to take more advantage of any depression which can be approached in such a way as to obtain a favouring wind. Meteorological information can now be obtained from a fairly considerable number of points, but prediction is rendered considerably easier if it is possible to read the barometer at a point on the ground below the ship herself. A barometer reading taken in the ship is, of course, useless unless the height of the ship can be determined by means other than barometric pressure. Instances have occurred in which the barometer has changed so greatly during an airship's patrol, that the ship struck the water during the night when her aneroid registered a height of 300 ft. When crossing an unknown country it is also desirable to determine the height above the ground, independent of the barometer and height above sea-level. To determine this height above the sea, it has been suggested that the report of a rifle discharged in the ship and reflected from the surface of the sea should be timed. A special form of stop-watch, which was used for gunnery research during the War, makes it possible to measure the interval between two similar sounds with an accuracy of within $\frac{1}{10}$ sec. Up to the present the method has not been found very satisfactory, on account of the difficulty of hearing the reflected report if the ship is not stopped, or her speed seriously reduced. It is, however, possible that in an emergency this device could be used with success by stopping or slowing down the ship. This is, of course, a serious disadvantage to the method, and something better is required.

The generation of hydrogen is probably the greatest difficulty in extending the use of airships to more or less undeveloped countries. Hydrogen at present is manufactured for airship purposes mainly from coke. Some method of manufacturing hydrogen from wood or other vegetable matter would probably prove of very great value in allowing airships to work in those countries in which they have their greatest advantage over other possible forms of transport.

The use of helium has been considered, and much experimental work has been done on the extraction of this gas from the natural gases obtained from wells in Canada and America. The price of this gas, when made by present methods, or by any system which appears probable in the immediate future, is, however, almost prohibitive, and failing a really remarkable discovery such as the possibility of getting hydrogen to degrade into helium, there does not appear much possibility of reducing the price to a commercial possibility.

Stresses

The calculation of the stresses produced in the hull structure of a rigid airship under the many different conditions encountered is one of considerable complexity, and one which cannot come within the limits of this lecture. The most interesting members of the structure may be regarded as long struts some 16 ft. long, designed to fail, when the ends are supported freely, under an end load of some 8,000 lbs., or a distributed load of some 2,000 lbs., *i.e.*, 120 lbs. per foot. The construction of such a girder has involved several very interesting, though probably not novel, principles. The bracing pieces, which have to be made of an easily stamped section, are formed so that their thin edges come in the neutral axis of the piece, and are, therefore, little exposed to secondary bending. The end of the bracing piece is carefully shaped so that the loading is as little eccentric as possible. Bracing pieces are arranged in pairs, and are riveted together where they cross. The piece in compression can then derive support from its fellow, which must at that time be in tension.

An interesting manner of assessing the relative merits of various types of strut is to consider how far the construction allows the material to develop its full yield stress. If a form of construction is such that the crippling load divided by the area of cross section of the strut approximates closely to the yield stress of the material, the form of construction must be considered very good.

The advantage to be gained, from a commercial point of view, by using a large ship is clear from the following consideration. For ships covering the same range at the same speed and having similar shape, the displacement varies as the cube of the linear dimensions (l^3), the weight of hull, fabric, etc., as l^3, the resistance, and, therefore, the weight of machinery and fuel, as l^2;

$$\therefore \underset{K_1 l^3}{\text{gross lift}} = \underset{K_2 l^3}{\text{wt. of hull, etc.}} \quad \underset{K_3 l^2}{\text{wt. of machinery}}$$

$$\text{Freight fuel consumed} = K_4 l^2.$$

Hence $$\frac{\text{freight}}{\text{fuel}} = \frac{K_1 l^3 - K_2 l^3 - K_3 l^2}{K_4 l^3},$$

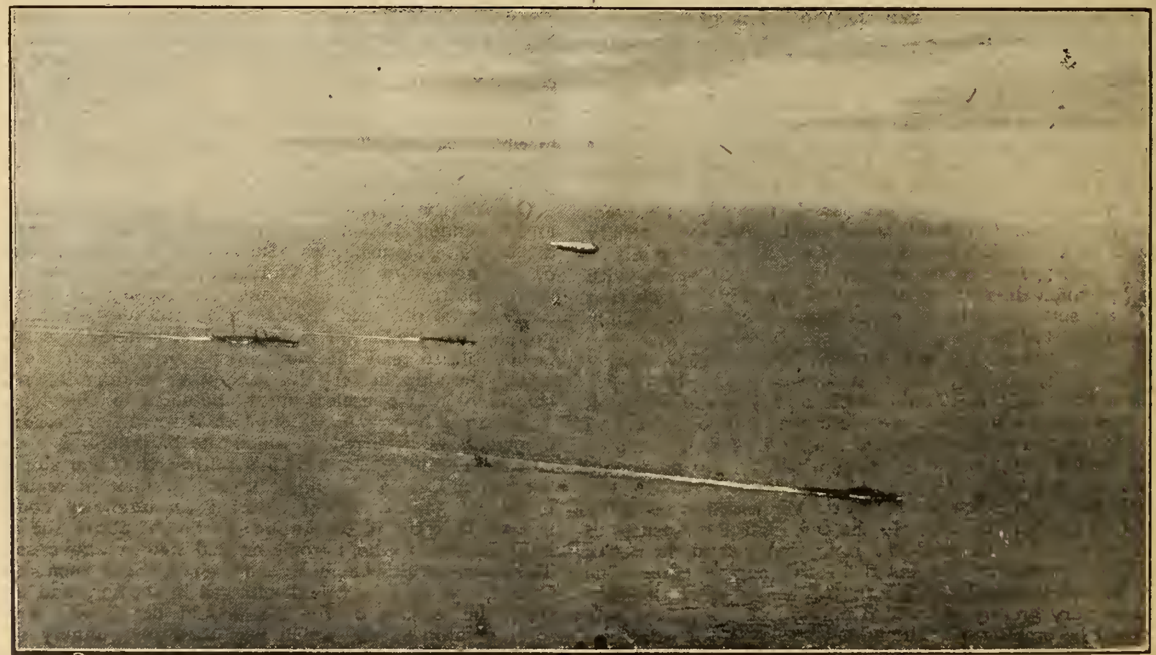
a function which clearly increases with the size of the ship.

It is, therefore, interesting to consider what limits the size of rigid and non-rigid ships of the types at present in view.

Increase of length of a rigid of given cross section appears to call for no increase in the strength of her hull, provided the load is properly distributed. No serious restriction to the length of rigids is, therefore, in view. The most dangerous stresses are produced in the main transverse members of rigids by unequal inflation of the gasbags on either side of a bulkhead. The bulkhead is formed of wires lying in the transverse plane and attached to the joints of the main transverses. Difference of pressure in adjacent bags, therefore, induces great tension in these wires, and hence compression in the transverse frame. The possible head of gas produced by the total deflation of one bag increases with the ship's diameter, and so does the span of the wires. In a ship of large cross section, therefore, the compression in the transverse frames becomes very serious.

The non-rigid airship is not, as at present designed, divided into compartments by diaphragms capable of resisting a difference of pressure in the gas on either side. If the ship takes up a very steep pitch the internal pressure at the upper end of the ship will be seriously increased if the pressure at the lower end is still to be maintained above atmospheric. This accumulation of pressure at the upper end of the ship while pitching may prove a serious difficulty in a really large non-rigid, but it is probable that by the employment of a circular section and fabric re-inforced in the manner already referred to, sizes considerably greater than any we have built at present can be achieved. The development of a large non-rigid offers—at any rate in the author's opinion—very great promise of advantage, because the ratio of disposable lift (fuel and freight) to the total displacement of the ship is so good. A non-rigid of 500,000 cub. ft. capacity, *i.e.* carrying a useful load of $7\frac{1}{2}$ tons, will have about the same value (50 per cent.) for this ratio as a rigid ship of four times the capacity (2,000,000 cub. ft.).

◆ ◆ ◆ ◆



Transports escorted by a Blimp, as seen from a sister airship.

AIRISMS FROM THE FOUR WINDS.

Signs of *The Times*. This week the following announcement appears in our great daily contemporary, and is a welcome milestone in commercial aviation :—

> Small Advertisements by Aeroplane.
>
> With the view of facilitating the insertion of urgent advertisements from readers of *The Times* in France, arrangements have been made whereby they will be delivered in London by aeroplane daily.
>
> All advertisements received at the Bureau du Times, 2, Chaussée d'Antin, Paris, up to 9.30 a.m. each day will be in time for the following day's issue of *The Times*.

* * *

Another sign of the times. In a fascinating description of a property advertised for sale, early in October, on Shuna Island, 18 miles south of Oban, by the auctioneers, Messrs. J. A. Lumley and Dowell, one of the "attractions" noted is "a good landing-ground for aeroplanes in front of the mansion." So here's a chance for some up-to-date sportsman to acquire on October 7 a nice tight little island 2½ miles long and nearly 2 miles broad in parts, with the aeroplane landing ground, a motor launch and other craft thrown in. It is to be hoped old Scotch families of the Clan Gotterdammering are barred from bidding.

* * *

To have carried with it the real D'Annunzio artistic touch, the Fiume *coup* last week-end ought to have been inaugurated by the poet's entry into the city, overhead his followers, *à la* 'plane.

* * *

Quite interesting should be the exhibition opening on October 8 at the Royal Academy, of examples by artists who have done camouflage work for the Navy and Royal Air Force. In addition to paintings and sculpture, there will be models of actual camouflage.

* * *

That the risk of travelling in rigid airships is not regarded as very onerous by the insurance world, may be gathered from the fact that one of the passengers in R 33, upon the occasion of her cruise to the Continent and back the other day, effected in London an insurance on his life for £1,000 at a premium of less than £2, equivalent to less than 4s. per cent. This is merely by the way, but it is suggestive. In other directions, where the aeroplane is the means of transit, quite considerable business is being transacted, amounts of £20,000 being quite in the ordinary run of policies, while the Aviation Insurance Association is known to have just quoted for two individual risks of £100,000 each. The one risk is on the life of a business man who proposes to travel by air every month between London and Paris, and the other relates to an American who proposes to make a flight in the United States. Directly supporting this association are nearly 250 underwriters and two large insurance companies, so that the actual share of each underwriting name in such large amounts is not very considerable.

Some R.A.F. Impressions

Wing-Commander Kilner, D.S.O., with bar, Commander, R.A.F. Training Depôt, Cranwell, Lincs.

* * *

Lieut.-Col. E. S. Halford, of the Air Ministry, is now the happy owner of the Stamp Souvenir Album of the First Transatlantic Air Post, and the Newfoundland Permanent Marine Disasters' Fund is the richer by the £210 which Col. Halford paid for this "prize" at the Stamp Exhibition Auction, 110, Strand, last week. The stamp is the one used to frank letters conveyed by Mr. H. G. Hawker on his Atlantic flight, and is mounted in an album, autographed by Lord Northcliffe and by all those immediately concerned in the great race, viz., Capt. Sir John Alcock, Capt. Sir A. Whitten Brown, Mr. H. G. Hawker, Capt. K. Mackenzie Grieve, and Mr. T. Sopwith. In addition, the stamp is initialled on the back by the Postmaster-General of Newfoundland. The £210 goes without deduction to the Marine Disasters' Fund. Lieut.-Col. Halford has left the album on view in the Stamp Exhibition till the end of the month, where it may be seen daily from 10 to 6, free of charge. Altogether a very unique historical souvenir.

* * *

Scientific research in connection with aerodynamics appears to be directly responsible for another little item likely to be of benefit to the health and comfort of mankind generally. It is a device to obtain the best effects from a radiator described by Prof. G. H. Bryan at the British Association meeting. Prof. Bryan states that his application of the aerofoil theory to the heating of buildings occurred to him while working at the mathematical theory in connection with aeroplanes. The results obtained had agreed with the theory far better than was anticipated. His proposal was that over each radiator in a public or private building there should be placed a deflector arranged at an angle to be determined by experiment. In the ordinary way, said Prof. Bryan, hot air from a radiator was drawn up towards the window—for some reason he did not know radiators always seemed to be placed beneath windows—and so passed away from the interior of the room. With the deflector in use, however, the hot air passed from its under side into the room, while the mass of cold air between the outer side of the deflector and the window formed a non-conductor and prevented the hot air from escaping through the window. It was essential that the deflector should have a sharp edge so that a free stream of hot air could be secured. With a rounded edge eddies of hot air were produced, which did not carry so far into the room.

- - -

How the Italian police surprised the frequenters of a gambling house at the fashionable resort of Capri (an island 20 miles south of Naples) by seaplaning over from the mainland is described in a telegram from Rome. The police realised that if they crossed by the regular steamer their arrival would be known. As it was, going over by air after dark, they raided the house, to find the forbidden amusement in full swing—under, be it noted, the ownership of a British subject.

- - -

Why, after this, looks as if no "profession" will be safe from sudden catastrophe. Bill Sykes suggests it's playing it a bit low down, and that 'planes will be employed next in circumventing the honest burglar during his eight hours working stretch, and there'll be nothing for it but to call for a national strike.

Our Airplane London–Paris Service has been maintained despite adverse weather conditions.

Lighthouse-keeper looking seaward, dramatically: "No craft can weather such a storm!"—*looking up*—"Well, I'm blowed!"

"Flight" Copyright

Not a Dervishes' dance or a Jazz competition, but just a "change over" in the men's relay race at the R.A.F. Athletic Association's meeting at Stamford Bridge.

Lady Sybil Grant's Airship Exhibition opened last Monday at Prince's Galleries, Piccadilly. "Airships in Peace and War," as Lady Sybil has named her show, has the support of the Air Ministry, and all proceeds from this collection of very interesting exhibits will be devoted towards an airship bed at St. Dunstan's. Prince's Galleries should be crowded during the few weeks this very varied exhibition will be open. Music, interpreted by the "Masked Airship Band," is a feature of the entertainment.

- - -

Not a few sensitive young men have been oppressed with a desire to render into verse their early sensations when flying. Flight-Commander Jeffery Day was one of them—after his first flight he proposed "with very great ease to write some most superior verses on the thrill and grandeur of it all." But this lad, who won the D.C.S. at 22, and whom six Germans, acting in concert, managed to kill at last, had plenty of sense. "His mind," he says, "was as full of half-grasped impressions as a small bag packed tight with young eels," yet he realised that "one doesn't sit down to write a rhapsody on strawberries and cream with a belly full of 'em, but with an empty belly and a great desire for them."

"Oh, wise young judge!"

- - -

For all that, he was able to receive, retain, and transmit many of his impressions in verse, which, even if it is not of the highest calibre, is at least smooth to the ear, and pleasantly stimulating to the mind :—

> "The engine stops : a pleasant silence reigns—
> Silence, not broken, but intensified
> By the soft, sleepy wire's insistent strains,
> That rise and fall, as with a sweeping glide
> I slither down the well-oiled slides of space
> Towards a lower, less enchanted place."

In the clouds :—

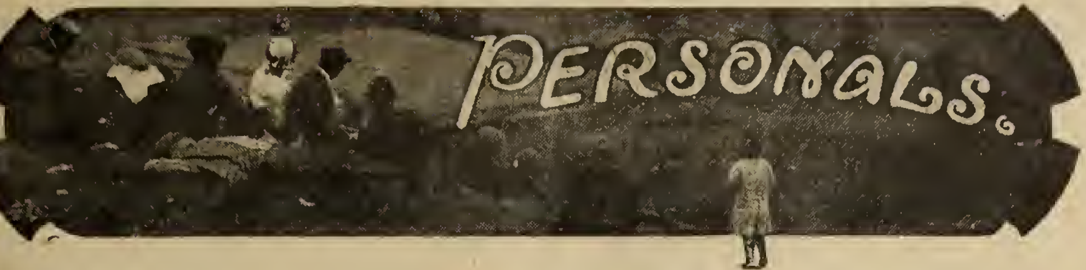
> "The wing-tips, faint and dripping, dimly show
> Blurred by the wreaths of mist that intervene ;
> Weird, half-seen shadows flicker to and fro
> Across the pallid fog-bank's blinding screen."

- - -

Nor does he fail in his gallant attempt to convey in metre the illusion of actual flight :—

> "My turning wing inclines towards the ground ;
> The ground itself glides up with graceful swing,
> And at the plane's far tip twirls slowly round,
> Then drops from sight again beneath the wing
> To slip away serenely as before,
> A cubist-patterned carpet on the floor.
> "Hills gently sink and valleys gently fill ;
> The flattened fields grow infinitely small ;
> Slowly they pass beneath, and slower still,
> Until they hardly seem to move at all."

There is movement in this, and colour and imagination. The little book, which is sold by Messrs. Sidgwick and Jackson at 3*s*. net, reveals much of the writer's spirit, and the extent of our loss.



PERSONALS.

Casualties

Capt. Raymond Victor Kann, R.A.F., who was killed in a flying accident at Stonehenge recently at the early age of 22, was the elder surviving son of Mr. and Mrs. R. Kann, of 37, Lancaster Gate. He was educated at Charterhouse and Geneva, and in September, 1914, though only 17 years of age, joined the Suffolks as a private. Early in 1915 he was given a commission in the Royal Scots Fusiliers, and proceeded to France with his regiment, taking part in the battle of Loos and other important engagements. In June, 1916, he transferred to the R.F.C., being promoted captain in September, 1918, and at the time of his death he was about to take up a permanent commission in the R.A.F.

Brig.-Gen. Charles Frederick Lee, C.M.G., who was killed in an aeroplane accident at Weston-super-Mare on September 1, at the age of 31, was the son of Maj. W. F. Lee, T.D., J.P. He was educated at Eton, joined the King's Royal Rifles (60th), and was adjutant of the 2nd Battalion when he retired about two years before the War and joined the Somerset Yeomanry. He transferred to the R.F.C. at the outbreak of War, and went to France in 1914 as adjutant to Air-Marshal Sir Hugh Trenchard (then a lieut.-col. commanding a wing). Afterwards he became brigade-major to Vice-Air-Marshal Sir John Salmond, and in July, 1916, he was appointed R.F.C. Staff Officer, 1st Class, and promoted lieut.-col. When Sir John Salmond went to the War Office as Director-General of Military Aeronautics, Gen. Lee (then lieut.-col.) was sent to America in command of the British Aviation Mission, where he did very valuable work, and was promoted acting brigadier-general.

An enthusiastic, if not latterly a very prominent, friend of aviation died on September 9 last, in the person of Mr. Edwin O. Sachs, F.R.S. Ed., F.R.G.S., the chairman of the British Fire Prevention Committee. Mr. Sachs and his committee did wonders in modernising and improving British fire-prevention and extinction methods, and his work may be said to have been as sound as it was non-spectacular. Only officers of fire brigades, building-construction experts, electrical engineers, and the like, can have known how much excellent work he did, because he had a very great distaste for personal publicity—thanks to his having had far too much of it in his younger days, when—with friends like the Duke of Marlborough—he was one of a number of very keen volunteer firemen, never so happy as when they were at work upon a big blaze. There was a memorial service in his honour conducted at the church of St. Martin's-in-the-Fields, Trafalgar Square, on September 16 last, attended by a large gathering of those who knew and esteemed him.

Married

Noel James Brebner, late Lieut., R.A.F., only son of Mr. and Mrs. Percy J. Brebner, of East Sheen, was married on September 10 at Christ Church, East Sheen, to Ethel Maud, younger daughter of Mr. and Mrs. John Walker, of East Sheen.

Capt. William Foster, R.A.F., youngest son of Mr. Robert Foster, of Stockeld Park, Wetherby, Yorkshire, and the late Hon. Mrs. Robert Foster, was married on September 2 at St. Mark's, North Audley Street, to Marjorie, only child of Sir Ernest Hatch, formerly M.P. for the Gorton Division, and Lady Constance Hatch, of 46, Upper Grosvenor Street, W.

Capt. Herbert E. Judge, late R.A.F., son of Mr. and Mrs. James Judge, of Cambridge, was married on September 10 at Bromsgrove Parish Church, to Olivette, elder daughter of Mr. and Mrs. Albert Eadie, of Rigby Hall, Bromsgrove.

Capt. Maurice Gaskell Sykes, R.A.F. (India Civil Service), youngest son of T. Gaskell Sykes, West Ealing, was married on September 4, at St. Jude's on the Hill, Golder's Green, to Constance Mary Lilian, younger daughter of the late Hugh Stewart Roberts.

Lieut. George Edward Leighton Woodhouse, R.A.F.' younger son of Mr. and Mrs. Arthur Woodhouse, of 17, Heygate Avenue, Southend, was married on September 1 at All Saints', Nottingham. to Mary, only daughter of Smith-Fowler Manning, Esq., J.P., and Mrs. Manning, of The Tower House, Nottingham.

To be Married

The engagement is announced between Maj. Harold H. Balfour, M.C., late 60th Rifles and R.A.F., second son of Col. and Mrs. Nigel Harington Balfour, of Belton, Camberley, and Barbara, only daughter of Claude A. Shepperson, A.R.A., A.R.W.S., and Mrs. Shepperson, of 5, Mulberry Walk, Chelsea.

The engagement is announced between Ralph Branthwayt Beevor, late 28th Squadron, R.A.F., eldest son of Mr. and Mrs. Ralph J. Beevor, of Reymerston, St. Albans, and grandson of the late Sir Thomas Beevor, Bt., and Phyllis Margaret Ashburner,, eldest daughter of Mr. and Mrs H. O. Minty, of Nessfield, St. Albans.

The marriage arranged between Fl. Lieut. D. S. Crosbie, R.A.F., and Dorothy Grace Mattingly will take place very quietly at the church of St. Mary-le-Strand, on Wednesday, October 8, at 12,.30 p.m.

The engagement is announced between Lieut. Victor Ellvers, R.F.A. and R.A.F., son of the rector of Melbury Abbas, Shaftesbury, Dorset, and Audrey Guest, daughter of the late Mr. George Elliott, K.C., and Mrs. George Elliott, of 54, Cheyne Court, Chelsea.

The marriage arranged between Capt. Gerard Fane, D.S.C., R.A.F., and Miss Rhoda Bacon, will take place on Wednesday, October 1, at 2.15, at St. Andrew's Church, Raveningham, Norfolk.

The engagement is announced between Maj. Paul Copeland Maltby, D.S.O., A.F.C., Royal Welsh Fusiliers, attached R.A.F., younger son of Mr. and Mrs. C. J. Maltby, Walgrove, Harpenden, Herts, and Winifred Russell, eldest daughter of Mr. and Mrs. J. H. Paterson, 6, Moray Place, Edinburgh.

The engagement is announced between Capt. Patrick Cameron Oliver Riddell (late of the Wiltshire Regt. and R.A.F.), elder son of the late Patrick Riddell and Mrs. Riddell, Noirmont, Weybridge, to Alice Moubray, younger daughter of the Rev. Spencer R. A. Buller, R.D., and Mrs. Buller, the Rectory, Weybridge.

A marriage has been arranged, and will shortly take place, between Lieut. F. W. Southgate, late R.F.C., third son of Henry Southgate, Needham Market, Suffolk, and Angela, elder daughter of Mr. and Mrs. Folkard, Addiscombe, Surrey.

A marriage has been arranged, and will take place on October 2, between Capt. Charles E. Turner, R.A.F., and Miss Elsie Hopkins, only daughter of Mr. and Mrs. T. E. Hopkins, of Perrysfield, Oxted, Surrey.

The engagement is announced, and the marriage will shortly take place between Temp. Maj. George Bankart Turner, M.B.E., R.A.F., son of Col. F. Mansel Turner (late R.A.), of Norton, Guildford, and Kathleen May Graham, youngest daughter of Mr. and Mrs. Bankart, of Manton Grange, Oakham.

Items

Gen. Seely is making steady progress towards recovery from his recent accident, in which he suffered injury to the knee as the result of a fall while staying at Brooke.

No. 40 Squadron. R.A.F. A dinner in connection with the above is being arranged for Friday, September 26. Will those who wish to attend communicate before September 19 with Cap. H. C. Todd, R.A.F. Club, 13, Bruton Street, W., or Maj. the Rev. B. W. Keymer, H.Q., Midland Area, R.A.F., Leamington Spa ?

Among the passengers on board the *Aquitania*, which left Southampton on September 6 for America, was Commodore Beaumont, president of the American Aero Club in France.

THE ROYAL AIR FORCE

London Gazette, Sept. 9.

The following temporary appointments are made :—

Staff Officers, 3rd Class.—(Air) Flight-Lieut. G. J. C. Maxwell, M.C., D.F.C., A.F.C. ; (Aug. 29) vice Flight-Lieut. E. O'D. Crean. Flight-Lieut. L. A. K. Butt ; (Sept. 1) vice Flight-Lieut. W. A. A. Chauncy.

The following temporary appointments are made :—

Staff Officers, 2nd Class.—(Air) Capt. G. A. Scott, from S.O.3 ; (Feb. 12, and to be actg. Maj. till April 30). (P).—Maj. E. V. H. Mackenzie ; (June 25). (Q.).—Capt. A. Smith, from S.O. 3 ; (May 30).

Staff Officers, 3rd Class (P.).—Lieut. R. Elphick ; (June 14). Capt. D. C. Hydes, from S.O. 4 (1st Grade) ; (April 1). Lieut. G. S. Lardner ; (July 1).

Flying Branch

Sec. Lieuts. to be Lieuts. :—(Hon. Capt.) H. J. Bullock ; (Aug. 25, 1918) (substituted for the notification in the *Gazette* of July 29). H. Rhodes, D.F.C. ; (Nov. 30, 1918). G. A. Lynch ; (Dec. 17, 1918). F. A. Downes ; (Feb. 8).

Sec. Lieut. P. C. Bailey (late Gen. List, R.F.C. on prob.) is confirmed in rank as Sec. Lieut. (A.) ; (March 15).

A. F. Williams (Lieut., Mon. R., T.F.) is granted a temp. commn. as Sec. Lieut. (O.) ; (May 23, 1918, and to be Hon. Lieut.).

The following relinquish their commns. on ceasing to be employed :—Sec. Lieut. (Hon. Lieut.) A. H. Waddy (Lieut., Beds. R.) ; (Feb. 9). Lieut. B. C. M. Ward (Lieut., E. Surr. R.) ; (Feb. 13). Sec. Lieut. F. L. Norden, (Lieut. R. Scots R.) ; (July 1). Lieut. E. T. Weigall (Lieut., R.H. and R.F.A.); (July 20). Sec. Lieut. (Hon. Lieut.) W. H. Norman (Lieut., R.A.) ; (August 7). Sec. Lieut. W. Coker, D.F.C. (Lieut., Temp. Capt., E. Surr. R.) ; (Sept. 3).

Then follow the names of 113 officers who are transfd. to the Unemployed List under various dates.

The following relinquish their commns, on account of ill-health caused by wounds, and are permitted to retain their rank :—Capt. H. F. Davison ; (Aug. 29). Lieut. W. S. V. Oliver ; (Aug. 21).

The following Lieuts. resign their commns. :—D. E. P. Chaplin (Lieut., R.H. and R.F.A.) ; (Sept. 6). W. H. G. Milnes, M.C. (Lieut., R. War. R.) ; (Sept. 10).

The initials of Sec. Lieut. G. W. Thornton-Inman are as now described, and not "D. W.," as stated in *Gazette* of Aug. 26.

The name of Lieut. Philip Wilson is as now described, and not "P. Wilsou" as stated in the *Gazette* of June 6.

The name of Lieut. E. C. Cockburn is as now described, and not "Cockwin," as stated in *Gazette* of March 25.

The notification in *Gazette* of June 3 concerning Lieut. G. F. Dell is cancelled.

The notification in *Gazette* of July 18 concerning Sec. Lieut. R. W. Silk is cancelled.

The notification in *Gazette* of Aug. 15 concerning Lieut. G. F. Bell is cancelled.

The notification in *Gazette* of Aug. 26 concerning Sec. Lieut. A. K. Doull is cancelled.

Administrative Branch

Lieuts. (O.) to be Lieuts :—R. S. Herring, M.C. ; (March 18) (substituted for notification in *Gazette* of April 15, wherein this officer was described as Lieut. R. R. Herring). T. Whitaker ; (April 17).

Capt. G. R. Kevill-Davies (Capt., Dgn. Gds.) relinquishes his commn. on ceasing to be employed ; (July 7).

Then follow the names of 27 officers who are transfd, to the Unemployed List under various dates.

The notification in *Gazette* of June 25, 1918, concerning H. E. Rea is cancelled.

The notification in *Gazette* July 15 concerning Sec. Lieut. J. C. Duncan is cancelled.

Technical Branch

Maj. G. P. Grenfell, D.S.O., is graded for purposes of pay and allces. as Lieut.-Col. while employed as Lieut.-Col. Grade (A.) ; (May 1).

Sec. Lieut. (Hon. Lieut.) (actg. Lieut.) L. W. Allen, M.C., to be actg. Capt., whilst employed as Capt., Grade (B.) ; (April 1, 1918) (substituted for notification in *Gazette*, Nov. 19, 1918).

Sec. Lieut. K. E. V. Beswick to be Lieut. ; (Oct. 11, 1918).

Secd. Lieut. (Hon. Lieut.) E. A. Gulson (since demobilised) to be Lieut. ; (April 2, 1918), without pay and allces. of that rank prior to Nov. 1, 1918) (substituted for notifications in *Gazettes* April 11 and May 23).

H. E. Rea is granted a temp. commn. as Sec. Lieut., Grade (B.) ; (June 21, 1918).

Lieut. K. L. Williams (Lieut., I.A.R.O.) relinquishes his commn. on reversion to I.A.R.O. ; (May 17).

Then follow the names of 19 officers who are transfd. to the Unemployed List under various dates.

Maj. L. C. Hope relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; (July 25). (Substituted for the notification in the *Gazette* of Aug. 5).

The notification in the *Gazette* of May 13 concerning Sec. Lieut. J. Sewell is cancelled.

Medical Branch

Capt. (actg. Maj.) C. J. G. Taylor, M.B. (Surg.-Lieut., R.N.V.R.) relinquishes his commn. on ceasing to be employed ; (Aug. 1).

Transferred to the unemployed list :—Capt. W. S. T. Connell ; (Feb. 3). Capt. T. R. Hunter ; (Aug. 22).

The notification in the *Gazette* of August 8 concerning Capt. (Actg. Maj.) C. J. G. Taylor is cancelled.

Memoranda

Lieut. G. H. Hill is granted the hon. rank of Capt. ; (March 31). (Substituted for the notification in the *Gazette* of May 27).

Then follow the names of 53 Cadets granted hon. commns. as Sec. Lieuts.

The following relinquish their commns on ceasing to be employed :—Temp. Hon. Lieut. W. J. Parkinson ; (Feb. 23). Capt. W. A. A. Chauncy (Capt. Yorks. R.) ; (Sept. 3). Maj. R. H. Woods, M.C. (Capt., K.R.R.C.) ; (Sept. 7). Lieut. P. H. Morrissey, M.B.E. (Paymaster, R.N.) ; (Sept. 1).

Then follow the names of 5 officers who are transfd. to the Unemployed List under various dates.

Col. (actg. Brig.-Gen.) R. E. T. Hogg, C.M.G., C.I.E. (Maj., Bt. Lieut.-Col., Indian Army), resigns his commn. ; (July 10), and is granted the hon rank. of Brig.-Gen.

The following officers have been granted short service commns. in the ranks stated, with effect from Sept. 12 (except where otherwise stated.) They will retain their seniority in the substantive rank last held by them prior to the grant of the short service commn., except where otherwise stated :—

Squadron Leaders.—R. P. Willock (A.), T. B. Meyer (T.), W. Sowrey, A.F.C. (A.).

Flight Lieutenants.—C. G. Murray (S.O.), J. L. Robertson (S.O.), F. Hudson, M.C. (A.), E. D. Johnson, A.F.C. (A.), L. A. McDougald (T.), E. N. E. Waldron (Ad.), A. D. Spiers (T.), H. O. Fellowes (Ad.), H. J. Edgar (A. and S.), W. H. E. Kemp, A.F.C. (A.), H. O. Barnaby (S.O.), D. W. Clappen (T.), A. C. H. Groom, D.F.C. (A.), N. Keeble, D.S.C. (A.), C. G. Hetherington, M.B.E. (T.), A. L. Messenger (A.)., E. J. P. Burling, D.S.C., D.F.C. (A. and S.), D. W. King (T.), T. L. Williams, M.C. (Ad.), W. H. Oakey (T.), C. A. Rea, A.F.C. (A.), H. V. Worrall, D.S.C. (A. and S.), A. E. Siddons-Wilson (T.), G. A. Richardson (T.), R. F. Osborne (T.), L. P. Ferris-Scott (Ad.), T. Lé G. Pynches (T.), H. Cox (T.), F. J. Vincent (A. and S.), D. F. Lucking (T.), A. G. N. Belfield (Ad.), H. G. Etheridge (T.).

Flying Officers (from Flight Lieutenants).—G. W. Hemming, D.S.C. (A.), R. C. Savery, D.F.C. (A.).

Flying Officers.—W. J. Standish (T.), R. V. Kann (A.), R. C. Bryant (A.), F. L. Barnard (A.), A. G. Jarvis (A.), H. C. Peirce (T.)., L. L. Brown (A.), G. W. Lee-Barter (T.), L. C. Tyson (S.O.), H. J. Birtles (S.O.), E. C. Kelly (A. and S.), J. G. Walser, M.C. (A.), W. H. Howell (S.O.), A. H. Barnard (T.), A. F. Warner (T.), R. A. W. Powell (Ad.), H. E. Kirk (Ad.), T. A. Langford-Sainsbury, A.F.C. (A.), H. O. Brown, M.M. (A.), L. S. Punnett (A.), G. A. Lingham, D.F.C. (A.), P. D. Robins (A.), R. H. Bright (T.), C. H. Pownall (Ad.), G. L. Ormerod (A.), W. R. P. Allen (T.), S. M. Park (A.), D. H. Carey (A. and S.), A. J. Fyfield (T.), A. T. Shaw (T.), W. G. Pudney (A.), H. H. Sharp (T.), M. W. Baseden (A.), J. D. de Pencier (A.), G. A. Curtis (T.), F. H. G. Shepard, A.F.C. (A.), H. L. Woolveridge (Ad.), W. W. McConnachie (A.), E. R. Bruce (A. and S.), J. W. Milner (A.), R. A. Vosper (A.), J. L. Denman (S.O.), T. E. Drowley (T.), R. W. Godfrey (A.), G. R. Howsam, M.C. (A.), C. Eaton (A.), S. G. Linssen (T.), A. J. E. Broomfield, D.F.C. (A.), T. Rose, D.F.C. (A.), J. S. G. Wrathall (T.), J. T. Paine (A.), J. H. Dale (T.), S. R. L. Poole (T.), C. E. Horrex (A.), A. E. Sweeting (A.), L. G. Harvey (A.), F. G. A. Robinson (A.), K. D. Marshall, D.F.C. (A.), H. E. F. Saunders (T.), W. N. Plenderleith (A.), A. L. A. Perry-Keene (A.), G. L. Blake (A.), L. G. Stevenson (T.), J. T. Rogerson (A.), R. W. Warner (Ad.), C. F. C. Wilson (A.), D. N. Dickson (A.), A. G. Knight, M.B.E. (Ad.), H. C. McDonald (A.), W. J. Sivewright (A.), B. R. Rolfe (A.), G. H. Howarth (A.), H. M. Struben (A.), J. H. Jennings (T.), F. Susans, M.B.E. (T.), J. Freeman-Fowler (Ad.), G. H. Bittles (A. and S.), F. G. Brockman (T.), H. E. Fenwick (A.), A. H. Scaife (T.), A. H. Burmann (S.O.), A. Walters (T.), B. C. Adamson (T.), W. F. Duff (S.O.), F. J. H. Ayscough (A.), M. (W.) Nolan (A.), C. E. Amoore (T.), W. Chapman (T.), H. B. Day (Ad.), J. W. Gage (T.), H. S. Alger (T.), A. J. Martin (T.), A. E. W. Finch (T.), H. P. Bridges (S.O.), W. C. Farley (T.), C. J. Polden (T.), S. G. Newport (T.), T. H. Sills (S.O.), H. W. Nicholl (T.), A. Grimshaw (A.), J. L. Miles (T.), G. Baker (T.), J. J. Ironmonger (T.), H. J. Lucas (T.), W. J. Cleasby (T.), H. F. Webb (S.O.), G. L. G. Watson (T.), E. S. Baker (T.), H. A. L. Way (T.), W. R. Fairbairn (Ad.), F. C. Worton (T.), J. E. C. Hammond (T.), S. C. Rose (T.), A. P. Woollett (T.), A. T. Wells (T.), A. J. Somers (S.O.), W. B. Francis (T.), G. W. Sturman (T.), A. Walters (T.), E. I. T. Duffield (T.), McD. Goodall (T.), J. S. Viner (T.), H. J. Adkins (T.), E. P. Dampier (Ad.), G. C. Maillard (Ad.), R. J. E. Haynes (T.), J. W. Hutchins (T.), G. J. Stroud, M.B.E. (T.), R. E. H. Allen (T.), A. H. Baker (T.), E. F. Thorpe (T.), W. Dickison, D.S.M. (T.), E. Parrett (T.), A. S. Berry (T.), E. V. E. Andrewartha (T.), C. A. Longhurst (T.), H. D. Fletcher (Ad.), J. F. Young (A. and S.), E. G. King (T.), G. W. C. Ravenhill (A.), H. F. J. Taylor (Ad.), A. W. Southall (A.), N. C. Waltho (A.), A. L. Courtenay-Dunn (A.), C. H. Flinn (A.), R. G. Mullette (A.), F. Cardwell (A.), C. E. Knight (Ad.), R. N. Walter (Ad.), A. M. Reidy (T.), J. M. Russell (Ad.), H. G. Sullivan (A.), A. C. Lobley (A.), R. L. G. Wright (A.), T. G. Bird (A. and S.), H. J. Gemmel (A.), V. G. A. Bennett (A. and S.), A. E. Pitcher (T.), S. Bingham (T.), R. G. Sims (T.), D. R. L. Powell (T.), E. W. Husband (T.), J. Mahoney (Ad.), R. W. Stevenson (Ad.), T. A. Higgs (Ad.), F. Dunlop (Ad.), D'A. D. A. Greig (A. and S.), J. B. Stockbridge (A. and S.), J. W. Bell (S.), T. L. Grey (T.), H. J. de Waal (Ad.), J. B. Slater (Ad.), I. G. G. Edgar (A.), J. S. Card (Ad.), G. A. F. Gibson (T.), C. Fenn (Ad.), A. H. Allan (T.), H. C. Haywood-Gibbons (Ad.), L. N. Sargent (Ad.), E. C. K. Kingston (A.), W. A. G. Goldsworthy (Ad.), N. Dainty (T.), W. A. Kyte (T.), J. McCarthy (Ad.), G. W. Robinson (Ad.), H. Cartwright (Ad.), V. B. Ranford (Ad.), H. A. Williams (Ad.), H. J. Bamber (Ad.), R. W. Stewart (Ad.), T. H. Jolley (Ad.), C. J. Elliott (Ad.).

Observer Officers.—H. Wisnekowitz, M.C., W. L. Rutledge (with effect from Aug. 10), R. A. C. Brie, J. C. Wallace, R. S. Langan, D.F.C., H. A. Boniface.

It is intended that officers employed as Stores Officers or on "Q" duties shall belong to the new Stores Branch when formed. Officers appearing in this *Gazette* who are at present so employed will be transferred to this branch on its formation, and will accept these short service commissions on that condition. They will then come on to the rates of pay of that branch, but will meantime be permitted to draw the higher rates laid down in the new scheme for officers on the General List. Any officer posted to the Stores Branch on its formation will then have the option of declining his short service commission.

Flying Branch

Maj. A. A. B. Thomson, O.B.E., A.F.C., is graded for purposes of pay and allowances as Lieut.-Col. whilst employed as Lieut.-Col. (A.) (from May 1 to June 30).

Second Lieutenants to be Lieutenants.—I. M. Moffat ; Nov. 27, 1918 (substituted for the notification in the *Gazette* of April 11). H. Booth ; Nov. 30. 1918. J. V. Scottorn ; Dec. 26, 1918. P. J. Baker, C. G. G. Fortune ; March 1. F. W. B. Anderson ; July 24

Sec. Lieut. R. A. Wade (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (A.) ; April 23.

The following relinquish their commns. on ceasing to be employed :—Lieut. (Hon. Capt.) (actg. Capt.) F. M. Hicks ; Feb. 2. Sec. Lieut. (Hon. Lieut.) T. F. Blight (Lieut., Manitoba R.) ; June 6. Sec. Lieut. P. S. M. Wilkinson (Lieut., Wilts. R.) ; June 25. Capt. A. Knight, M.B.E. (Lieut., Loyal N. Lancs. R.) ; June 30. Lieut. G. Thompson (Lieut. (Temp. Capt.), Brit. Col, R.) ; July 8. Lieut. G. L. S. Rowell (Lieut., R.A.) ; Aug. 5. Lieut. H. F. Attwater (Lieut., North'd Fus.) ; Sept. 1. Sec. Lieut. C. H. Woolwin (Lieut., Midd'x. R.) ; Sept. 4.

(Then follow the names of 91 officers who are transfd. to the Unemployed List under various dates.)

Capt. G. S. Creed (Lieut., S.A. Defence Forces) relinquishes his commn. on account of ill-health ; Aug. 25.

Lieut. J. E. Lewis relinquishes his commn. on account of ill-health caused by wounds and is permitted to retain his rank ; Sept. 3.

Sec. Lieut. R. H. Harlow relinquishes his commn. on account of ill-health July 12 (substituted for notification in *Gazettes* of Feb. 4 and Sept. 2).

Lieut. C. W. Wridgway (Lieut., Midd'x. R.) resigns his commn. ; Sept. 13

The initials of Capt. A. N. Wyatt are as now described, and not "A. M." as stated in *Gazette* of June 27.

The surname of Sec. Lieut. W. Cougle is as now described, and not "Gougle," as stated in *Gazette* of Dec. 10, 1918, on page 14573 (substituted for notification in *Gazette* of April 18).

The surname of Sec. Lieut. W. R. Forster is as now described, and not "Foster," as stated in *Gazette* of July 1.

The notification in *Gazette* of Sept. 6, 1918, concerning M. A. Watts is cancelled.

The notification in *Gazette* of Feb. 18 concerning Capt. F. M. Hicks is cancelled.

The notification in *Gazette* of April 1 concerning Sec. Lieut. W. H. Brown is cancelled.

The notification in *Gazette* of July 22 concerning Lieut. O. R. Gayford, D.F.C., is cancelled.

The notification in *Gazette* of July 29 concerning Lieut. J. Stewart is cancelled.

The notification in *Gazette* of Aug. 5 concerning Sec. Lieut. H. Thomas is cancelled.

Administrative Branch

The following Sec. Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts. :—E. Bentley (to June 25); (Hon. Lieut.) A. G. Buxton, J. E. Carter, W. R. Fairburn (to May 31); A. H. Jones, (Hon. Lieut.) H. O. Newland, J. B. Slater; May 1.

The following Sec. Lieuts. are graded for purposes of pay and allowances as Lieuts. while employed as Lieuts. :—J. E. W. Billings (to June 30); T. Caine, R. N. H. Cole, J. S. Card, H. J. De Waal, E. I. T. Duffield, (Hon. Capt.) W. C. Green, M.C., H. C. Haywood-Gibbons, W. F. Hopkins, J. G. Le Brun (to June 25), (Hon. Lieut.) T. Mumford, F. H. Stapleton (to June 30), H. J. Thomas; May 1.

Sec. Lieut. H. J. Grant is graded for purposes of pay and allowances as Lieut. while employed as Lieut. from (T.); May 1.

The following relinquish their commns. on ceasing to be employed :—Lieut. (Hon. Capt.) R. J. Porter (Capt. and Qrmr., R. Innis. Fus.); June 21. Sec. Lieut. C. W. Clutson (Sec. Lieut., Glouc. R.); Aug. 19.

(Then follow the names of 14 officers who are transfd. to the Unemployed List under various dates.)

The following relinquish their commns. on account of ill-health, and are permitted to retain their rank :—Lieut. C. Lyons; Aug. 29. Lieut. P. Sormani; Sept. 5. Sec. Lieut. R. R. W. Millward (caused by wounds); Aug. 28.

Sec. Lieut. (Hon. Lieut.) A. G. Buxton relinquishes his commn. on account of ill-health contracted on active service, and is granted rank of Capt.; Sept. 3.

Technical Branch

Capt. A. H. Kendall is graded for purposes of pay and allowances as Maj. while employed as Maj., Grade (A.); May 1 (substituted for notification in *Gazette* Aug. 1, wherein this officer was described as Capt. A. K. Kendal).

The following Sec. Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (A.) :—A. G. Rigdon, E. J. Thorpe; May 1.

The following Sec. Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (B.) :—(Hon. Lieut.) G. F. Antell, G. Baker, (Hon. Lieut.) W. J. Cleasby (to June 30), L. A. Lavender (Hon. Capt.), E. R. Tongue-Croxall, A. Walters; May 1.

Sec. Lieut. (Hon. Lieut.) S. Waring is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (B.) from (Ad.); May 1.

The following Sec. Lieuts. are graded for purposes of pay and allowances as Lieuts. whilst employed as Lieuts., Grade (A.) :—W. J. Coadwell, W. R. Day (to July 31), R. McG. Freemantle, M.B.E., J. W. Hutchins, L. E. Heather, H. O. Keenan, E. G. King, J. B. Meilke, M. F. Morris, H. W. Nicholl, J. A. Owen, P. R. Pratt, C. H. Paget, T. J. E. Thornton, J. Turnley, E. J. Williams, H. Williams; May 1.

The following Sec. Lieuts. are graded for purposes of pay and allowances as Lieuts. whilst employed as Lieuts., Grade (B.) :—(Hon. Lieut.) A. Daniels, T. A. Dimon, (Hon. Lieut.) T. L. Grey, J. A. Joyce, C. A. Longhurst, P. G. Price, F. B. Reed, C. O. Towler (to July 31); May 1.

Sec. Lieut. A. F. Stevens is graded for purposes of pay and allowances as Lieut. whilst employed as Lieut., Grade (B), from (Ad.); May 1.

Sec. Lieut. H. Dear to be Lieut.; without pay and allowances of that rank; April 2, 1918 (substituted for the notification in the *Gazette* of March 7).

Sec. Lieut. E. G. King (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut., Grade (A); July 5, 1918 (substituted for the notification in the *Gazette* of Sept. 10, 1918, wherein this officer was described as E. C. King).

Sec. Lieut. F. Denham (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut., Grade (B); July 20, 1918.

Sec. Lieut. C. C. N. Wace (Capt., K.O.L.Y.I.) relinquishes his commn. on ceasing to be employed; Aug. 2 (substituted for notification in *Gazette* July 22.)

Sec. Lieut. P. O. Lovett relinquishes his commn. on ceasing to be employed; March 12 (substituted for notification in *Gazette*, April 1).

(Then follow the names of 14 officers who are transfd. to the Unemployed List under various dates.)

Lieut. C. B. Maddocks relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain rank; Aug. 29.

The notification in *Gazette* July 4 concerning Lieut. C. B. Dick-Cleland is cancelled.

Medical Branch

Capt. W. H. Cam is transfd. to the Unemployeyd List; Aug. 2.

Memoranda

The following Lieuts. are granted hon. rank of Capt. :—F. L. Mond (decd.); May 1, 1918. A. L. Chick, A.F.C.; Oct. 13, 1918.

(Then follow the names of 25 Overseas Cadets granted temp. commns. as Sec. Lieuts. and 14 cadets granted hon. commns. as Sec. Lieuts.)

Lieut.-Col. (actg. Brig.-Gen.) J. A. Houison-Cranford, C.M.G., C.B.E. (Maj., retd., I.A. (Hon. Lieut.-Col. in Army), relinquishes his commn. on ceasing to be employed; June 1, and is granted the hon. rank of Brig.-Gen. (substituted for notification in *Gazette* July 25).

The following relinquish their commns. on ceasing to be employed :—Temp. Hon. Capt. R. J. Bray; Feb. 8. Temp. Hon. Lieut. T. Spencer; Aug. 16. Temp. Hon. Lieut. C. Watt; Aug. 31. Capt. P. Sidney (Capt., North'd Fus.); Sept. 2).

(One officer transfd. to the Unemployed List).

SIDE-WINDS

MR. C. W. BRETT, managing director of Barimar, Ltd., writes :—"I have been asked by the Secretary of our Football Club to say that he requires fixtures for the coming season—both home and away—from October 11 onwards. Perhaps secretaries of medium teams with open dates will kindly communicate with Mr. W. Pritchard, c/o Barimar, Ltd., 10, Poland Street, Oxford Street, W. 1. The Barimar ground adjoins Sudbury Town (Harrow) Station."

- - -

WE understand that the well-known firm of Y. Goldberg, the specialists in plywood manufacturing and importing, has been converted into a private limited liability company under the style of Y. Goldberg and Sons, Ltd., with their registered offices at 7 and 7A, Kingsland Road, Shoreditch, E. 2, and the factory, which is known as the Aero Plywood Works, at Lawrence Road, Tottenham, N. 15. Mr. Harris Goldberg is the governing director, assisted by Mr. I. W. Goldberg as the director. The conversion will not affect the general conduct of the business, which will continue as in the past; all debts and liabilities will be paid by the company on behalf of the firm, and all debts to the firm may be paid to the company.

- - -

MR. BARCLAY HARDING WARBURTON, JUNR., of Philadelphia, U.S.A., has just taken his Royal Aero Club Certificate at the Grahame-White School of Flying, Hendon, under the instruction of Capt. P. T. Chamberlayne, Chief Pilot of the company. It is noteworthy that Mr. Warburton flew solo after four hours' dual instruction, and passed his certificate tests satisfactorily after having done 45 minutes of solo flying.

- - -

BEARING in mind the bad weather at the end, the trip of Capt. Woolley from Hounslow to Amsterdam, on a Blackburn Kangaroo, on August 28, was distinctly good. The following is Capt. Woolley's report :—

"I left Hounslow at 12 noon. The weather was not very good, the clouds were about 2,500, still we made Lympne at 1 p.m. Put 30 gallons of petrol in and had lunch, and started again at 2.30 p.m. The weather now was getting very good. Very few clouds and very clear. I passed over Folkestone at 2,34, and made Calais at 3.0. It was simply perfect. I made up the coast and passed Dunkirk 3.1 p.m. Here I made up my mind to try and make Amsterdam without another stop. I passed Zeebrugge at 3.45, Flushing at 4 p.m. at 2,000, Rotterdam at 4.40 p.m. at 1,000.

"After leaving Rotterdam I ran into rain, and the visibility was very bad indeed; still, I made Amsterdam at 5.22 p.m. It was simply fine not having to worry about Huns and anti-aircraft guns going over the Zeebrugge Mole. I could hardly believe that I was safe. I could see the block-ship in the entrance, and I can tell you the Royal Navy made a good job of it, it being very nearly right across."

- - -

As a souvenir of the recent visit of Mr. Selfridge to Dublin on an Airco machine, Aircraft Transport and Travel have produced a little brochure setting forth the facts and containing reproductions of a number of photographs of incidents during the flight. It may be recalled that Mr. Selfridge likened the aeroplane to a "super-special" train and that phrase has been chosen as the title of the booklet. Copies may be obtained by any FLIGHT reader who applies to the Airco headquarters at 27, Buckingham Gate, S.W. 1.

- - -

NEWS has been received from Amsterdam that a Airco 9R aeroplane fitted with a 450 h.p. Napier Aero engine, piloted by Capt. Gathergood, obtained the fastest time in a closed circuit race of 220 kilometres, the next machine to finish taking 10 minutes longer. Thirty-five competitors finished the course, and the average speed of the Napier-engined Airco was approximately 145 m.p.h. This same machine flew from Hounslow to Amsterdam in 2 hours 10 minutes, and returned on the afternoon of September 11 in 2 hours 8 minutes. This remarkable speed of 145 m.p.h. beats the British record for a closed circuit—also held by a Napier-engined Airco machine—by approximately 15 m.p.h.

- - -

A VERY useful cabinet of "Leonard" Plug Gauges, the main and important feature of which is that they are renewable, is being marketed by G. W. Dowding & Co., 66, Victoria Street, S.W. 1. The set consists of 15 sizes ranging from ¼ in. to 1¼ in., and costs £4 17s. 6d. complete. In addition, it is decidedly interesting to note that the double-ended limit plugs can be supplied at proportionate prices on the same renewal principle. The firm will be happy to send their pamphlet showing illustrations and giving full particulars to all firms interested in this workshop necessity which has the additional merit of being British made.

1st Aviation Lieut. A. Cortinez Mujica, of the First Chilian Aviation Co. This autographed photo. has been sent by Senor Mujica to the Bristol aeroplane constructors as a memento of the first crossing of the Andes and back, during which flight he established the South American altitude record. The photo. bears the following inscription (translated):

The British and Colonial Aeroplane Co.,
Filton Works,
Bristol,
England.
As a memento of my flight on a "Bristol."
Santiago-Mendoza—Mendoza-Santiago,
5th April, 1919.
Armando Cortinez Mujica,
1st Aviation Lieutenant.

* * * *

PUBLICATIONS RECEIVED

Income Tax and Super-Tax 1842-1920. All the 1919 Budget Changes. Edinburgh: Oliver and Boyd, Tweeddale Court. Price 1*s.* net, post-free 1*s.* 2*d.*

"Twenty Years' Progress." Mann, Egerton and Co., Ltd., Norwich.

The Future of Aviation. By Jean Dargon. Translated by Philip Nutt. London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd. Price 10*s.* 6*d.* net.

Instructions for Charging and Operating "Exide" and "Clifton" Batteries. The Chloride Electrical Storage Co., Ltd., Clifton Junction, near Manchester.

The Transport Facilities of Sheffield. The Development Committee, Sheffield City Council, Town Hall, Sheffield.

A Treatise on British Mineral Oil.—Edited by J. Arthur Greene. London: Charles Griffen and Co., Ltd. Price 21*s.* net. Post free, 21*s.* 6*d.*; Abroad 22*s.*

Aluminium Sheet and Sections in Automobile and Aircraft Construction. The British Aluminium Co., Ltd., 109, Queen Victoria Street, E.C. 4.

The Shell That Hit Germany Hardest. By P. G. A. Smith. London: The "Shell" Marketing Co., Ltd., 39-41, Parker Street, Kingsway, W.C. 2.

* * * *

NEW COMPANIES REGISTERED

COMMERCIAL AEROPLANE WING SYNDICATE, LTD., 34-6, Gresham Street, E.C.—Capital £30,000, in £1 shares. Acquiring from A. A. Holle, of 19, Half Moon Street, Piccadilly, W., an invention for improvements in aero-foils for aeroplanes and the like. Under agreement with A. A. Holle and the Varioplane Co., Ltd. (vendors). The Varioplane Co., Ltd., may appoint three directors and the Blackburn Aeroplane and Motor Co., Ltd., may appoint two.

Y. GOLDBERG AND SONS, LTD., 7, Kingsland Road, Shoreditch, E. 2.—Capital £30,000, in £1 shares (5,600 preference). Acquiring business of a plywood and veneer and timber importer formerly carried on by H. Goldberg as "Y. Goldberg," at 7, Kingsland Road, E., and 52-6, Lawrence Road, Tottenham, N. H. Goldberg permanent governing director.

RESETTLEMENT

There are many officers and men of the R.A.F. who are demobilised or are about to be demobilised.

In order to assist those who are undecided or are seeking advice as to their prospects in civil life, the Editor has arranged for an expert, with wide experience of service, industrial and educational conditions, to give advice to those who may solicit it through the medium of this Journal.

Applications, which must be in writing, should be marked *Resettlement*, and addressed to the Editor, **Flight**, 36, Great Queen Street, Kingsway, W.C. 2. They will be dealt with in these columns, as far as possible, in rotation.

M.P.B., Capt., R.A.F.—We think your best plan would be to get in touch with the Consuls of some of the States you mention. They should be able to furnish you with the kind of information you are seeking. You can also apply to some of the leading manufacturers of flying boats whose advertisements appear in this Journal.

H.J.B., R.W.R., and Other Flight Cadets.—We regret we are unable to give any rulings with regard to A.M.W.Os. or S.E.A.Os. or to supply copies of these orders. If still serving, apply to the demobilisation officer for current regulations with regard to honorary commissions, kit allowances, etc. If demobilised, write to the Secretary, Air Ministry, and give full particulars as to service, when appointed a cadet and the amount of training received. Information *re* kit allowance, and payment when admissible, can be obtained from Messrs. Cox and Co., St. Martin's Lane.

* * * *

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published September 18, 1919

3,912. H. Middleton. Airships and bird-winged flying machines. (131,323.)

7,298. W. D. Oddy. Propellers. (131,329.)

7,375 and 7,446. Aeronautical Instrument Co. and G. Brewer. Devices for supporting wind or static pressure tubes on aircraft. (131,333 and 131,338.)

7,797. G. Constantinesco. Controlling devices for aircraft, etc. (131,354.)

8,336. Soc. Anon. des. Etab. Nieuport. Penetration cones for aircraft. (131,364.)

8,459. Soc. Anon. des Etab. Nieuport. Process and apparatus for constructing sectional moulds. (131,366.)

8,815. Sir R. A. Hadfield. Manufacture of special steel. (131,373.)

9,488. F. Cumbers and British Cellulose and Chemical Manufacturing Co. Covering and producing tautness of fabrics. (131,384.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlix, l, li and lii).

NOTICE TO ADVERTISERS.

In order that "Flight" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT
The Aircraft Engineer and Airships
36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates:*—

United Kingdom.	s.	d.	Abroad.*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 " " ..	14	1	6 " " ..	16	6
12 " " ..	28	2	12 " " ..	33	0

These rates are subject to any alteration found necessary under war conditions.

*European subscriptions must be remitted in British currency.

Cheques and Post Office Orders should be made payable to the Proprietors of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 561 (No. 39, Vol. XI.) SEPTEMBER 25, 1919 [Weekly. Price 6d. Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY W.C. 2

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**

These rates are subject to any alteration found necessary under war conditions

**European subscriptions must be remitted in British currency.*

CONTENTS

PAGE

Editorial Comment:

Pay in the Department of Civil Aviation .. 1269

The Future of the R.A.F. .. 1270

Yellow Press Methods Again .. 1270

Bad Flying .. 1270

"The Future" .. 1272

Flight—and the Men: Lieut.-Col. Spenser Grey .. 1271

The Balloon Strafer .. 1273

The German D.F.W. Biplane .. 1274

The Royal Aero Club—Official Notices .. 1279

Correspondence .. 1279

The London Flying Club, Hendon .. 1280

The Central Aircraft Company's Biplane .. 1285

The Dornier Flying-Boat .. 1288

The New German "Delag" Commercial Airship "Bodensee" .. 1289

Airisms .. 1290

Some Factors in the Working of Large Aircraft .. 1292

Commercial Air Transport .. 1294

Personals .. 1295

Royal Air Force .. 1296

Side-Winds .. 1299

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Sept. 26 ...	No. 40 Squadron R.A.F. Dinner.
Oct. 5 ...	Aviation Meeting at Barcelona.
Nov. ...	Entrance Examination for R.A.F. College.
Dec. 19 to ... Jan. 4, 1920.	Paris Aero Show.

EDITORIAL COMMENT

Pay in the Department of Civil Aviation

APPARENTLY there is trouble in the Department of Civil Aviation owing to the parsimony of the Treasury in the matter of the salaries of the civilian staff. It is stated that the whole of the *personnel* of two sections have refused to sign on unless the terms of engagement are radically altered and the pay brought more into line with the times. It is pointed out that, under the new scale, a major employed on the Air Ministry staff receives consolidated pay at the rate of £900 per annum, while a demobilised major who has reverted to civil employ in the Ministry receives from £400 to £600 a year for performing the same duties. Obviously, there is something wrong somewhere. Either the officer on the active list is paid too highly for his work or, alternatively, the civil rates of pay are too low. The conclusion that forces itself upon us is that it is the latter.

The Treasury, in fixing the rates of pay, appears to have ignored the fact that the men who are engaged in the attempt to develop civilian aviation are highly trained specialists who can, as a rule, command high salaries outside Government employ, and that if it is desired to keep them they must be paid accordingly. It is not only that the difference in emoluments between the military and the civilian elements of the staff is markedly great, but the position is even more anomalous than appears at first sight.

The military branch, which receives from 30 to 50 per cent. more pay than the civil staff, has a pension to look forward to at the end of service. The civilian staff, on the other hand, not only are denied that advantage but are only engaged for a year, with no certainty at all that their engagements will be renewed.

The obvious question that has to be asked is whether or not the Government is sincere in its expressed determination to assist in the true development of aviation. If it is, then it must make up its collective mind to instruct the Treasury that the men who are indispensable to the proper carrying out of the task must be paid at least enough to tempt them to remain in the service. If it is not, then let us know at once so that we may know where we stand.

To our way of thinking there is nothing of economy in driving the best men out of the Civil Aviation Department to seek a livelihood elsewhere. We have a long road to travel in the development of aviation, and it is to those men we are looking to keep the Empire in the lead of the nations where aerial navigation is concerned. If we lose them through parsimony then we lose our lead in the air.

The Future of the R.A.F.

Still the rumours of an impending dissolution of the R.A.F. are going the rounds! Official denials notwithstanding, they continue to be repeated, until we really begin to wonder whether there is not fire behind the smoke. According to the diarist of the *Pall Mall Gazette*, he hears "on good authority" that the R.A.F. will shortly cease to exist as a separate arm. "As long," he says, "as the Independent group of the R.A.F. was in existence there was a certain amount of excuse for the R.A.F. considering itself a separate arm, but now that the war is over and the bombing of enemy country a thing of the past, it is unnecessary to preserve the R.A.F. as a distinct force from the Army and the Navy."

Dogmatic, to say the least! Were it not that we know the *Pall Mall* to be deeply in the confidence of certain members of the Government, we should probably regard such a statement as this as being a lucubration of a diarist hard up for a topic to discuss in the columns of his journal and, hearing the gossip of the clubs, setting down the first thing that came into his mind. As it is, however, we take it more seriously than that, and are fain to ask what is behind it all? Is economy to run mad and is the R.A.F. verily to be scrapped? Is this not a *ballon d'essai* thrown up by the Government to see how such a proposal will be taken?

We do not propose to recapitulate all the arguments we have used on so many occasions against any such suicidal policy as that enunciated. Our readers are perfectly familiar with them and we will not weary them further. It is enough to say in this connection that the Parliamentary group which interests itself in aviation must be on the alert to stand between the R.A.F. and its enemies. Incidentally, it may be useful to quote from a letter to the *Telegraph*, written by Col. Fullerton, in which he cogently and succinctly sets forth the whole case for the existence of a separate Air Service. He says:—

> "In order to understand the true function of an Air Force, it is necessary to consider the work done by the forces composing the national fighting machine. The Army has to drive back or capture the advanced land forces of the enemy, the Navy performs similar duties as regards his sea forces, while the Air Force has to assist both by breaking up the lines of communication, destroying depôts, etc., and thus preventing reinforcements of men and material reaching the fighting fronts. In all previous wars the necessity for destroying communications was fully recognised, but the difficulty in doing so was so great that practically little or nothing in that way was accomplished. The invention of the flying machine has, however, altered all this, and it is now possible for a well-managed air service to so damage an enemy's bases and lines of communication that retreat or collapse of his field forces is inevitable. But in order to ensure these duties being successfully carried out, an aerial campaign on an immense scale will be necessary. Hundreds of squadrons will be required, backed up by large reserves, the whole acting on a clear and definite plan, prepared and carried out just as carefully as those drawn up for the Army and Navy. The duties in connection with this aerial campaign will be very heavy, and a great deal of technical knowledge will be necessary for its conception and working; while the strategical and tactical operations, differing as they do very largely from those of the land and sea services, will require officers specially trained in such work to organise them successfully.
>
> "It is quite clear that no War Office or Admiralty could carry out such large and important operations in addition to its own work,—and a separate Air Service independent of both the Army and Navy (but acting in conjunction with them when required to do so) is absolutely necessary. By all means, let us have retrenchment, but do not damage the efficiency of the fighting forces to save a few pounds."

If the people who are so keen on seeing the R.A.F. thrown to the dogs will read intelligently and properly digest these words of Col. Fullerton who, both as soldier and aeronaut, knows well of what he speaks, they may see reason to change their opinions. Anything more convincing we do not remember to have read.

◆ ◆ ◆

Yellow Press Methods Again

One day last week the *Evening News* came out with great "scare-heads" announcing a "Blow to British Aircraft Builders," and made great play with the wholesale discharges which are alleged to be taking place at aircraft works all over the country. The "Economy Axe" had fallen and the Government apparently was determined that nothing but the ruin of the industry was to satisfy the economists of Whitehall. We cannot sufficiently deprecate these "yellow" methods of evening journalism. Certainly discharges are taking place at aircraft works, but not at all as a consequence of any new economy campaign originated by the Government. As a matter of fact, discharges have been taking place ever since the armistice, as was clearly inevitable. The whole world knows, as an official states, that we had bent almost the major part of our energies to the output of decisive aircraft, and it was obviously impossible to maintain the same high pressure of production after the war had been won. To have done so would have meant the expenditure of tens of millions of pounds on machines which would have been entirely superfluous and so much waste. True, there were contracts running which could not be immediately cancelled, and there were many hundreds, if not thousands, of machines and aero-engines in such an advanced stage of construction that they could only be pushed on to completion, since it was cheaper to finish than to scrap them. Naturally, this sort of thing must come to an end some time or other, and it is coming to an end now. Consequently, further discharges are taking place in the factories. Further, the *Evening News* has just discovered, and makes a great song about its discovery, that certain works hitherto devoted to the building of aeroplanes are now driven to the expedient of manufacturing milk-churns and motor-car bodies. That we have known for a very long time, and really fail to see anything remarkable in the fact that firms whose plant is suitable for the making of these articles should have turned from the arts of war to those of peace as soon as they could. To our mind, it shows a very commendable spirit of enterprise and is nothing to throw up at them as evidence of their being in desperate straits.

These "stunts" do no good to anyone—even to the journal indulging in them. On the other hand, they may do harm by assisting to shake the confidence of the public in an industry which really requires all the assistance it can get at the present juncture. The *Evening News*, in its effort to scare up a little passing sensation, has only made itself look ridiculous, but it has done a disservice to a deserving industry.

◆ ◆ ◆

Bad Flying

Major Lloyd writes in the correspondence columns of the *Daily Mail* on bad flying at civilian aerodromes, and has one or two things to say that may very well be taken to heart by those engaged in the promotion of civil aviation. He points out that in the R.A.F. the commonest cause of a flying accident has been found

Flight—And the Men

"Flight" Copyright.

Lieutenant-Colonel SPENSER D. A. GREY, D.S.O., a Member of the Royal Aero Club Committee, who did splendid work in the R.N.A.S., and later in the R.A.F.

to be an "error of judgment on the part of the pilot." In flying, this cause in nearly every case is the ultimate reason for a crash. It might be expected, therefore, that companies embarking in commercial aviation would be most careful in their selection of pilots in order to reduce to a minimum this almost uncontrollable human element of danger. Major Lloyd doubts if this is so, and quotes his own experiences as an eye-witness of bad flying at certain civilian aerodromes. We should not like to say that such bad flying is the rule, or even that it is done to any appreciable extent, but nevertheless the point is a very good one. It must be remembered that a single accident has more influence on the confidence of the public than a hundred flights accomplished in safety. The first everyone hears about, while the second are never talked about outside a small circle.

Major Lloyd proposes a drastic regulation for putting down bad flying. He would raise the status of pilots to that of the captain of a ship, and in case of a crash would permanently cancel his certificate. We are all for making flying as safe as it can humanly be made, but we are inclined to think the penalty too severe for general application. Where absolute default on the part of the pilot could be proved, we should not be averse to imposing such a penalty, but there are cases in which the human element is not exactly blameworthy, though possibly a little error of judgment which may admittedly have serious consequences has been committed, and here it seems that the immutable rule would work great hardship on the pilot. By all means let every case of accident be dealt with on its merits and where foolhardiness or sheer carelessness or incompetence has resulted in accident let the pilot have his certificate cancelled. But we cannot go all the way with Major Lloyd, who seems to be of the Spartan type of judge.

◆ ◆ ◆

"The Future"

At last it would seem we are to have a definite announcement of the Government's industrial and economic policy. Indeed, we have already got the broad outlines of the procedure which is to govern our trade policy. Through the medium of a publication called *The Future*, which is described as a "Government statement of national needs and national policy," the executive has announced its autumn programme of legislation. The most important aspects of the programme are in the matter of trade policy, in connection with which it is announced that there will be free imports (with certain exceptions) from the 1st instant. There is to be no Government support of foreign exchanges except to prevent complete collapse, and no dumping of foreign goods at sweated prices. Powers are to be taken to prevent any flood of imports competing unfairly with British goods through a collapse of exchange in the country of origin. There is to be protection of "unstable key industries," which are defined as (*a*) products essential for war; (*b*) industries so neglected before the war that there was an inadequate supply of their products; (*c*) industries which it was found necessary to foster and promote during the war; and (*d*) industries that cannot maintain the level of production essential to the nation without Government support. At the same time it is made clear that no undue profits are to be made at the expense of the community by reason of protection of such unstable "key" industries.

Generally speaking, all this is admirable if the practice can be made to fit the theory. Undoubtedly it is essential, to take the point regarding the prevention of the flooding of the market by low-priced goods through a collapse of exchange in the country of origin, that industry should be protected against a manifest menace. Obviously, this is initially directed against Germany, where the exchange has collapsed to an extent which would enable her to swamp this country with commodities with which our own manufacturers could not hope to compete. We want money from Germany and we certainly do not want, nor can we afford to pay her any save for articles of commerce which we are unable to produce for ourselves, except so far as trading might help to bring greedy profiteers to their senses. Apart from that, it is but fair that our own industries should be safeguarded from a form of competition which results from the position which Germany as an enemy country and a defeated one fortuitously finds herself. It would be unthinkable that Germany should actually be allowed to benefit from her crimes.

In the matter of "key" industries, we imagine that everyone will agree with the Government view that these must be protected. How nearly Germany won the war through her insidious policy of underselling us in the home market in "key" productions is a matter of too recent knowledge to need emphasising now. If we take the case of the magneto, which was the key to the aeroplane industry, and regard how, by a scientific system of obtaining a monopoly of the British market so that we were, at the outbreak of war, not producing more than a hundred of these essential machines per week, we shall see how important it is to maintain our key industries against such competition. Cases could be multiplied of how well and carefully Germany prepared for war by ensuring that "The Day" should find us dependent upon herself for many of the products essential for war. Apart from risks of further wars, we have created our own "key" industries, and they must not be filched from us for want of the essential protection. At the same time, it is well that the warning should have been given that undue profits will not be allowed to be made at the expense of the community by reason of the protection of these industries. Unfortunately, bitter experience of shameless profiteering has made the mass of the people very suspicious of proposals for the protection of industry. They see in such proposals merely fresh levers for the use of the profiteer, and we are pretty well convinced that if a plebiscite of the electors were taken on the question of protection of industry without guarantees against the making of undue profits, there would be an overwhelming majority against such protection.

◆ ◆ ◆ ◆

Church's Gift to R.A.F.

VICE AIR-MARSHAL SIR GODFREY PAINE, Inspector-General R.A.F., opened, the other day, at Netheravon an institute which has been presented to the R.A.F. by the Church of England Board for the welfare of the Imperial Forces in the diocese of Salisbury.

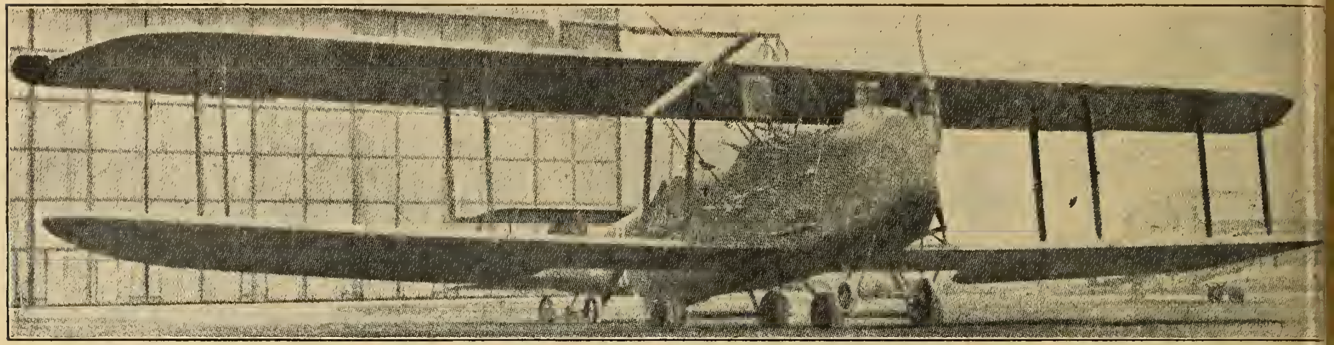
Sir Godfrey emphasised the fact that it was the first institute presented by anybody to the R.A.F., and the gratitude of the whole of the R.A.F. was due to the Board for its munificent gift. The institute, which has been erected at a cost of £4,000, has accommodation for 600 persons, comprises a lounge hall, billiard-room, buffet and a chapel or devotional room, which was dedicated by the Bishop of Salisbury, who presided at the function.

By J. McGilchrist.

THE BALLOON STRAFER: A D.H. 5 at work.

THE GERMAN D.F.W. COMMERCIAL FOUR-ENGINED BIPLANE

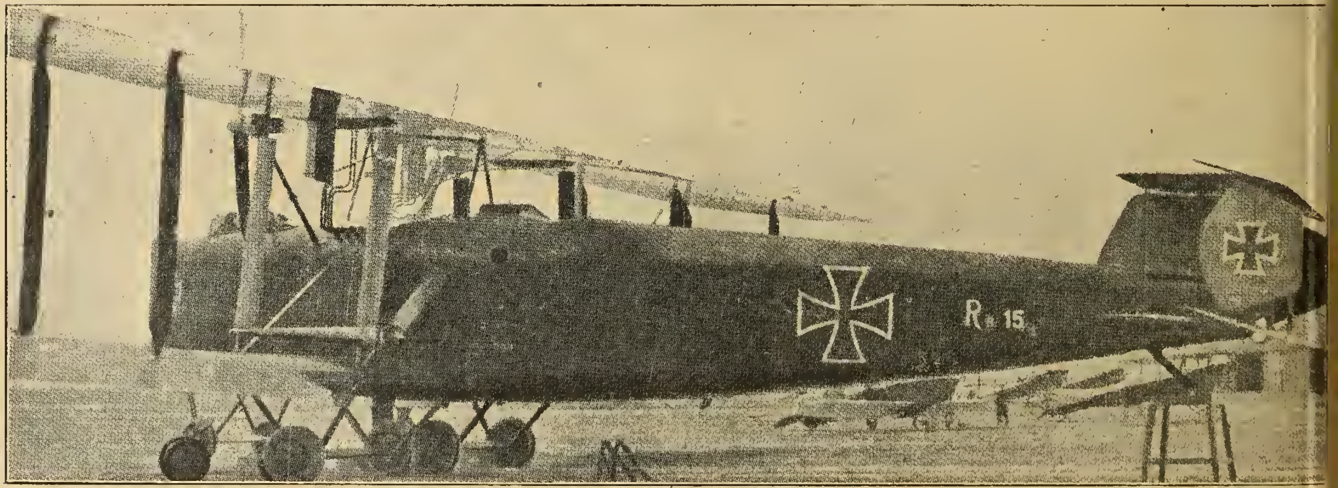
In spite of the handicaps caused by the Peace conditions, German aircraft firms are losing no time in getting going on their post-War commercial aeroplanes. Since the conclusion of hostilities several firms have commenced the construction of large multi-engined passenger carriers. Among these is the D.F.W. firm (Deutsche Flugzeug Werke), who have nearing completion a large four-engined biplane, designed to carry 24 passengers. This machine is a development of the military type built during the War, and before commencing a description of the commercial machine a brief reference to its prototypes may be of interest.



THE D.F.W. MILITARY TYPE R II.: Three-quarter front view.

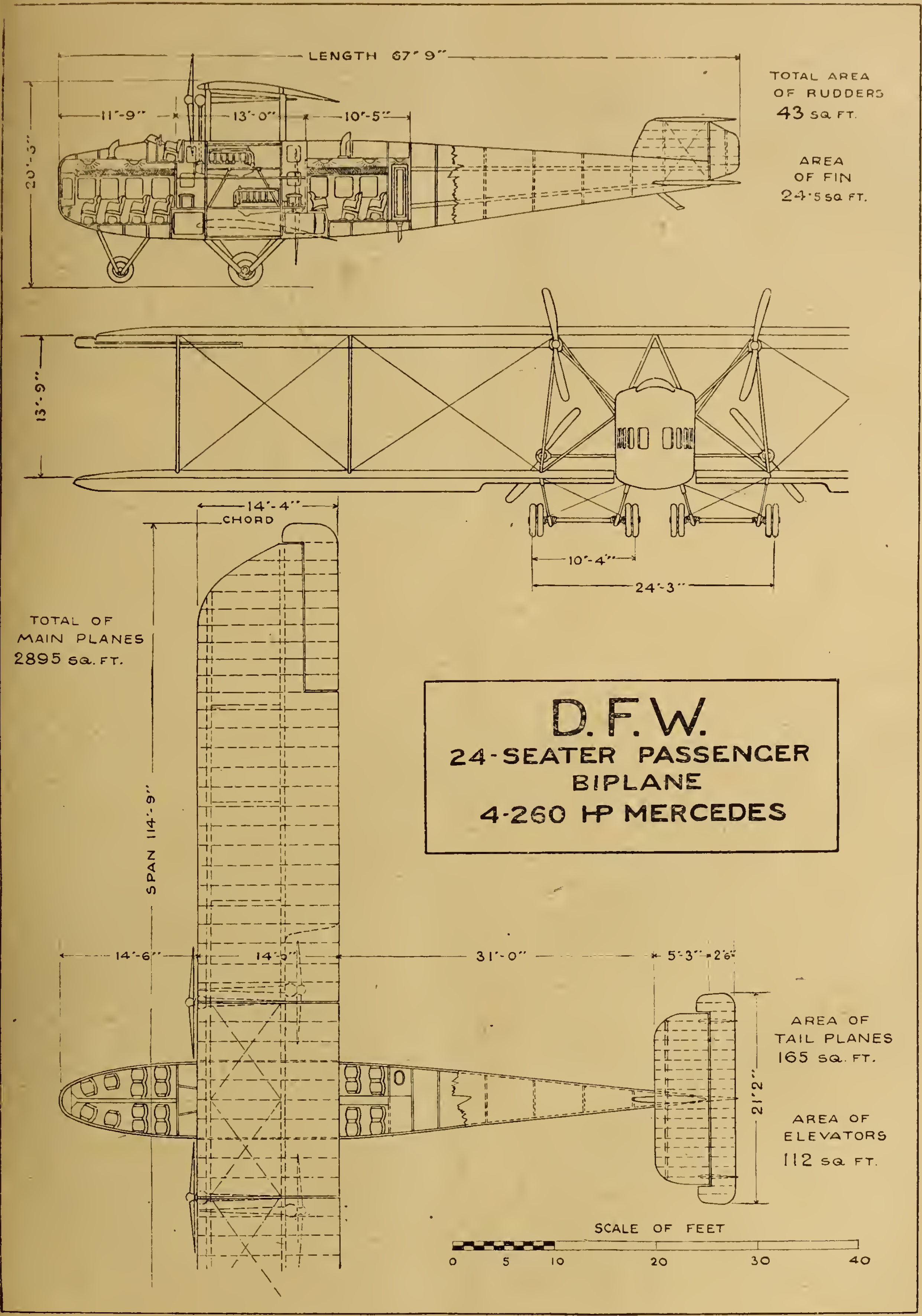
It was in September, 1915, that the D.F.W. works commenced the construction of their first multi-engined type, the R I. This machine was fitted with four 220 h.p. Mercédès engines placed in the *fuselage* and driving airscrews on the wings by means of bevel gears and shafts. The four engines were arranged inside the *fuselage*, two on each side, one above the other, leaving a central gangway between them. Under the floor-boards, in front of and behind the engines, the tanks were placed, three in front and three behind. The amount of fuel carried was sufficient for a flight of six hours' duration. Each engine was provided with a transmission-drive to airscrews placed on the wings, and the screws were geared down to run at 900 r.p.m. Generally speaking, the power plant was so arranged that each engine, with its transmission-drive and propeller, formed a complete unit which functioned quite independently of the other three. The trial flights are said to have taken place without any breakdowns occurring, and after a total of eight hours in the air the machine was considered ready for her acceptance tests, which took place on October 19, 1916. When weighed for this test the weight of the machine empty was found to be 6,800 kg. (15,000 lbs.), and the various loads required by the military authorities amounted to 2,600 kg. (5,700 lbs.), bringing the total weight in flying trim up to 9,400 kg. (20,700 lbs.). The wing loading worked out at about 10.3 lbs./sq. ft., and the power loading at 23.5 lbs./h.p. With this loading the performance during the acceptance tests was as follows: 3,300 ft. in 10 mins.; 6,600 ft. in 25 mins.; and 10,900 ft. in 53 mins. The maximum speed attained was 130 km. (78 miles) per hour. After a flight of 2½ hours' duration the machine landed without mishap at Doberitz.

During further test flights at Doberitz—after the machine had been taken over by the Flying Service—trouble was experienced with the crankshafts, which continued to break. This was put down to the excessive length of the eight-cylindered engines, and also to faulty engine mountings. These were re-designed, and the transmission shafts were provided with universal joints. These alterations were completed in March, 1917, and towards the end of that month a trial flight of two hours' duration was made, during which no trouble was experienced. On April 30, 1917, the machine was flown across to the Eastern Front, the trip to Konigsberg being made in 3 hours 55 mins. The experience gained with this type was so satisfactory that the D.F.W. works received an order for six more, these, however, to be fitted with four 260 h.p. Mercédès engines, and to be able to carry a useful load of 3,400 kg. (7,500 lbs.) instead of the useful load of 5,700 lbs. carried by the first machine.

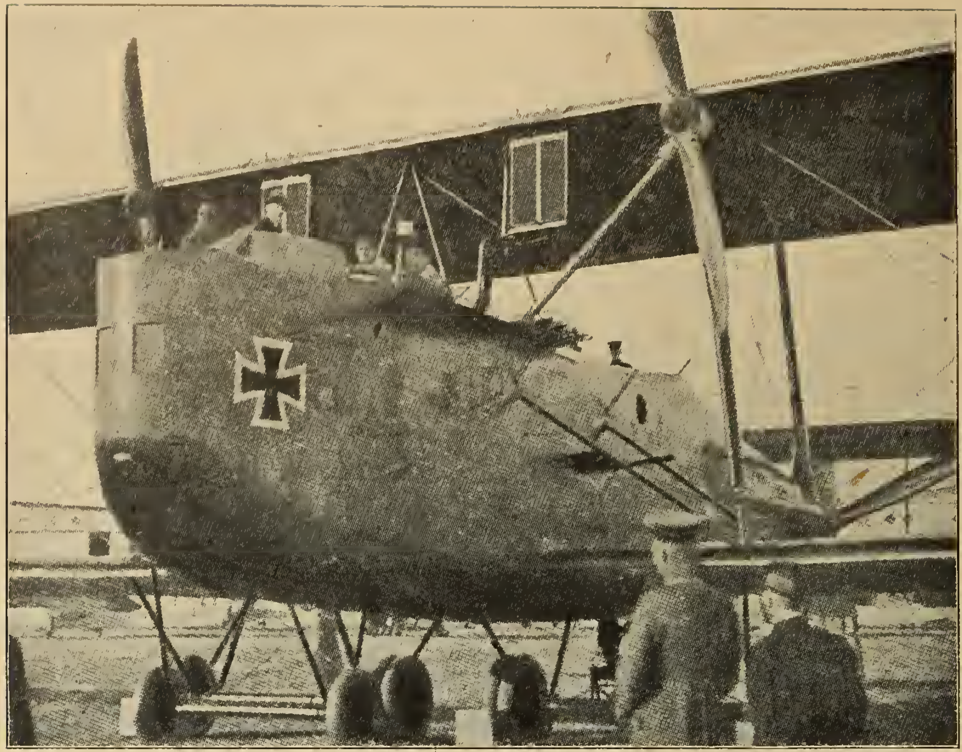


THE D.F.W. MILITARY TYPE R II.: Three-quarter rear view.

The fitting of larger engines, and the demand for a higher useful load, necessarily resulted in a somewhat larger machine. This became known as the Type R II, the first of which was commenced in the early part of 1918. The transmission system was, generally speaking, similar to that of the R I.



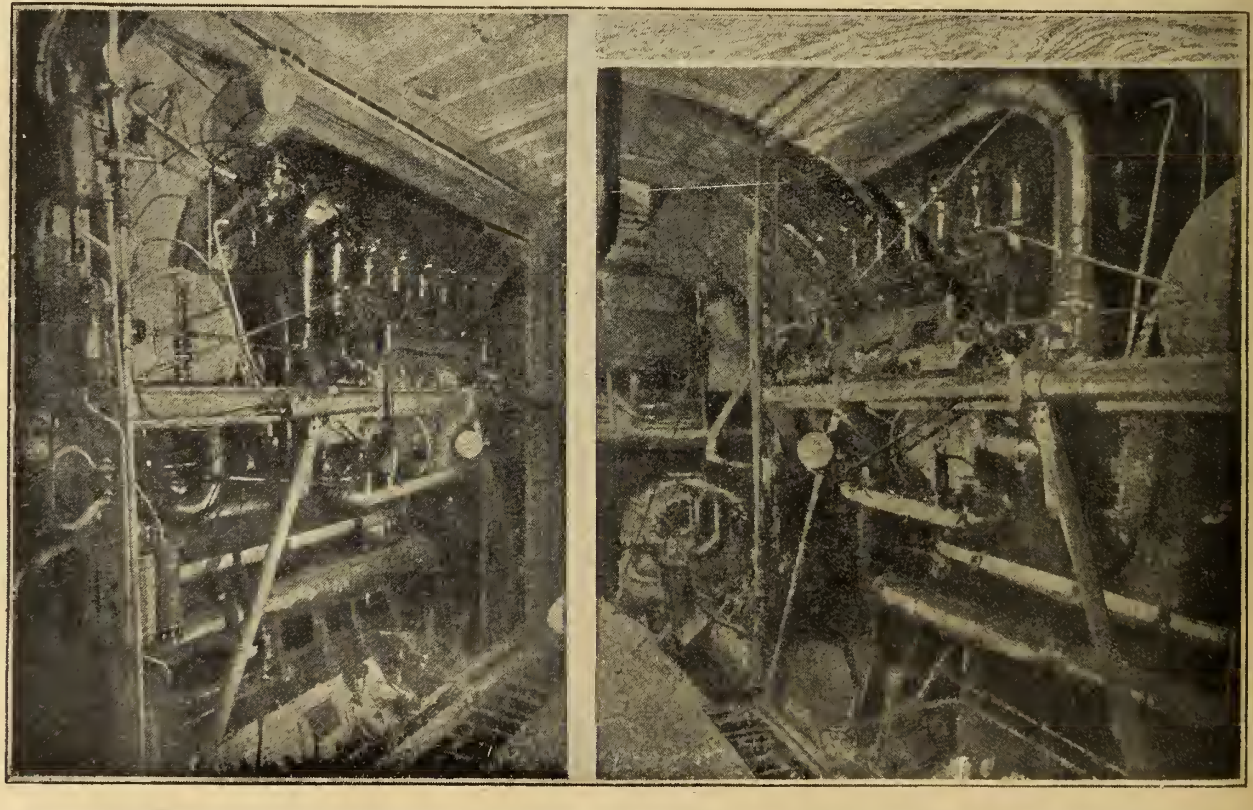
THE D.F.W. PASSENGER CARRIER: Plan, side and front elevations, to scale.



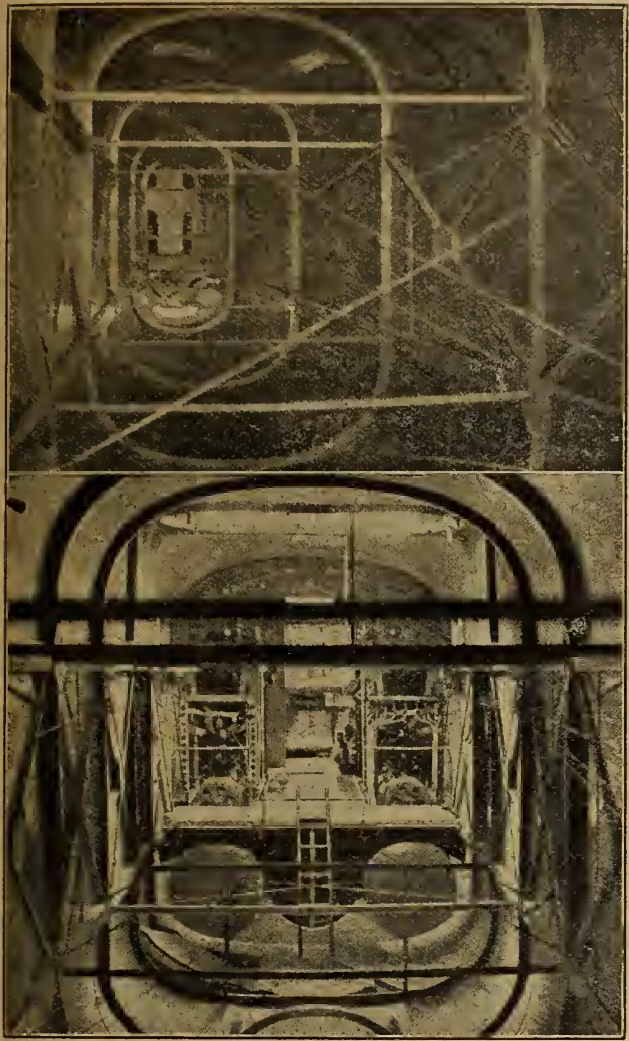
The D.F.W. Military Type R II.: View of the nose of the *fuselage*, showing transmission shafts, etc.

The first of the R II machines made its first trial flight towards the end of August, 1918. Again transmission troubles developed, and the transmission shafts, which ran at 3,000 r.p.m., showed excessive vibration. In order to stop this the shafts were enclosed in tubes, which arrangement appears to have had the desired effect, as no more transmission trouble was, it is said, experienced. The weight empty of the R II was 8,600 kg. (18,900 lbs.), and the total loaded weight somewhere about 12,000 kg. (26,500 lbs.). The power load was 25.25 lbs./h.p., and the wing loading 9 lbs./sq. ft.

Before describing the 24-seater passenger machine, it might be mentioned that the D.F.W. firm had the drawings ready for a giant war machine, a side elevation of which is shown in the accompanying illustration. With the signing of Peace this machine was not required, and was, therefore,



TWO VIEWS OF THE ENGINE-ROOM OF THE D.F.W. MILITARY TYPE R II.: Left: The port engine installation. Right: The starboard engines.



Two views of the interior of the D.F.W. Military Type R II.: Top: Looking aft from the engine-room. Bottom: Looking forward through the engine-room to the pilot's cockpit.

never built. It is nevertheless of interest in showing the ambitious designs which were entertained by the Germans towards the end of the War. This machine, which, had it materialised, would have been the largest aeroplane in the world—according to the Germans—was to be fitted with eight engines, each of 270 h.p., or a total of 2,160 h.p. The engines were to be started by a compressed air starter operated by an engine of 120 h.p. The same engine would probably be used for driving the electric generator furnishing current for lighting, heating, and wireless. In addition to an armament of eight machine-guns, the machine was to carry 5,500 lbs. of bombs. It will be noticed that in spite of its size the giant D.F.W. was to be fitted with a monoplane tail.

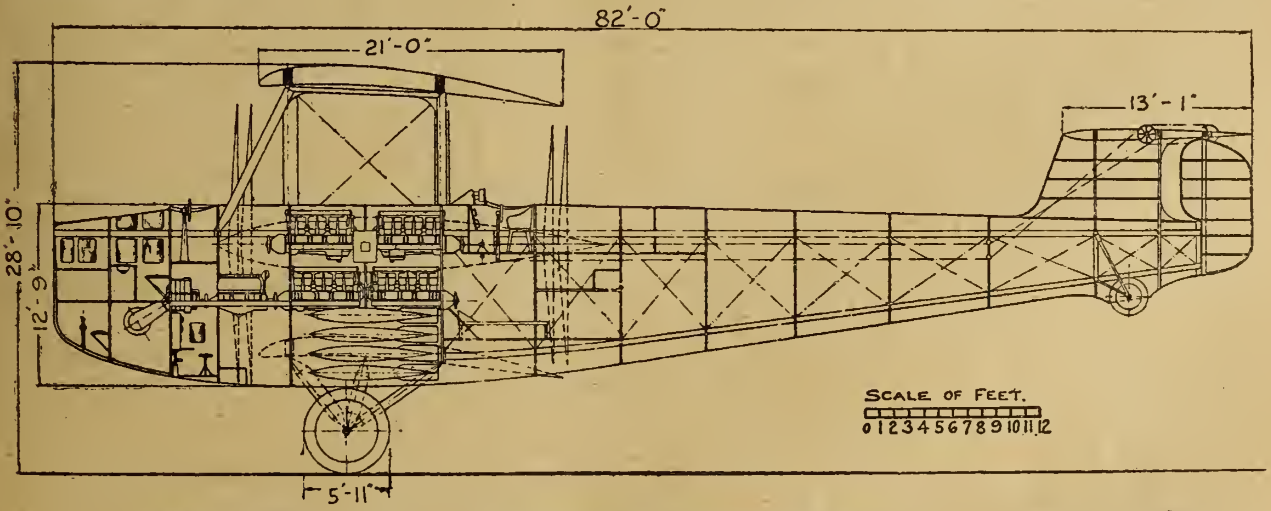
The D.F.W. Passenger Carrier

As in the case of the military machine, the passenger carrier has a *fuselage* built entirely of wood. There are four main *longerons*, to which transverse formers are attached at intervals. In places there are incorporated in the construction steel tube struts and wire bracing. The floor-boards, gangways, etc., are so designed as to assist in rendering the *fuselage* structure rigid. Special attention has been paid to the engine installation. The engines are mounted on a structure of pressed steel inside the *fuselage*, two on each side, one slightly ahead of and above the other. The points where the members of this pressed steel framework are secured to the *fuselage* also serve as attachments for wings and undercarriage struts. The whole *fuselage* is covered with plywood. The front and rear portions of the body provide accommodation for the passengers, while the central portion is the engine-room. In each of the passenger cabins there are twelve seats, so arranged as to give the occupants a good view out through the numerous windows with which the cabins are provided. Electric lighting and heating are provided, and a wireless outfit is carried. Fire extinguishers are placed at suitable points throughout the *fuselage*. and all modern conveniences are provided.

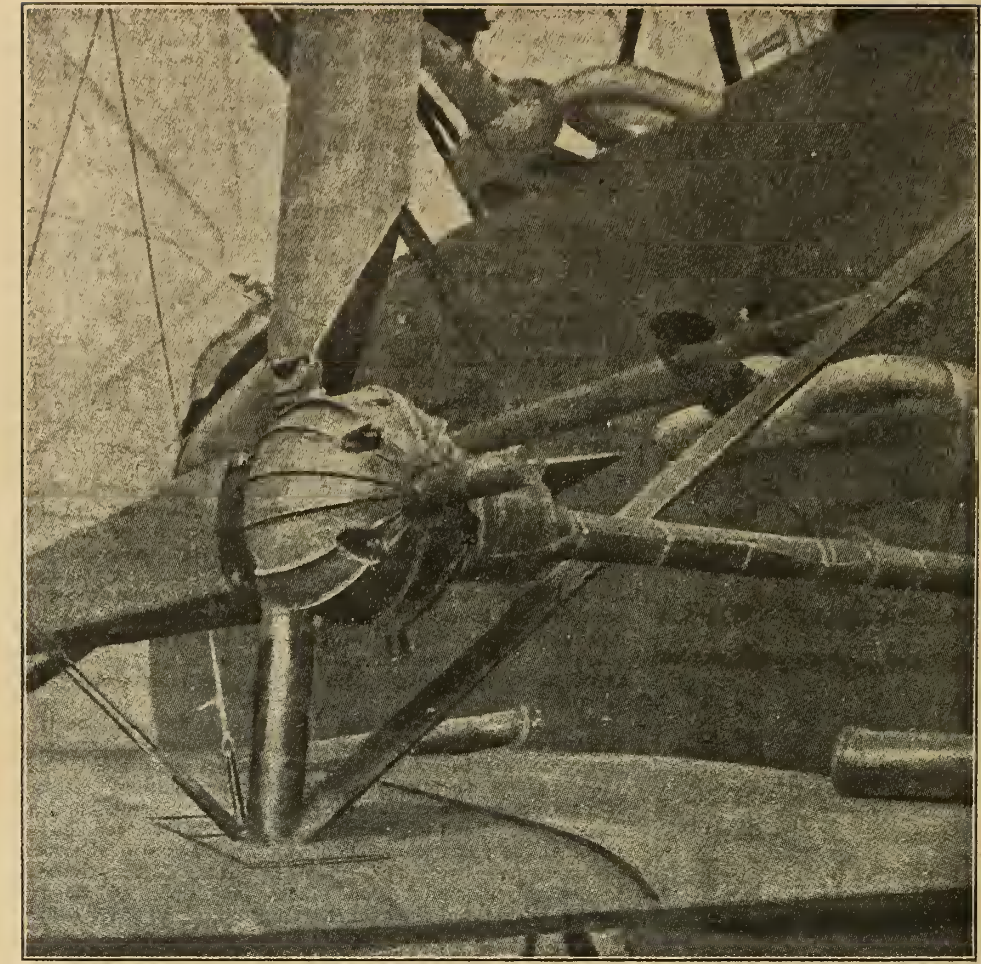
As will be seen from the illustrations, the machine is a biplane, with its top plane in three sections. There is a centre section to which the two end sections are attached. The lower plane consists really of four sections, the two inner ones of which, however, remain in place. The end sections are joined to the two short wing roots of the bottom plane at the point where occur the attachments of the outer undercarriage struts and propeller struts. When the end sections of top and bottom planes are dismantled, the top centre section and the two short bottom plane roots remain in place, with their strutting, propeller drives, etc. The wing construction is of more or less standard form, with spars and ribs of wood, built-up sections being glued with waterproof glue. The wing bracing is in the form of duplicate steel cables. *Ailerons* are fitted to the top plane only.

The tail, it will be seen, is of the biplane type. The vertical fin is built integral with the *fuselage* and is covered with ply-wood. The two tail planes are attached to the fin and to the *fuselage* respectively. The bracing is by struts and cables as in the case of the main planes. The elevators are mounted on ball bearings at the rear edge of the tail planes, and the rudders are attached to the rear inter-tail plane struts. The elevator and rudder control cables pass inside the body through suitable guides, while the *aileron* cables pass over pulleys in the lower plane, and hence to the controls.

The arrangement of the undercarriage will be understood from an inspection of the general arrangement drawings.



A D.F.W. design for a giant aeroplane to be driven by eight engines, each of 270 h.p. Owing to the finish of the War this machine was never built.



The D.F.W. Military Type R II.: The port pusher airscrew shaft, above the rear spar of the bottom plane.

There is an undercarriage on each side, consisting of two Vees of streamline steel tubes, the inner one of which is attached to the *fuselage*, while the outer one is bolted to the bottom plane. The two Vees are braced diagonally by steel cables. The axles are of chrome nickel steel, slung from the apices of the Vees by rubber cord, and rest in a slot in a ply-wood fairing. In order to prevent the machine from turning on its nose on landing, a front undercarriage is fitted towards the nose of the *fuselage*. A swivelling tail skid is mounted direct in the rear part of the body.

As already mentioned, the motors are placed inside the *fuselage*, above one another, and it is said that as a result of keeping the whole central portion of body and wings a complete unit, this part of the structure is very rigid, and that as a consequence no transmission troubles are experienced. As will be seen from the side elevation, the upper engines have their gear end facing forward, while the lower engines are placed the reverse way. The two front engines drive air-screws placed on the front spars of the top plane, while the lower engines drive pushers situated near the rear spars of the lower plane. Consequently the engine shafts and propeller shafts are parallel with one another, and the drive is by sloping shafts and bevel gears. The size of the bevel gears is so proportioned that a gear reduction of 14 to 9 is obtained. That is to say, when the engines are making 1,400 r.p.m. the airscrews are revolving at 900 r.p.m. It is claimed that by placing the tractors high and the pushers low as indicated, both are working in undisturbed air, and that this fact, in conjunction with the slow running of the air-screws' 900 r.p.m., makes for very high airscrew efficiency. It is also claimed that in case of one engine cutting out the trim can be maintained by use of rudder and elevators. As the distance between airscrews is fairly great, this claim might be open to doubt. It is said that the machine will fly comfortably with only two engines running, and while this is probably true as regards the actual power, it may be doubted in view of the points of application of the power. In other words, if the trim of the machine is right with all engines working, it is doubtful whether it would be with, for instance, only the tractors pulling, as the centre of thrust would be in that case very much too high. As naturally the transmission bearings are subject to considerable loads, it is important to be in a position to know always what is their condition. To this end all the bearings in the transmission system are provided with electric thermometers which indicate at any time the temperature of each bearing. There are seven petrol tanks placed in the body, each holding 350 litres.

⊡ ⊡ ⊡ ⊡

Germans Want International Air-Post

NEGOTIATIONS are being carried on between German and foreign firms with the object of securing Germany's participation in an international air-post service.

Regular air-mails between Berlin and Copenhagen are expected to begin shortly, and arrangements are being made with the other Scandinavian countries. An important part of the service will be the conveyance of "aerograms" to relieve the telegraphic service.

The shortage of petrol in Germany at present is restricting the use of aircraft for mail purposes.

Germans and Transatlantic Flying

FROM messages sent out from Berlin it appears that a new International Aerial Traffic Co. is being planned to carry on aerial communication between Germany and neutral and other States, including America. It is suggested that the journey between Europe and America may be reduced to 48 hours by utilising a reconstructed and altered type of the Hungarian rigid steel airship, with a carrying capacity of about 45 tons and "with increased firmness, speed and running security." This new construction is said to consist of a system of curved steel pipes, designed to give the airship greater strength.

Zeppelin Services to Italy

THE municipal authorities of Locarno have received a proposition from a Swiss firm which wishes to establish an aerodrome in the Maggia delta, with a view to running a service of Zeppelins between Germany and Italy, across Switzerland. A committee has been appointed to go into the matter.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

SPECIAL COMMITTEE MEETING

A Special Meeting of The Committee was held on Wednesday, September 17, 1919, when there were present :—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair ; Mr. G. B. Cockburn ; Lieut.-Col. Spenser D. A. Grey, D.S.O. ; Lieut.-Col. F. K. McClean ; Lieut.-Col. Alec Ogilvie, and the Secretary and Assistant Secretary.

Jacques Schneider International Seaplane Race.—The report of the Commissaires Sportifs was received and telegram from Mr. Lorenzo Santoni, President, Societa Idrovalanti Alta Italia, lodging protest on behalf of the "Savoia."

The Secretary reported that Mr. Santoni had also requested the Aero Club of Italy to lodge formal protest with the Fédération Aéronautique Internationale, Paris.

Organisation of the Race.—Letter from Lieut.-Col. Spenser D. A. Grey, D.S.O., dated September 15, 1919, on the Club's organisation of the Race was read.

The organisation of the Race was discussed at great length and the Committee considered that the arrangements were faulty.

The Committee further considered the method of carrying out future competitions.

SPECIAL COMMITTEE MEETING

A Special Meeting of The Committee was held on Monday, September 22, 1919, when there were present :—Mr. G. B. Cockburn, in the Chair ; Lieut.-Col. Spenser D. A. Grey, D.S.O. ; Sqdn.Ldr. T. O'B. Hubbard, M.C. R.A.F. ; Lieut.-Col. F. K. McClean ; Lieut.-Col. Alec Ogilvie, and the Secretary and Assistant Secretary.

Jacques Schneider Trophy.—It was reported that the Aero Club of Italy had lodged a protest with the Fédération Aéronautique Internationale against the disqualification of Sr. Janello, the Italian representative, on the "Savoia," in the recent race at Bournemouth for the Jacques Schneider Trophy.

The Committee unanimously decided that although Sr. Janello did not actually complete the course as marked out for the race, the Royal Aero Club, as the holders of the Trophy, should recommend to the Fédération Aéronautique Internationale when the protest is heard, that the Trophy and Prize should be awarded to Sr. Janello, the Italian representative.

Royal Aero Club Seaplane Competition.—It was further decided that the Royal Aero Club should offer a Prize of £500 and Trophy, valued at £100 (kindly presented to the Club by Lieut.-Col. F. K. McClean) for an International Seaplane Competition to be held in the Solent and Southampton Water in the last week in October next. The conditions will be similar to those of the Schneider Race, with the exception that the alightings on the water will be made after the course of 200 nautical miles has been completed.

The final regulations are now being drawn up and will be issued on October 1.

Intending competitors are requested to communicate with the Royal Aero Club.

TECHNICAL AND COMPETITIONS COMMITTEE

A Meeting of the Technical and Competitions Committee was held on Monday, September 22, 1919, when there were present :—Lieut.-Col. F. K. McClean, in the Chair ; Sqdn. Ld. T. O'B. Hubbard, M.C., R.A.F. ; Maj. R. H. Mayo ; Lieut.-Col. Alec Ogilvie ; Lieut.-Col. H. T. Tizard, Mr. Howard T. Wright and the Secretary and Assistant Secretary.

Royal Aero Club Seaplane Competition.—The conditions for this Competition were considered, and the Committee adjourned till Tuesday, the 30th inst.

Presentation to Club

Mr. Hugh Lewis has presented to the Club a large framed coloured picture of Squadron 32 (D.H. 2 Scouts) Royal Flying Corps at Vert Galland Farm, France, Somme Battle 1916.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

CORRESPONDENCE

SCHNEIDER CUP CONTEST

[1981] With reference to your account of the Schneider Cup contest in your issue of September 18, I write to request that you will correct the impression created on page 1249 that the Sopwith-Jupiter machine gave up the race partly on account of engine trouble.

The machine is fitted with the 450 h.p. radial air-cooled "Jupiter" engine built by this company, and its running was entirely satisfactory in every way. I spoke to Mr. Hawker a few minutes after his giving up the race and was glad to learn that the engine was running perfectly, the mist only making it impossible to find the way round the course.

The Cosmos Engineering Co., Ltd.,
T. D. Wynn Weston, *Sales Manager.*

[It was not in any way in our mind that the engine was at fault. Our reference was merely an attempt to describe the usual happenings when a pilot is switching on and off during his work in the air.—Ed.]

[1982] The wording of your report on the eliminating trials for the Schneider Cup competition would imply that the photograph sent by us to you of the actual machine was not that of the actual racer, but one that we had sent with a view to concealing the features of the machine entered.

If you will refer to a contemporary you will see the same photograph that you published together with the true facts of the case stated, *i.e.*, that the machine had two pairs of wings, the choice of which for the actual race depended on the weather conditions at the time.

It has been our consistent policy not to publish particulars or details of our modern machines, but we think it would have been more courteous to have applied to us for the true facts before implying that we were guilty of misrepresentation and, had you done so, you would have been given the same information as was accorded to other journals.

The Fairey Aviation Co., Ltd.,
A. A. Amos, *Secretary.*

[In our remarks upon the Fairey machine, we naturally could only deal with facts as obtainable and as before us. It was hardly possible that we could assume there were two sets of wings to be used for different conditions obtaining at the moment of the race. We did communicate with the Fairey Co. for full particulars of their entered machine, and when sending us the photograph which we published on page 1182, Sept. 4, no word was mentioned as to the dual set of wings. From our own observations and photographs obtained at Cowes we still had no means of knowing of the dual wing arrangements, and it is obvious from a glance at the two photographs that our remarks are the only natural conclusion to arrive at in the circumstances. We hardly, therefore, understand how it is we were "given the same information as was accorded to other journals."—Ed.]

▣ ▣ ▣ ▣

Cairo-Karachi Air Post

It is understood that owing to the lack of commercial prospects sufficient to justify the great expense, it has been found necessary to postpone the inauguration of the Cairo-Karachi air-mail service, reports the *Times* correspondent from Baghdad.

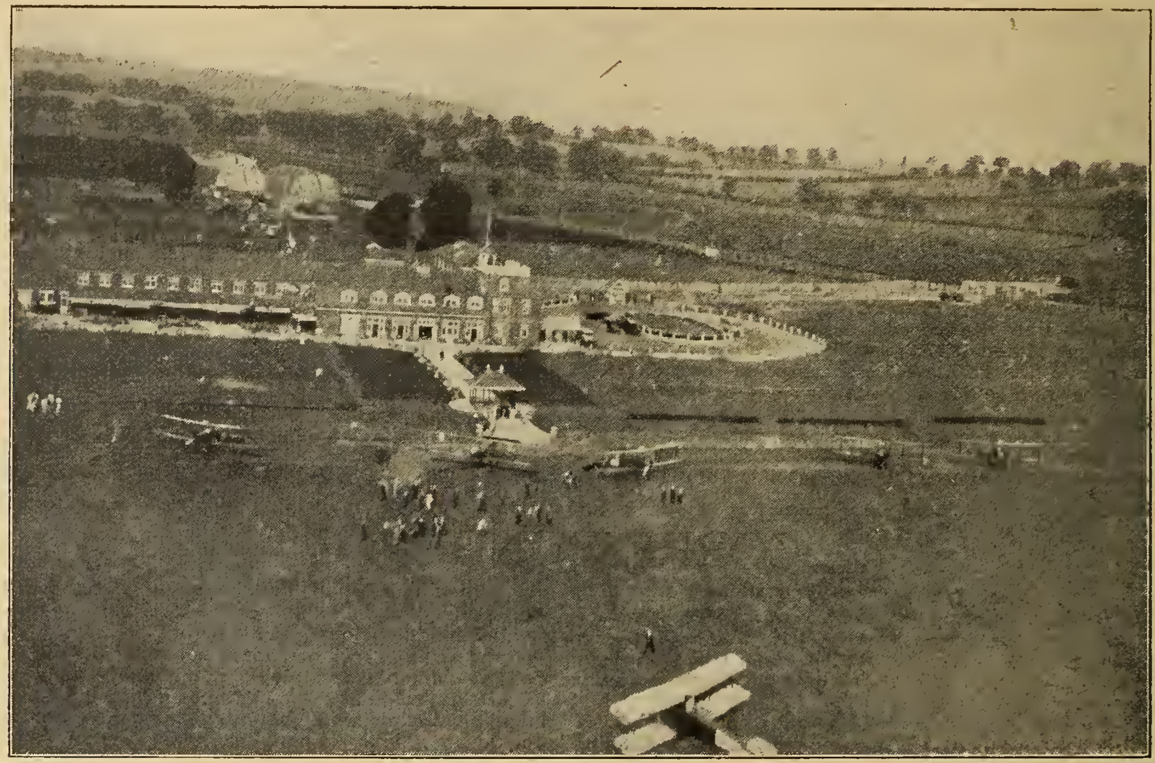
A survey party recently crossed the desert from Damascus in cars to Abu Kemal, on the Euphrates, and thence to Baghdad, and marked landing grounds at intervals of 20 miles in the desert.

Fatal Accident in India

An aeroplane, while trying to land at the Residency at Quetta, crashed to the ground and burst into flames. A passenger, Capt. Steele, and two Brahmins were killed.

THE LONDON FLYING CLUB, HENDON

RECENTLY, following a visit to the L.F.C., we gave an outline of the remarkable transformation which has been brought about at one of the corners of the Hendon Aerodrome, by the erection of a really up-to-date flying and country club-house, by Mr. Claude Grahame-White and those associated with him. Last week at an informal gathering of the Press and friends, the Club was inaugurated at a luncheon at which Lord Louth presided, in the unavoidable absence of the chairman of the Club, Lord Lonsdale. The beauties and possibilities of this, London's latest attraction, were greatly appreciated by the guests, and whilst tennis and other sports were in full swing, the visitors had opportunities of enjoying flights in the Club aeroplanes which were ranged in the Club 'drome in front of the members' terrace. Some photographs, which we are able to give this week, will convey in a small way the actualities of the Club and its "accessories." So far as possible, the idea has been to follow the lines of country clubs as run in America.

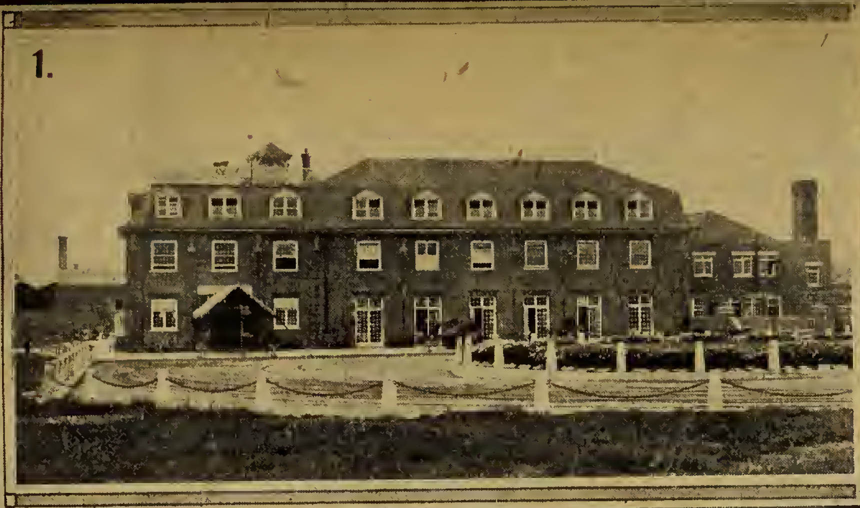


"Flight" Copyright.

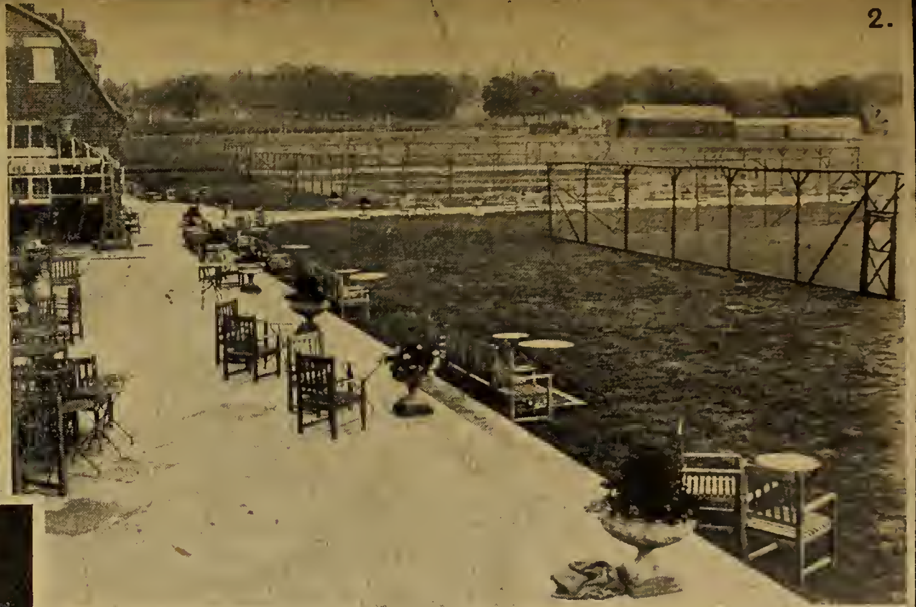
THE LONDON FLYING CLUB, HENDON : A view of the Club-house from above, showing the Club aeroplanes ready for members at the end of the terrace dividing the hard tennis courts.

At the opening gathering, Mr. Grahame-White explained that the first idea of the Club occurred to him in 1909, and with the coming of the Armistice, and having regard to the thousands of skilled pilots who had graduated during the War, and the enormously increased field of interest in aviation which had arisen, the time was ripe to bring his dream into materialistic fact. The London Flying Club, he believed, would be but the forerunner of similar clubs all over the country, even the world, and by their all keeping in association and touch with each other, a chain of club-houses and aerodromes would come into being which would greatly help the forward movement of aeronautics. It was not the flying man only for which the L.F.C. and the other clubs would cater, but his aim was to found rather a super sports club, a Ranelagh-Hurlingham-Stoke Poges centre of sport and society. A great feature was the arrangements for both summer and winter sports and entertainments, and they had in contemplation the adding of covered tennis courts, croquet, polo, a real ice-rink—the latter being particularly called for now that Prince's is to be transformed into a central motor car depot and garage. It might not be known, but they even had a trout stream on the premises, and a club golf course was now in process of being laid out on the other side of the railway. A great advantage was that Club aeroplanes were always ready on the spot for hire by members, either with pilots or in the case of pilot members, without the professional aid. Those who desired to learn would also have special advantages, while the Club was brought practically to the doors of members by means of the fleet of Club cars—from the genuine Rolls-Royce to the *8d.* per mile Club taxis—which were always ready for short or long distances. To Mr. Matthew was due, Mr. Grahame-White said, the credit of the architectural work, and for the harmony and scheme of colour throughout the furnishings and decorations he wished to give full credit to Mrs. Grahame-White (Miss Ethel Levey). The secretarial chair was occupied by Maj. Oliphant, late of the 12th Lancers, who was enthusiastic in his support of the whole undertaking as a sports and social centre of meeting.

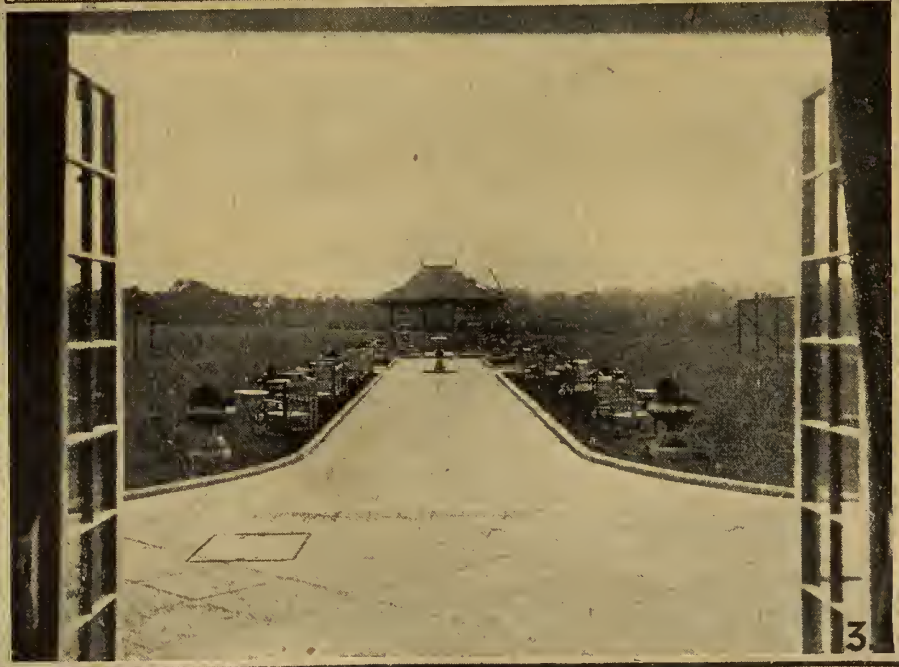
That the Club should attract an influential membership is a foregone conclusion, and by way of an official inauguration, Monday last was selected for an open lawn tennis tournament, lasting the entire week, a number of valuable prizes being put up for competition in gentlemen's open singles, ladies' open singles, open doubles for each sex and open doubles for ladies and gentlemen. A special committee had charge of the tennis section of the Club, with Mr. D. R. Larcombe as referee. The Vice-Presidents of the Club are :—Lord Willoughby de Broke, Mrs. Ian Bullough, the Marquis of Cholmondeley, Mrs. Winston Churchill, Viscountess Cowdray, Sir Arthur du Cros, Bt., Lady Cunard, Viscount Curzon, Lord D'Abernon, Lady D'Abernon, the Countess of Drogheda, Sir Alfred Fripp, K.C.V.O., Lieut.-Col. Cecil Grenfell, Mr. C. Grahame-White, Mrs. Claude Grahame-White, the Hon. Sir Sidney Greville, K.C.V.O., C.B., the Hon. Mrs. Lionel Guest, Princess Hatzfeldt, Lieut.-Gen. Sir David Henderson, 1.



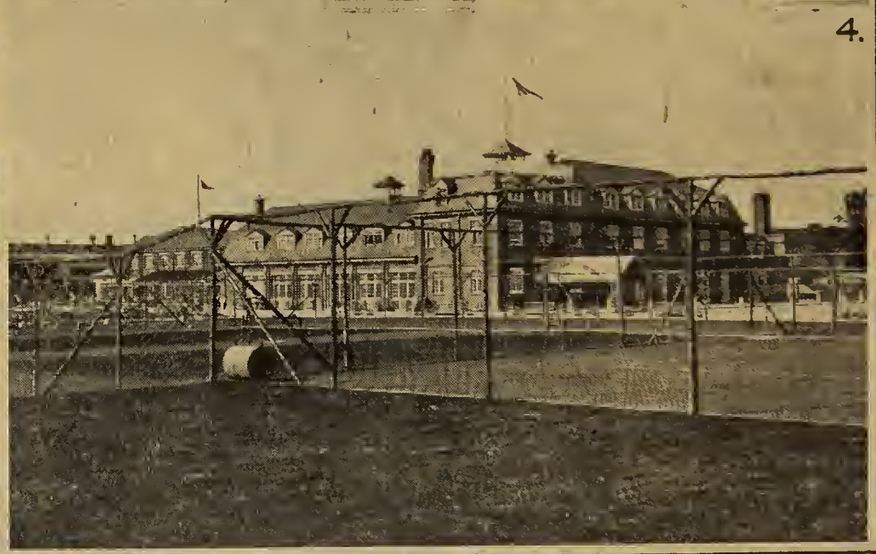
2.



3.

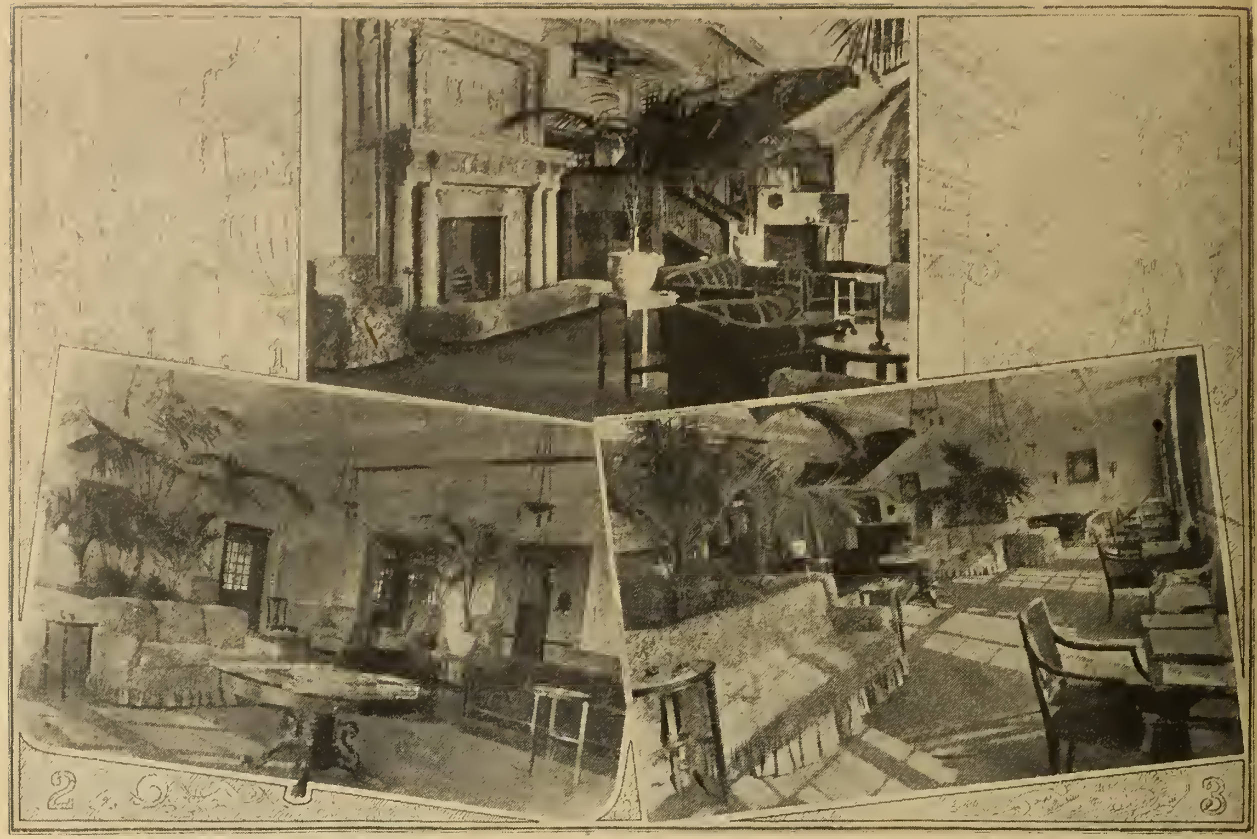


4.



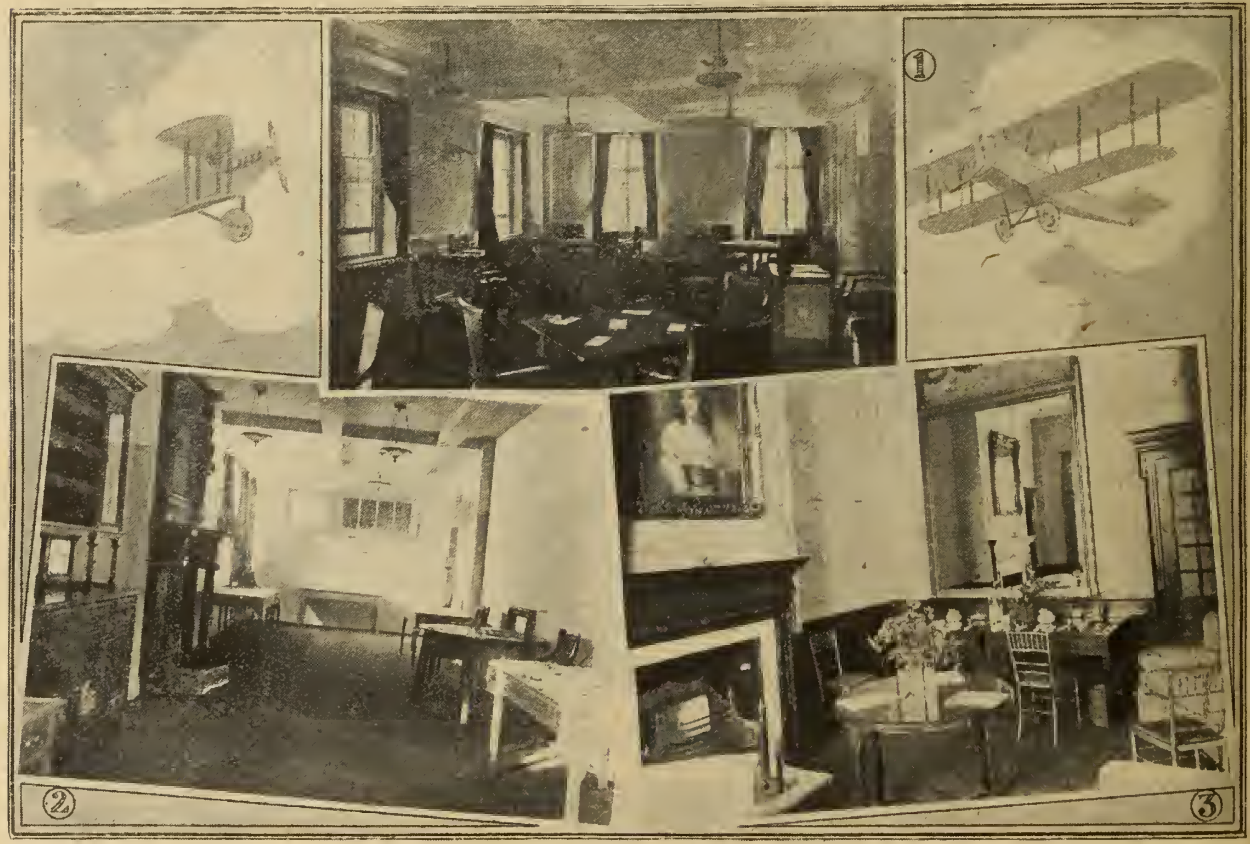
"Flight" Copyright

THE LONDON FLYING CLUB, HENDON: A view of the Club-house, the terrace facing the Club aerodrome, the "gangway" to the aerodrome pavilion between the hard tennis courts, as seen from one of the windows of the Salon, and the hard tennis courts.



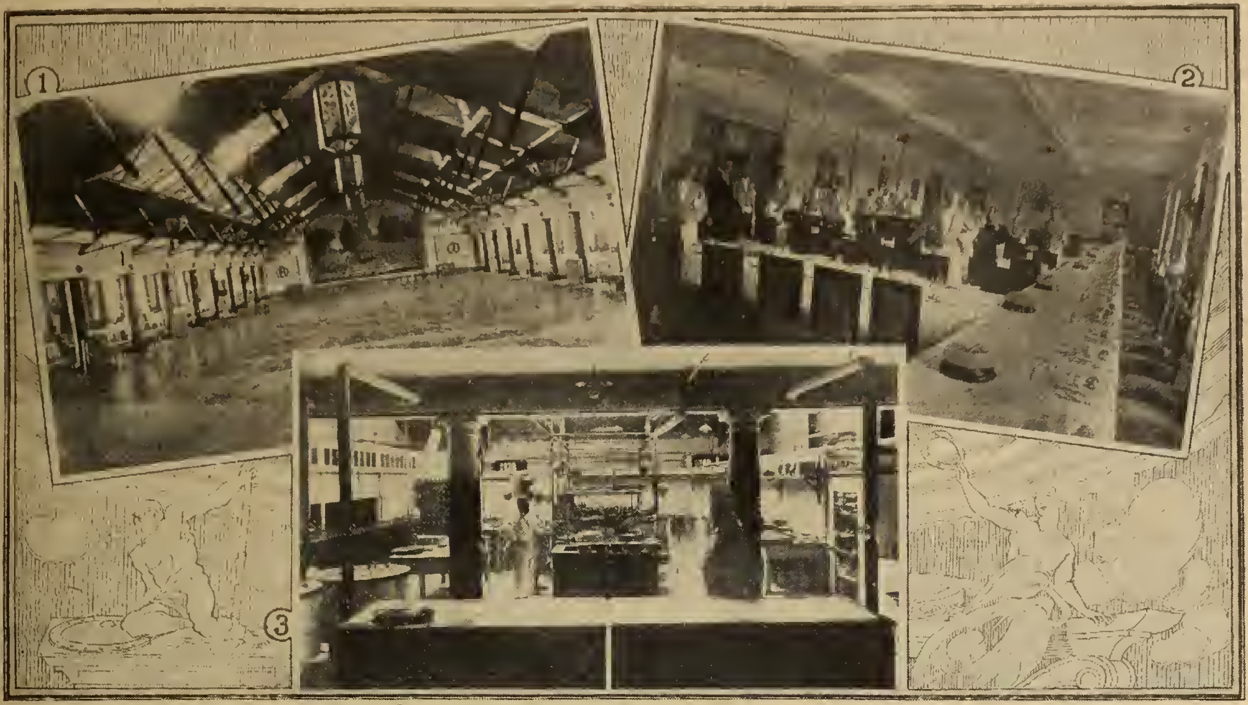
"Flight" Copyright

THE LONDON FLYING CLUB, HENDON: The main salon of the Club, and above, the massive fire-place which adorns this handsome room.

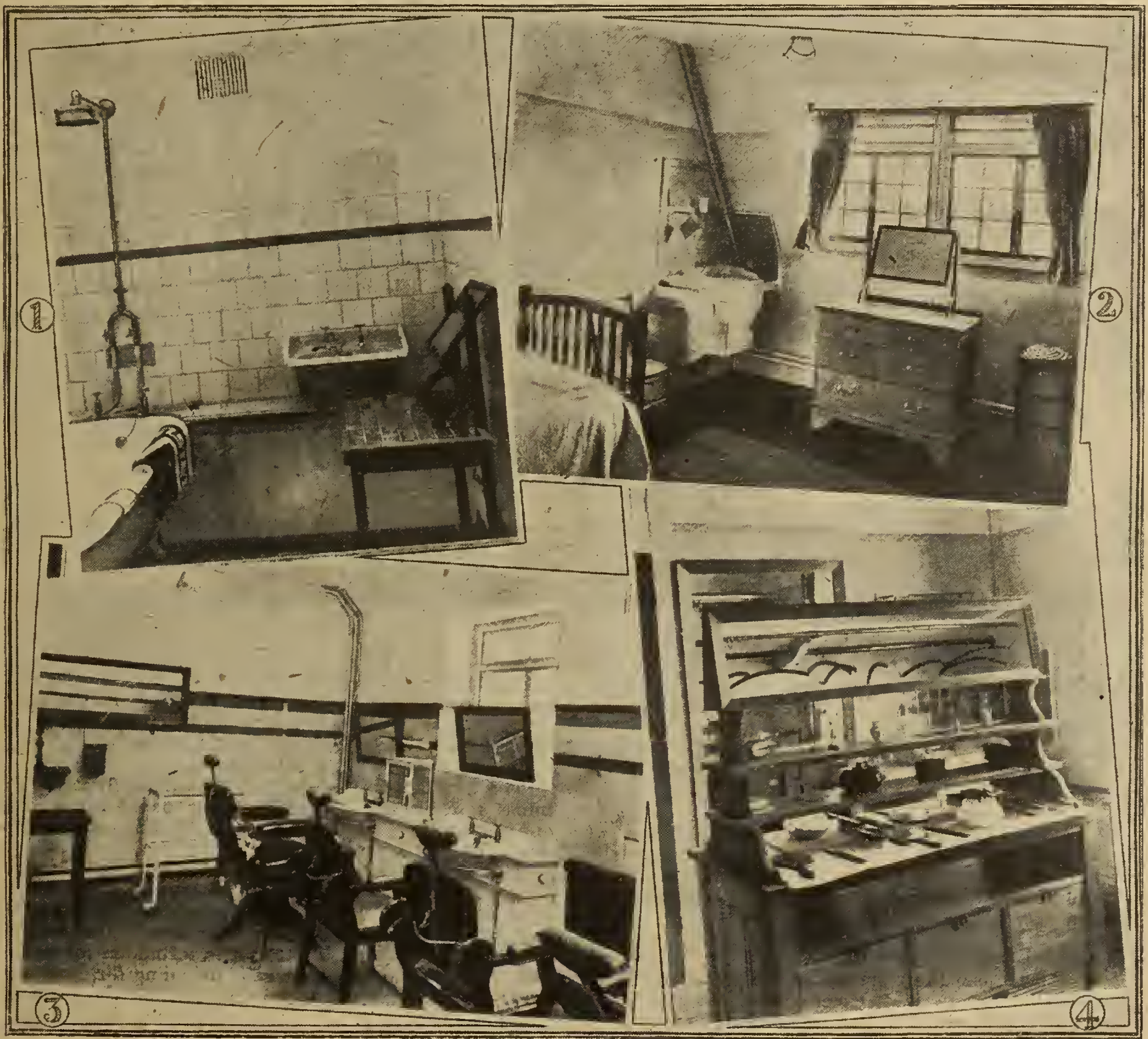


"Flight" Copyright

THE LONDON FLYING CLUB, HENDON: Views of the writing room, the library and ladies' boudoir.



THE LONDON FLYING CLUB, HENDON: The ball-room, the dining-room, and below, the kitchen.



THE LONDON FLYING CLUB, HENDON: An example of the bath-rooms, the bedrooms and the hairdressers' room and ladies' dressing-room.

"Flight" Copyright.

"Flight" Copyright.

THE LONDON FLYING CLUB, HENDON: Machines in the Club 'drome, busy taking up visitors.

K.C.B., K.C.V.O., D.S.O., the Hon. Mrs. Henley, Muriel Lady Helmsley, the Countess of Limerick, Lord Lough, Lord Lurgan, Princesse de Monaco, Lady O'Hagan, Sir Milsom Rees, C.V.O., Lady Rees, Lord Ribblesdale, Maj.-Gen. Ruck, C.B., the Duke of Rutland, K.G., Maj.Gen. Sir John Seely, C.B., D.S.O., Admiral Sir Edward Seymour, G.C.B., Lady Tree, Mrs. Hall Walker, Lord Weir, the Duchess of Westminster, Mrs. Hwfa Williams.

The London Flying Club, Hendon: The "Observatory" on the top of the Club-house with a general view of the Club aerodrome.

The Air-Port Doctor

THE Ministry of Health have requested the Heston-Isleworth District Council to appoint the Medical Officer of the Hounslow Aerodrome as an assistant Medical Officer of Health for the district for air-port sanitary services, without salary from the local authority.

The Air Ministry Staff

IN a return issued in the form of a White Paper on Saturday, it is shown that on August 1 the staff of the Air Ministry numbered 3,229, a decrease of 25, as compared with the total on July 1.

R.A.F. Recruiting Suspended

So rapid has been the response to the special recruiting campaign of the R.A.F. that, except for a few trades, the Force is now up to its present authorised strength, and recruiting has had to be suspended for the present. There are a few vacancies for carpenters, cooks, and clerks, and those who wish to get into the Force now should apply at once.

The Bulgarian Treaty

THE following is the official summary of the air clauses in Part IV of the draft Treaty of Peace handed to the Bulgarian delegates in Paris on September 19:—

Air Clauses

The air clauses provide that the armed forces of Bulgaria must not include any military or naval air forces. The entire *personnel* of the air forces in Bulgaria is to be demobilised within two months.

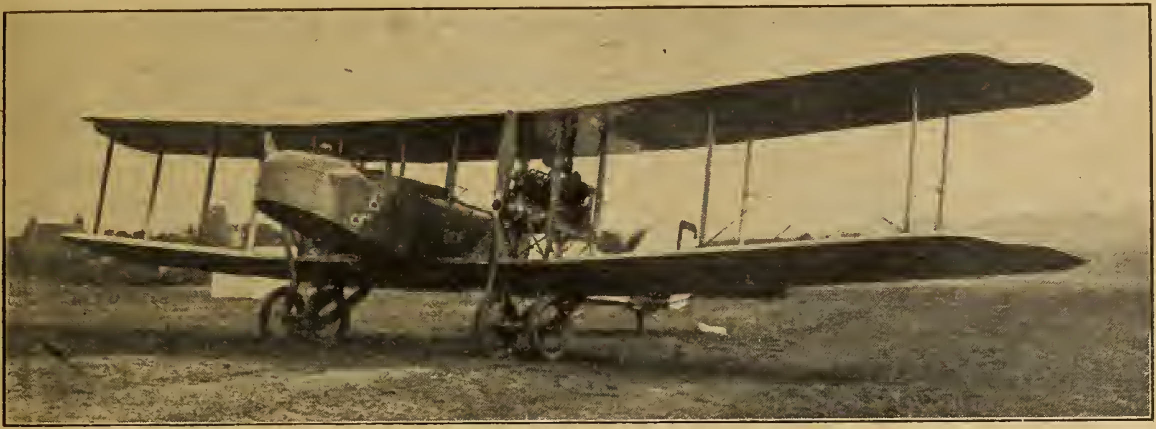
The aircraft of the Allied and Associated Powers is to enjoy full liberty of passage and landing over and in Bulgarian territory until the complete evacuation of that territory by the Allied and Associated troops. The manufacture of aircraft and parts of aircraft is forbidden for six months. All military and naval aircraft, including dirigible and aeronautical material, are to be delivered on the ratification of the present Treaty.

Part X of the Treaty, dealing with air navigation, is identical with that in the Austrian Treaty given in FLIGHT of June 5, 1919.

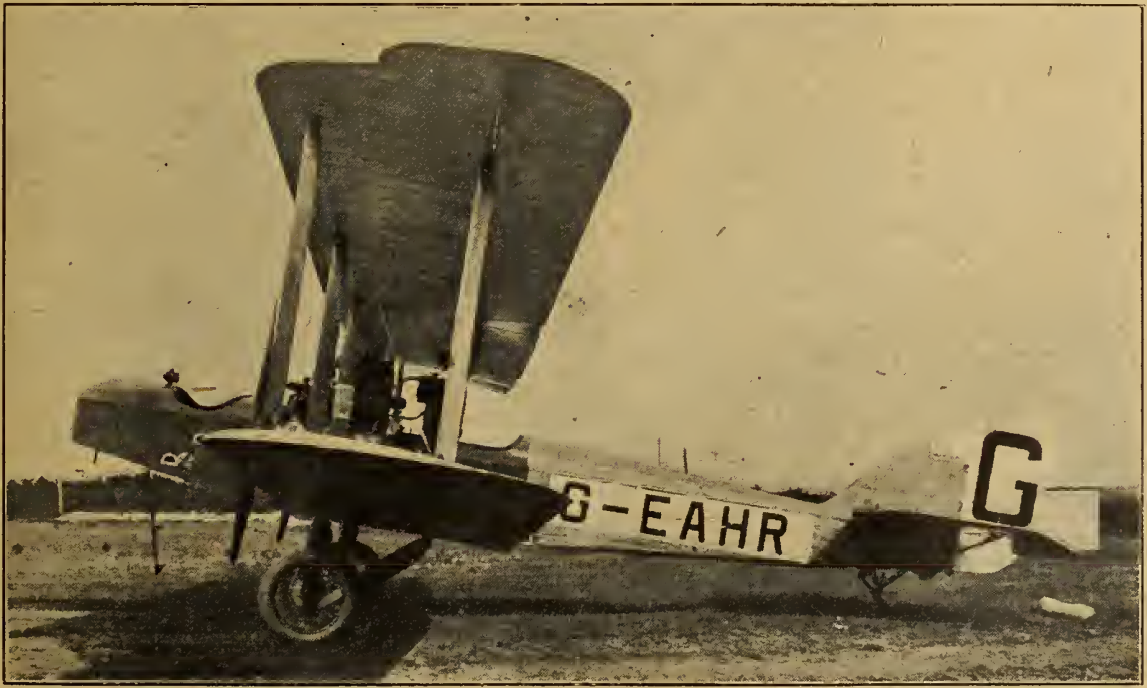
THE CENTRAL AIRCRAFT CO.'S 9-SEATER BIPLANE

Two 160-h.p. Beardmore Engines

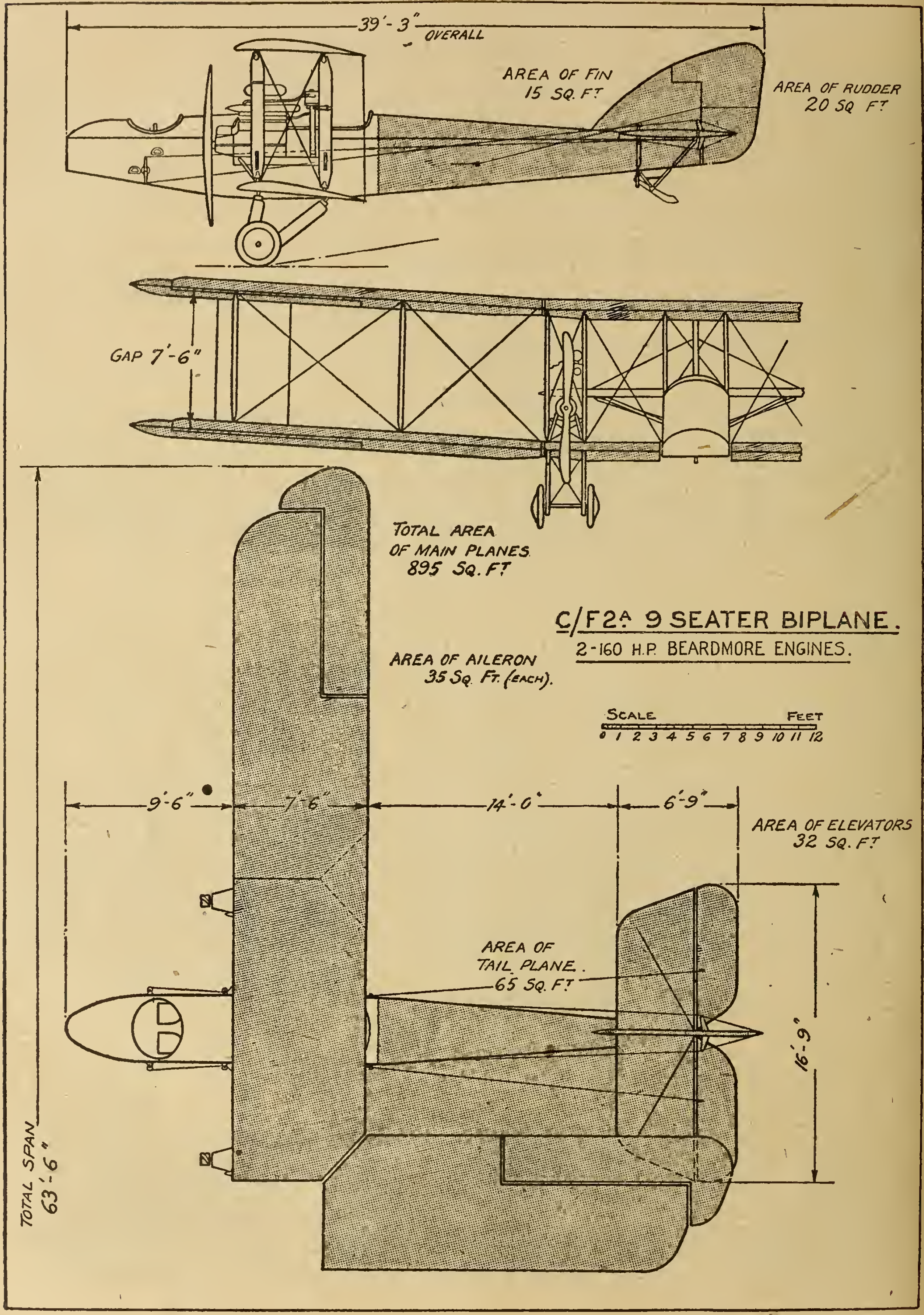
In our issue of March 6, 1919, we referred briefly to a twin-engined passenger carrier which the Central Aircraft Co., Ltd., of 179, High Road, Kilburn, then had in contemplation. This machine is now an accomplished fact, having passed her initial tests at the Northolt aerodrome of this firm. In the issue referred to an illustration was published showing the machine as she would appear in flight. A comparison between this illustration and the photographs and drawings published herewith will show that some minor alterations from the original design have been made. Thus it was originally intended to enclose the engines and to place the radiators in the nose of the engine *nacelles*. As actually built, the radiators are placed behind the engines, which at present are left uncovered. Another respect in which the actual machine differs from the original design is in the matter of passenger accommodation. The intention was to provide a cabin for the passengers, while the pilots were to be in an ordinary open cockpit. In the first machine built, however, the cabin has been omitted, the passengers sitting in two open cockpits. There are two ways of designing an aeroplane—as there are of doing many other things—one is to design the machine as an aeroplane first and to add the desired amount of refinement afterwards. This is the plan followed by Mr. "Tony" Fletcher,



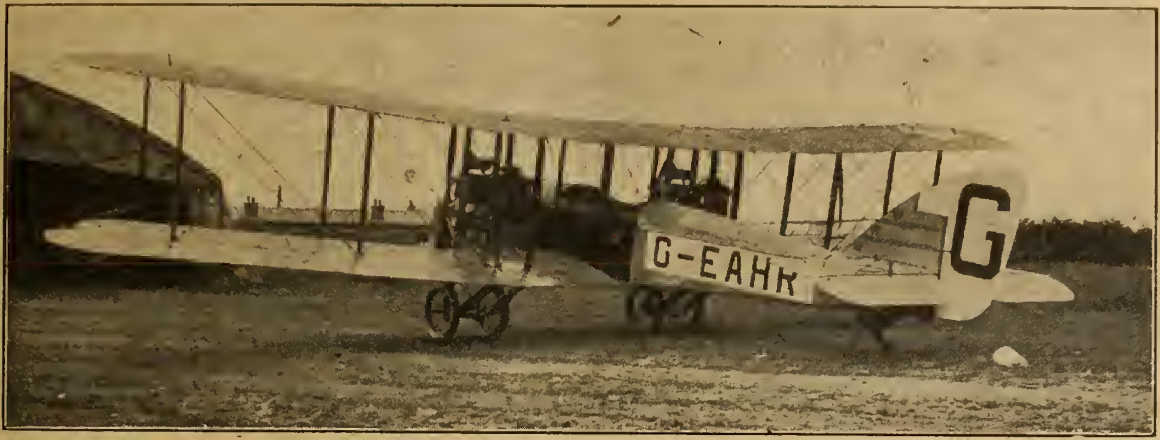
THE CENTRAL AIRCRAFT CO.'S 9-SEATER: Three-quarter front view



THE CENTRAL AIRCRAFT CO.'S 9-SEATER: Side view



THE CENTRAL AIRCRAFT CO.'S 9-SEATER BIPLANE: Plan, side and front elevations, to scale



THE CENTRAL AIRCRAFT CO.'S 9-SEATER: Three-quarter rear view

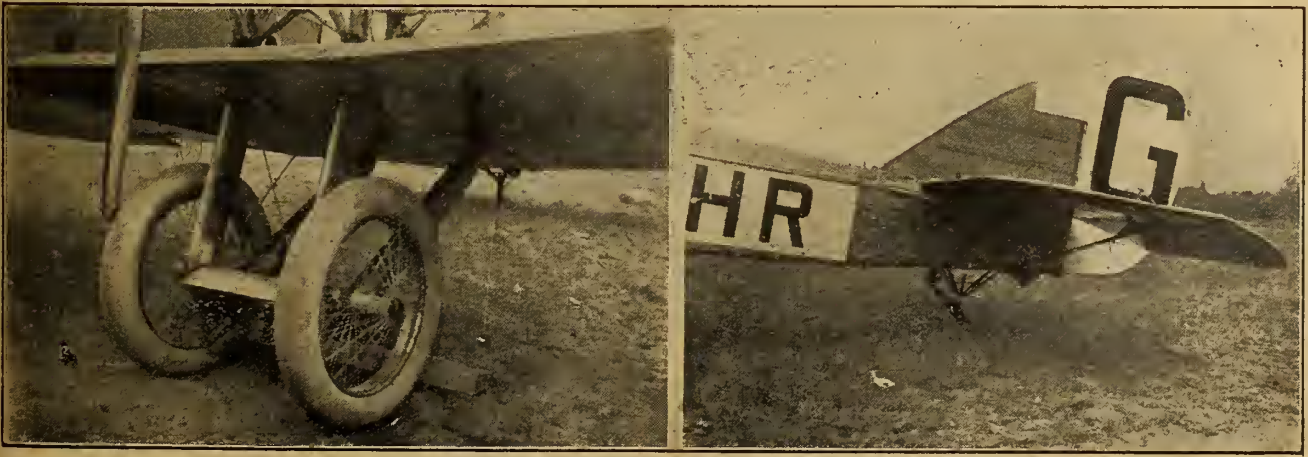
chief designer of the Central Aircraft Co. The other is to design the upholstery first and then to build the machine around it.

By keeping everything simple the initial expense of the first experimental machine—and in spite of our considerable knowledge of the subject, experimental machines are not yet entirely superfluous—is kept down to a reasonable figure, while quite as much can be learned from such a simplified aeroplane as from the highly-finished article. Having then by experiment and experience discovered the aerodynamic and structural qualities, it is time enough to commence thinking about the upholstery. This is, we believe, approximately the reasoning which has led the Central Aircraft Co. to keep their first twin-engined machine as simple as possible, and as the accompanying illustration will testify, the procedure has by no means spoilt the lines, which, as a matter of fact, are very pleasing to the eye. Bearing in mind, then, that the machine is an experimental one, and judging it from this point of view, we may proced to an examination of its various features.

Generally speaking, the C/F 2A, which is the series number of the machine, is an ordinary *fuselage* biplane with the engines placed on the wings. In general arrangement standard practice is followed, and the machine is, in fact, a straightforward, commonsense production, designed to be built at reasonable cost, and of sturdy construction to withstand hard wear. If there is anything unusual about the design it is mainly a matter of aerodynamic efficiency, which will allow a good load to be carried with a reasonably low engine power—320 h.p. to carry nine people, including the pilot, at 90 m.p.h.—must be considered fairly good economy as aeroplane transport goes.

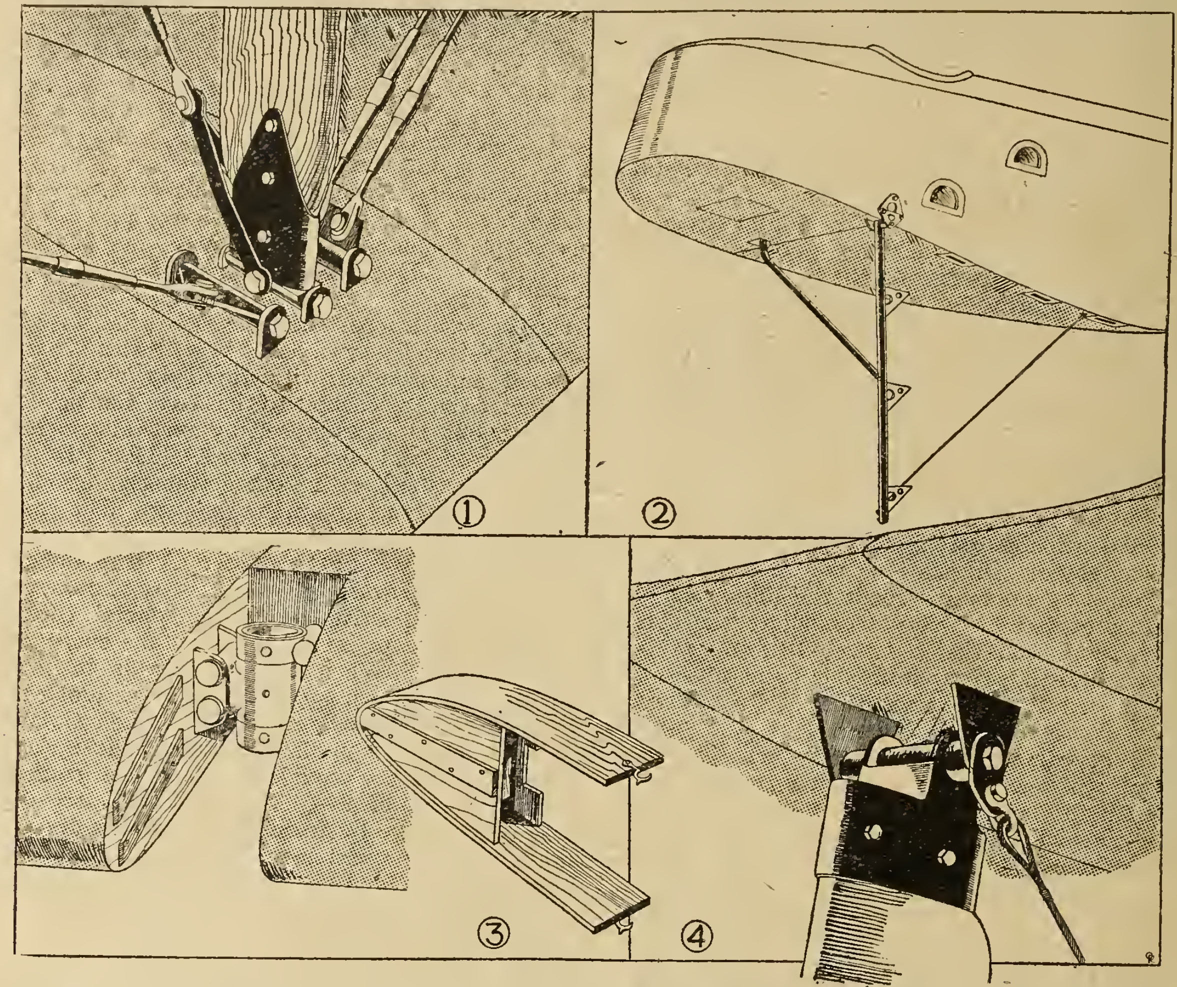
The *fuselage* is constructed, as regards its front portion, of four *longerons* cross-braced with X struts of wood and covered with three-ply wood. The rear part, from the cockpit to the stern, also has four *longerons*, but is cross-braced by vertical and horizontal struts and bracing wire. The two top *longerons* run straight through, forming an excellent datum line for trueing up the *fuselage*. The three-ply covering of the front part of the body is extremely neatly done, especially the nose. A trap door in the floor of the *fuselage* gives access to the back of the instrument board, while the pilots' cockpit is reached *via* steps mounted on a tube suspended from the body. When the machine is in flight these steps are drawn up, the tube lying along the bottom with the steps projecting through slots in the floor. The two pilots are seated side by side and dual controls are provided. The rudder controls are in the form of foot bars, while elevator and aileron controls are by wheel mounted on a tubular column. All the usual instruments are fitted.

Immediately behind the pilots' cockpit, separated from it by a bulkhead, is the petrol tank, which has



THE CENTRAL AIRCRAFT CO.'S 9-SEATER: On the left, one of the undercarriages; on the right, view of the tail and tail skid a capacity of about 50 gallons, or sufficient for a flight of two hours at full throttle or two and a-half to three hours when flying throttled down. The oil tanks are mounted above the engines on the inter-plane engine struts.

Behind the petrol tank are the passengers' cockpits, or, rather, there is one cockpit divided by a horizontal strut in the top of the body. The front part of this cockpit accommodates four passengers, each sitting in a corner, so that two face forward and two face aft. The rear portion of the cockpit seats three passengers, two facing forward and one facing aft. Just at present the seats are not over-comfortable, but it should be pointed out that the arrangement is a temporary one, and that when a cabin is fitted the seating arrangements will be given further consideration.



SOME CONSTRUCTIONAL DETAILS OF THE CENTRAL AIRCRAFT CO.'S 9-SEATER: 1. The hinged interplane strut attachment. 2. Access to the two front seats is by means of steps secured to a tube which is drawn up during flight. The three steps then rest in slots in the floor of the *fuselage*. 3. The spar joints are of the hinge type as the wings are made to fold back. Access to the joint in the front spars is by means of the easily removable section of the leading edge shown on the right-hand side of the sketch. 4. The attachment of the undercarriage struts to the bottom spar

The main planes, which consist of straight centre sections and end sections set at a dihedral angle of 4 deg., have a span of 63 ft. 6 ins. and a chord and gap of 7 ft. 6 ins. There is no stagger. As already mentioned, the engines—160 h.p. Beardmore's are mounted between the planes. The ash engine bearers are carried on stout transverse beams resting in slots in the inter-plane engine struts. The whole structure is well cross-braced and gives an impression of great strength. It was originally intended to have the engines cowled in and to place the radiators in the nose of the engine *nacelles*, but the present machine has the radiators placed between the rear pair of engine struts, and no cowling is fitted. Cowls may still be fitted if desired, as the exhaust collectors could be passed out through the openings left for this purpose in the radiators. In that case louvres in the cowls would have to be provided. Two instruments are fitted direct on the engine bearers and are placed at a slight angle, so as to be more easily seen from the pilots' cockpit. These are revolution indicators and radiator thermometers. The petrol leads, as well as the engine controls, pass out to the engines from the *fuselage* through fairings.

As the machine is of somewhat large span the wings are made to fold back, in which position the overall width of the machine is reduced to about 27 ft. The hinge joints in the wings are of a simple but substantial type, as shown in one of the accompanying sketches. The space in front of the front spar joints is covered by an easily removable false portion of the leading edge, as shown in the sketch. All the inter-plane struts are of spruce, streamline, of course, and the wing bracing is in the form of stranded cables, duplicated in the case of the lift cables and single for the anti-lift cables. The attachment of these cables and of the pin-jointed inter-plane struts is shown in one of our sketches. *Ailerons* are fitted to both upper and lower planes, and in order not to upset the *aileron* control cables when the wings are folded, these are passed from the body to a pulley on the rear spar hinge, which forms the pivot for folding the plane, and hence outward and forward again to a pulley on the front spar, from which the cable passes to the *aileron* crank lever. The elevator cables are placed outside the *fuselage*, while the rudder control cables pass inside the body, where they are protected, in the space occupied by the passengers, by aluminium casings.

The tail planes are of conventional type and do not call for any comment except to point out that the symmetrical tail plane is mounted on four brackets and is adjustable, although not during flight. The tail skid is mounted externally on a pyramid of steel tubes.

Each of the two undercarriages consists of two vees of wood, attached to the lower wing spars immediately under the engines. The following is the specification of the Central Aircraft Co.'s nine-seater :—Span, 63 ft. 6 ins. (with wings folded, 27 ft.) ; length o.a., 39 ft. 3 ins. ; height, 12 ft. 6 ins. ; weight empty, 3,850 lbs. ; weight fully loaded, 5,850 lbs. ; weight/sq. ft., 6·6 lbs ; weight/h.p., 16·7 lbs. ; engines, two Beardmore, 160 h.p. each ; petrol consumption about 25 galls. per hour ; oil consumption, 2 galls. per hour ; speed range, 40–90 m.p.h. ; duration, 2–3 hours.

◆ ◆ ◆ ◆

AIRSHIPS

THE NEW GERMAN "DELAG" COMMERCIAL AIRSHIP "BODENSEE"

Already before the War there were in existence German commercial airships owned by the Deutsche Luftschiffahrts Aktien Gesellschaft, or DELAG, as the firm was commonly called from the initial letters of its title. The same firm is still in existence and has built a new airship, the "Bodensee," which is said to differ in several ways from the earlier ships. The following translation of a brief description of the "Bodensee," published in *Flugsportliche Rundschau*, may be of interest :—

"Compared with earlier types of airships belonging to the DELAG, the commercial airship "Bodensee" is of quite a different type, both as regards shape, construction, and engine arrangement. In the new airship have been incorporated all technical improvements which have been effected during the excellent development of airship construction during the War. Already at first glance it is noticeably of different proportions. It is more compact. That is to say, it is of shorter length in proportion to its diameter. While the well-known airships 'Viktoria Luise' and 'Hansa' had a length of 142 m. and a diameter of 14 m. 900, their cubic capacity being 19,700 cub. m., the 'Bodensee' is 120 m. long, 18 m. 700 diameter, and has a capacity of 20,000 cub. m. In spite of a smaller fineness ratio the 'Bodensee' is of graceful outline, and is of true streamline shape, which form, as is well known, offers a minimum of resistance. The speed of this airship is, therefore, considerably greater than that of previous ones. While these had a speed of about 70 km. per hour, the "Bodensee" does a comfortable 130 km. per hour. This increase in speed is chiefly due to the increased engine power. While the 'Hansa' had three engines of 150 h.p. each, the 'Bodensee' has four engines of 260 h.p. each, or a total of 1,040 h.p., compared with a total of 450 h.p. in the case of the 'Hansa.' The placing of the engines is also quite different, the four engines being placed in three cars, of which two are side gondolas placed approximately halfway along the length, and carrying one engine each, while the other two are housed in a rear gondola towards the stern.

"The passenger cabin is no longer built into a keel in the centre of the ship, but is built integrally with the navigation car, which is suspended under the bow of the airship. During flight the passengers are, therefore, very comfortable, there being no noise and no exhaust gases to inconvenience them.

"Apart from these improvements, the construction of the 'Bodensee' follows usual Zeppelin practice. There are 11 gas bags, each lying between two transverse formers. This division of the gas chamber into separate compartments results in added safety of the passengers, as one or more of the gas bags may become empty without endangering the safety of the airship. The whole framework and the gas bags are enclosed in a doped cotton cover to reduce friction and to protect the balloons against strong sunlight.

"In the front gondola are all the control wheels, ballast and valve cords. In each of the side gondolas is an engine driving a two-bladed airscrew, while in the rear gondola are two engines driving one screw. At the stern are the rudders and elevators, as well as vertical and horizontal stabilisers. As all control systems are in duplicate, great reliability is provided, since one rudder or one elevator is sufficient for steering, while one engine will give the airship sufficient speed to proceed on her course. With all engines working the speed of the airship is 35-36 m. per second. With three engines running the speed is 31 m. per sec. With two engines the speed is 26 m. per sec., while with one engine only the speed is about 20 m. per sec. It will, therefore, be seen that even in case of one or more engines breaking down the airship has sufficient speed, driven by the remaining engines, to complete her journey.

"The gross lift of the airship amounts to 23,000 kg. at sea level. If the weight of the airship itself and its engines is subtracted, there is still a useful lift of about 10,000 kg., more or less according to elevation. As is well known, a height of only 80 m. reduces the lift of an airship of the size of the 'Bodensee' by about 200 kg., while an increase in the temperature of the air of 1° C. reduces the lift by approximately 80 kg. From the gross lift is usually subtracted about 2,400 kg. for petrol and oil. With this supply the airship can fly for 11 to 12 hours with all engines working, and 15 to 16 hours with three engines running. During that time the airship is capable of covering a distance of 1,500 and 1,800 km., respectively. According to the direction of the wind this distance will be increased or decreased, say between 700 km. and 2,500 km. The crew consists of about 15 officers and men.

"Of special interest is the fact that the 'Bodensee' is provided with wireless apparatus, which enables her to be in communication with both terminals of her route, while also affording passengers facility for sending private telegrams.

"The cabin, in spite of its necessarily simple arrangement, is very comfortable. The decorations and fitting-out have been undertaken by Prof. Pankok, and have been carried out at the Friedrichshafen works. The cabin reminds one of the dining-cars of a railway train, and all modern conveniences are provided."

AIRISMS FROM THE FOUR WINDS

THAT effort on the part of certain morning and evening dailies to be known as "*the* paper that gets the scoops" continuously leads to all sorts of ridiculous positions—although carrying with them at times anything but pleasant results to many associated with the object the "scoopers," at the moment, are out to "scoop." In this connection the *Evening News* last week was a bad offender over the scare line "All aircraft contracts cancelled" wheeze. Of course, nothing new out of the way had occurred at all. It was merely the natural sequence to the long since announced policy of the Air Ministry, in the form of the natural closing of certain contracts which were still, in a minor key, running. Yet shrieks in whole columns, with double-column headlines, was the method of treating this, the only little bit of "scoop" which was, that day, caught sight of quietly going to its home. But "yellow journalism" must be maintained by hook or by crook and d—— the consequences.

- - -

INTERVIEWED upon this *faux pas* of our contemporary, an Air Ministry official spoke as follows :—

"To try and make out that this is the end of an epoch is absurd. No war work firm can expect to go on doing war work in peace time, and it is exactly the same with the aircraft firms as with munition works.

"The cutting of our last few contracts has been dictated by the national policy of economy, and by the fact that the number of Air Force Service squadrons has been reduced. But the national business move is as nothing to the cutting down which took place months ago, soon after the armistice.

"This does not mean that no more contracts for war aircraft will be placed. These few aircraft firms are simply undergoing the same inevitable change from war to peace time work which all firms making war material have undergone."

In other words, the main basis of this great "scoop" is old.

- -

EVEN if D'Annunzio, judged by his present actions, be a "degenerate," as suggested, and his Fiume raid of the order of *Opera Bouffe*, at least his mind is clear and straight upon one point, the all-important value of aircraft in plans of offence or defence. In reviewing his "troops" last Sunday he said that aviation was of vital importance to the success of the Fiume cause, and therefore "the newly-established aviation camp must be defended at all costs."

It is to be hoped that our "degenerates" will also realise before too late the necessity of maintaining and having ready at proper strength in peace time, against troublesome days, the deciding arm of the future.

- -

To see a little gratitude occasionally for services rendered is a pleasant experience. Last week at a meeting of the City of London Corporation, upon the proposal of Alderman Sir William Treloar, the following resolution was passed with enthusiasm :—"That this Court desires to record its appreciation of the effective measures taken for the defence of London on the occasion of the many raids by enemy aircraft during the war, and especially on the night of May 19, 1918. This Court wishes to express the great indebtedness of the citizens and inhabitants of London for the untiring devotion and splendid services of the pilots, airmen, gunners, and others engaged under the command of Maj.-Gen. Ashmore on the night of May 19, when not only were seven of the enemy machines brought down, but so much further damage was done to the enemy that the Germans finally decided to abandon attacks on London."

- - -

AERIAL postage stamp collecting is striking quite a new note in philatelical circles. According to *The Times*, a leading stamp market authority recently expressed the opinion that aerial postage stamps are calculated to succeed the ever-popular war issues in the collector's favour.

The latest aerial postage stamp comes from the South American State of Colombia, where, on the inauguration of an experimental air-post service between Barranquilla and Puerto Colombia recently, a small supply of the current two centavos rose was overprinted, "1° Servizio Postale Aereo." It is stated that the issue was restricted to 200 specimens.

Mr. Hugh Vallancey also has a lot to say in his double number of *Stamp Collecting* which he has just published, in an article on aerial posts and postage stamps. This form of marking aerial history is very fascinating.

- - -

SIR PHILIP SASSOON, by his purchase of an Avro for his private use in getting about, particularly between London and his country residence near Lympne, is, we believe, really the first private citizen to so provide himself. The time occupied in reaching Lympne—a distance of about 70 miles—will be about 45 minutes as against the fastest train with 90 minutes. Naturally for short distances like this, the difference in saving of time is hardly so marked as when the mileage is increased. But to suggest, as has been done, that therefore, having also regard to the difference in cost, this very progressive departure on the part of Sir Philip is not worth while, is to view his enterprise from the narrowest possible point of view. A few examples upon the same lines are likely to help along the cult of air-travel in a more practical form than miles of theoretical tosh that only under such and such conditions will it be possible for the thing to be done. It recalls the old old story of the man when told by the policeman he could not do a certain thing, replied promptly, "Its no use your saying I can't do it, I've jolly well done it !"

- -

To point the moral and by way of an object lesson in the advantages of the aeroplane in long-distance work, there is the flight starting from London at 4 a.m. last Saturday of Lieut.-Col. Henderson and Maj. Lloyd, to Nice, the latter city being

Some R.A.F. Impressions

"Spic." Lieut.-Col. M. Spicer, A.Q.M.G., R.A.F., in the Field and Universal Provider.

reached at 3 o'clock the same day. Eleven hours to the Riviera! Phew! Some saving! And no fuss about it.

– – –

IT looks as if, after all, Sr. Janello, who piloted the Savoia in the Schneider Cup contest, will lift the £1,000 and the trophy for Italy. The Royal Aero Club Committee having gone into the matter recommends the F.I.A., or F.A.I., to award the race to the Savoia, and there is little doubt, under the circumstances, that this recommendation will be adopted. Congratulations, therefore, to the Italian team for their sporty win.

– – –

UNDER slightly different conditions a prize of £500 and a trophy value £100 has also been put up by the Royal Aero Club to be competed for in the Solent and Southampton Water in the last week of October. As the alighting tests will *follow* the actual speed race, there should be a good deal better chance of comparing performances in and on both elements.

– – –

ROTTERDAM municipal authorities are well alive to the wisdom of facilitating the use of their port by aircraft. The authorities are planning a permanent aerodrome with suitable space for seaplanes to the south-west of the town. In little England, by way of contrast, the inclination is to steadily close down well-established centres. Sack the lot!

– – –

ACCORDING to the *Petit Journal* the German aviator Boehm, who established a long-distance record before the war, intends to undertake a tour of the world with a machine which, it is said, has the property of being unable to fall.

Without doubt "an aeroplane of distinction," as one paper described it, but a pretty predicament the pilot would be in if he ran out of petrol. As in the old story, he'd just have to starve to death up in the ether, or be shot down to save his life.

– – –

CAPT. A. E. COOPER, R.A.F., in his series of pictures, which forms part of the unique Airship Exhibition got together by Lady Sybil Grant at Prince's Galleries, is very convincing in his method of treating his subjects of terra firma as seen from above. But then Capt. Cooper is also unique inasmuch that he ascends into the air to depict what he sees with his artist's eye. Most of these clever drawings are the result of opportunities which the artist had of fixing his impressions from airships based on East Fortune, Edinburgh. Naturally the subjects are related to that district, as the titles will suggest. "Edinburgh Castle from the Air," "Leith and N.S. 7" (painted from another dirigible), and "Aberdeen from R 29," are three striking examples. About 500 ft. up is Capt. Cooper's favourite height for obtaining effects. It is well to know that several of the artist's pictures have been secured for permanent preservation by the Imperial War Museum.

– – –

"AERIAL TRANSPORT" is the title of a new work to be immediately issued by Messrs. Hodder and Stoughton, from the pen of Mr. G. Holt Thomas, to whose enterprise is due the inauguration and maintenance of the first express air service between London and Paris. The book, which has an introduction written by Lord Northcliffe, is the result of many requests to Mr. Holt Thomas to devote himself to a book of this character. In describing his aim in this volume the author says :—

"What I desire particularly is not to appear a fanatic. I have studied flying for 13 years. Long before the War I urged the development of aircraft as weapons; and I can say without boasting that, when War came, my predictions were more than fulfilled. To-day I am just as keen an advocate of the aeroplane in commerce, and just as certain—even, in fact, more so—that my contentions are right. But I am quite as aware of the limitations of a commercial aircraft as I am of its powers. What I seek, in this book, is to show the actual place of the aeroplane in our general scheme of transport; the precise work it can do usefully, with its speed of 100 miles an hour, and the sort of thing it would be foolish to ask it to do. Specially, too, I emphasise the point, which is fundamental, that the aeroplane does not compete with existing forms of transport. It does something they cannot do; it supplements, not supplants, them."

As Mr. Holt Thomas's book will contain close upon 100 full-page reproductions of a series of specially-selected photographs, each illustrating some phase of aerial transport, its advent should be looked for with considerable interest by all those concerned with the progress of aeronautics.

– – –

"CORISANDE" of the *Evening Standard* is responsible for the following recital in connection with a new social phase of flying :—

"Flying parties should soon be all the rage, judging by the success of the pioneer affair given by Mrs. J. D. Campbell at Upper Gatton Park, in the perfect weather of Saturday afternoon. The stretch of parkland into which the lawn at Upper Gatton merges makes an ideal landing place, and the surrounding well-wooded country is quite charming for bird's-eye viewing. Flying must raise the spirits, for everybody came down laughing and full of enthusiasm as they described how near they had been to Croydon or how much they had seen of the sea.

"Aeroplanes seem more modern than ever when one goes and climbs into one after tea in the shade of great cedars like those on the lawn at Gatton, which were planted some 300 years ago—a time when even road travel was difficult and adventurous. They are probably the finest group in the country.

"Nearly all the guests were eager to fly. Small boys and girls were especially keen, and one delighted mite who got no view at all because her head didn't reach above the aeroplane body went for a short flight and came down still smiling."

"Hi, Sir! You've forgotten your mascot."

SOME FACTORS IN THE WORKING OF LARGE AIRCRAFT

By B. THOMSON, B.Sc. (E.), A.C.G.I.

THE opinions set forth in the following notes are the result of practical experience in the working of large aircraft principally gained with the original Handley Page Squadron of the R.N.A.S. in which the initial development of such machines took place.

In spite of certain disappointments, subsequent experience with other types of varying makes have only served to confirm a belief held from very early days in the final success of the big aeroplane.

For the moment, owing to lack of sufficient employment, smaller types may prevail, but once air transport is established, the economy of the big machine in pilots, personnel, land and equipment per ton carried will render it essential.

In the meantime it has appeared worth while placing certain factors on record for the benefit of commercial men interested in aeronautics, but more especially for the designer who, during the War, has been kept in woeful ignorance of the conditions under which his machine was worked.

The object of this article is to point out certain difficulties commonly met with in the working of large aircraft, and to discuss the methods by which these can be overcome. Many of these difficulties are common to all aircraft, though machines of under five tons flying weight are not contemplated here. Seaplanes have been left aside though many of the observations made apply to them, and it is taken for granted that power systems employing two or more engines will be used.

Apart from aerodynamical questions, many of the broad lessons of aerodrome experience have yet to be conveyed to the drawing-office. Manufacturers are able to build machines which work, but the difficulties met with in working them have not yet received the study they deserve. For commercial success they are of equal importance with the flying qualities of the aircraft. The major portion of the expenditure of the company will be on personnel and equipment, and this is a direct function of the facility or otherwise with which the machine used can be operated.

Three serious objections are generally levelled against large aeroplanes :—

(i) They are very cumbersome to handle on the ground, and require costly shed accommodation, even when made to fold.

(ii) On multi-engined machines minor repairs to one motor puts the whole machine out of action, and temporarily render useless the capital locked up in it.

(iii) Owing to their size no inspection or repair work can be done on them without the use of elaborate scaffolding or ladders.

The writer frankly admits the truth of these accusations so far as present-day machines are concerned, but all can be met. To the first, it can be replied that handling difficulties only occur when the machine is not moving under her own power, and that the policy of folding large aeroplanes and housing them in sheds is a doubtful one, the expenditure on sheds having to be balanced against the cost of making good weathering of the machine when left in the open. To the second of these objections, the answer is that the policy of mounting so unreliable a piece of mechanism as an aero-engine as an integral part of so reliable a machine as an aeroplane is obviously wrong. The motor, complete with its installations, should be a separate unit, as readily detachable from its parent structure as a locomotive is from its train. The third objection can be met by the provision of suitable hand and foot-holds and cat-walks about the machine; a trivial matter, it is true, but of as real importance as the other two, though it never seems to receive any attention from the average designer.

Discussing the question of ground handling and maintenance first, it resolves itself into (*a*) Is there a financial advantage sufficient to warrant the use of sheds as opposed to anchoring out ? (*b*) In the event of anchoring out being used, what alteration to the design of machine and what type of mooring must be used ?

No exact figures can be given on the cost side of the question, but the conditions of working can be balanced up. If shed housing is adopted, in addition to the cost of sheds and their repairs, handling tackle and men to work must be provided for getting the machines in and out, and the aeroplanes used must be made to fold so as to economise floor-space. The body of men required is not inconsiderable, and the cumbrous unhandiness of large aeroplanes is realised to the full. The delay in getting a spare machine away on a flight in the event of any breakdown will be large, owing to the time taken in towing out, unfolding, and rigging with a body of men, necessarily kept at a minimum in number.

Should a system of mooring-out on turn-tables, on to and off which machines can taxi under their own power, and on which they are free to swing head to wind, be used, the expenditure on sheds is restricted to that necessary for repair purposes, handling parties disappear, and time lost in getting in and out of sheds is saved.

The advantages offered by shed maintenance are that repairs can be executed in comfort, and that weathering is reduced, increasing the life of the aeroplane. It is no exaggeration to say that 80 per cent. of the running repairs that have to be made to aircraft are attention to engine and engine installation. The details of a unit system of engine mounting will be discussed later. It is sufficient here to remark that such a system will transfer all engine work to the engineer's shop, the proper place for it, leaving only minor machine repairs to be done in the flight shed. The nature of these repairs is such that the majority of them can readily be performed in the open, while for large overhauls a machine will have to be sent to the repair shed no matter what maintenance policy is adopted.

The gain in the life of a machine housed in a shed is probably less than is commonly supposed. Consider the conditions under which aircraft were worked during the War. Except in the case of seaplanes, hardly any effort was made to protect them from weathering. The canvas sheds used on active service invariably leaked in rainy weather, and were no guard against the effect of damp atmosphere ; in sunny weather they were stiflingly hot, yet machines kept in them gave extraordinarily little trouble, in spite of a form of construction having glue, varnished timber, and fabric as a basis. Towards the end of the War large seaplanes were moored to buoys as a regular practice, to avoid the difficulty of hauling them up out of the water. And recently, in the anything but salubrious climate of Nova Scotia, the large four-engined Handley Page was erected and maintained in the open for a considerable period.

It is admitted that to make a success of a policy of anchoring-out, the machine must be designed for it, and the efforts made in seaplanes to keep water from reaching the interior of the wings must be extended to the whole machine.

The fundamental difficulty is the use of doped fabric for a covering material. Timber *fuselages*, such as that of the Tarrant, but fitted with hatches over the cockpit, form a solution for the body. The tail plane is of small area, and a similar covering may be used ; but until some means of working the wing surface in as part of the carrying structure is obtained, the use of fabric appears unavoidable for the main planes. Much may be done by heavier doping and varnishing, but main planes on a machine in continuous service will probably need recovering every six months. They will certainly demand more frequent attention than the rest of the machine, and, during design, arrangements should be made for the removal of the wings as complete units to a repair shop and for the ready substitution of another pair.

Next to fabric, the most serious problem to be faced in the design of a machine that is to be kept in the open is the protection of the engine from damp. Where a suitable unit system is evolved, with proper handling plant, engines will in all probability be stored in the engine shop when not actually at work, thus evading the question. If machines fitted with engine-rooms be used, these can be made waterproof and provided with internal heating, giving a much better protection to the motors than a cold, damp canvas shed.

The motors of flying-boats are rarely cowled, yet these machines are maintained anchored out with nothing but a tarpaulin sheet over the engines, which do not seem to suffer very seriously from the practice.

On the whole, the writer is of opinion that the gains to be expected from shed storage grow less and less as the size of the aircraft increases, and that the largest machines now in use are well past the dimensions at which the policy is unsatisfactory.

Passing to the second objection, that of unreadiness for flight owing to one of a number of engines being out of action, and its solution by means of a detachable engine unit system, before proceeding to discuss the pros and cons of such a method, some indication of what is meant by the phrase must be given. The initial conception in the writer's mind is that of a wing *nacelle*, complete as a unit, with cowling, oil and water cooling systems, and engine-bearers provided with slinging hooks and supported from the structure of the aeroplane by a framework of struts attached to the engine-bearers with quick-release pin-joints. The only pipe connection to the *nacelle* is that of the main petrol feed. Controls are passed by telescopic torsion tubes working over fixed angles so that no adjustment is required when changing units. Engine instruments are either placed on the side of the *nacelle* where they can be seen by the pilot, or have their readings repeated electrically on his instrument-board.

The changing of a *nacelle* is then simply a matter of disconnecting the petrol pipe and quick-release pin-joints, when the whole unit can be slung out and replaced by another.

This matter of quick change of *nacelles* is the foundation of the unit system; if a sparking-plug fails it should delay the aeroplane less to change the *nacelle* than to locate and replace the missing plug.

It is hoped that the foregoing makes clear the underlying intention on which the advocacy of a unit system is based. Discussing its primary qualities the chief advantages are: (*a*) By the provision of a percentage of spare engine units, machines can be kept constantly in action. (*b*) Delays due to the tracing of obscure engine troubles are avoided, the work being transferred from the aerodrome to the engineer's shop, and the machine is sent away with another unit. (*c*) If units are removed from a machine as soon as she arrives from a long flight, they can be examined and tested under complete supervision, and minor faults can be detected before they develop. (*d*) The major portion of the engineers' work is done in the workshop, under the eye of the chief engineer, and where tools and appliances are ready to hand. To work the system successfully calls for special design in the aeroplane and for special plant in the shape of motor lorry cranes, capable of carrying an engine unit between the workshop and the machine, and holding it while it is fixed in place or detached; and also for special stands in the workshop on which units can be mounted for repair or test. The disadvantages of the system are: (*a*) It renders the provision of an engine-room somewhat difficult, especially within the *fuselage*. (*b*) Since, owing to the size of the tanks, the petrol system will probably have to be a fixture on the machine, one main pipe connection will have to be broken each time a unit is changed. (*c*) Certain other mechanical difficulties of a minor nature are introduced into the lay-out of controls and instrument connections.

The advantages of such a unit system, from the point of view of getting work out of the plant available, are so obvious as hardly to need emphasis. With it the figure of 80 per cent. of the total time out of action for engine repair can probably be reduced to a tenth, that is the total time out of action for repair will be well below a third of its present value, quite possibly below a quarter; for 80 per cent. is on the low side. The writer is so convinced of the value of a unit system that, if the choice lay between it and the provision of an engine-room in which small repairs could be made during flight, he would unhesitatingly select the former. Anyone acquainted with the working of aircraft will agree that it is not engine troubles in the air that prevent flying so much as engine troubles on the ground.

The problem of providing an engine-room is not difficult in the case of machines in which the engines are mounted in wing *nacelles*. To arrange the whole *nacelle* as a detachable unit, engine-room and all, is mainly a question of the gear available for handling the unit when detached. The difficulty is that such a *nacelle* will be bulky, so as to afford working space round the engine, and that probably two or three engines will be fitted in it, hence, unless these engines are arranged so that they can come away separately, certain motors which are capable of running will be lying idle while another is being repaired. A factor favourable to the unit system, but adverse to the use of engine-rooms, is the promising development of the static air-cooled radial motor. Such engines are readily adapted to the needs of a unit system, but it is not clear how reasonable cooling can be obtained combined with the provision of an engine room enabling a man to work on the engine when running, without grave risk from the propeller.

If an engine-room is to be used, the right place is undoubtedly the *fuselage*, and the adoption of this lay-out only awaits the production of a suitable gear-drive to the airscrew. Engines so mounted will never be so readily removable as those fitted in to wings, but even here a unit system can be adapted, the units either being dropped by tackle through the floor of the *fuselage* or slid out through the side on rails.

Turning to the third serious objection put forward—that large machines cannot be worked on without the use of scaffolding or ladders, any casual observer of the process of getting a large machine away for a flight will be struck by the number of ladders used and the fact that a few steps and hand-holds would render all of them unnecessary. What is required is a means of entering the *fuselage* from the ground, doors from the *fuselage* on to the bottom plane, walking platforms along the main spars and working platforms on each side of the engine *nacelles* if no engine-room is provided; in short, means whereby any part of the machine can be reached and inspected without the use of extraneous gear, which is never available when it is wanted, and requires men to move it about. The increase in weight and head resistance, on a machine of the size contemplated, will be negligible, while the gain in efficiency owing to increased ease of working will be very large.

Having now disposed of the three primary objections to large aircraft, certain other points remain to be touched on. The average aeroplane is very fairly well divided up into units, composed of power plant, wings, body, tail, control, chassis and tail-skid; the dismounting of these units as a repair job is reasonably easy, and the plea for a quick detachable power unit is only put forward owing to the large amount of attention needed by this part in comparison with the rest. The quick repair of the aeroplane is mainly a matter of having spare units available and handling plant by means of which they can be put in place. During design, attention should be paid to the question of handling complete units, suitable means for attaching handling gear being provided. Wings or tail should be capable of removal as complete units from the machine, and generally are, but the working out of the details of attachment to the standing parts could be greatly improved.

Controls are the chief offenders in this respect, wire leads being arranged without any consideration of the job of making-up. Small fair leads of tube are used, and pulley-guards fixed in such a manner that, when a wire is renewed, it has to be led through them and soldered up in place. Fair leads should be avoided or be made up in the form of rings sufficiently large for the loop and eye of the end of the wire to pass through. Pulley-guards should be so made that by the removal of the pulley-bolt the pulley and guard come adrift and leave the wire free to slip clear. By this means control-cables can be made-up in lengths and kept in the store, and the time a machine is out of action to replace a frayed wire greatly reduced. The run of control-cables should take due account of the factor of ease of inspection. Action balance cables, running across the top of a plane some 20 ft. off the ground, are not examined as often as they should be.

In the design of chassis, attention should be paid to ease of wheel changing and of re-winding of the shock-absorber elastic. It should be possible to jack the machine up and perform either of these operations without the use of specially long jacks or tressels. Tail-skids, if sufficiently substantial, give little trouble, except that the metal shoeing of the timber soon wears through and has to be renewed. Much thicker metal should be used, and the practice of attaching the shoe by wood screws should be dropped, bolts being preferable on a part that needs constant replacement.

Before concluding, it may be pointed out that large aircraft possess, by virtue of their size, certain advantages with which they are not usually credited:—

Present theories of aerodynamics point to the use of high surface loading as a means of increasing efficiency, the reduction in structure weight and head resistance allowing a bigger load to be carried at a higher speed. High surface loading means a high landing speed, and in practice the larger machine is easier to land at a given speed that the smaller. An error in judging distance is of less effect. To "pancake" 3 ft. on a fast single-seater may mean a crash, but provided the chassis design is anything like reasonable, is of little importance on a machine weighing 5 tons.

Given equally good piloting, the run on landing, and the landing speed, are very intimately connected with chassis design, and the writer has no hesitation in allotting more importance to this factor than to minute variations of the Kymax of the wing employed.

Modern machines with low-built chassis have to be landed fast to prevent the tail-skid touching the ground before the chassis and throwing the machine on to her nose or breaking a *fuselage*. A mile or two an hour at top speed may be gained by their use, but at a heavy sacrifice in enlarged aerodromes and risk of crashes.

Observation leads also to the conviction that the value of the maximum lift coefficient is appreciably affected by the chord of the wing. There may be little scientific basis for the belief, but biplanes of over 10 ft. chord appear to have a landing speed corresponding to a Kymax 5 or 10 per cent. in excess of monoplane test figures. So that large aeroplanes seem to have a double advantage where high loading is concerned.

It is only fair to point out that many of the past difficulties of working have been due to War conditions. Design was done hurriedly, and the designer's experience of working machines stopped at the door of the erecting shed. True, he received reports of trials, but these only checked his work as the designer of something that would fly; they gave him little indication of the working troubles of the vehicle he had produced.

The accusation of unhandiness on the ground is largely due to the military instinct to use man-power and avoid the use of machinery wherever possible. Mechanical development in warfare on land has been greatly hindered owing to this tradition. The writer does not criticise the attitude here; he merely comments on it as an explanation of a most serious argument brought forward against large aircraft.

Conditions of commercial work where machines are operating from fixed bases over fixed routes allow full advantage to be taken of the possibilities of mechanical handling, the most valuable one being the unit system of engine installation. Under present working conditions an aeroplane can be available for flight 12 hours out of the 24, four days a week. Unit organisation with suitable plant should enable her to be available 18 hours out of the 24 for six days of a seven-day week: 108 hours compared with 48 with no appreciable increase in working cost.

Detail questions have been left aside from these few notes. Apart from repetition production machinery and large power plants, the study of economy in operational labour is comparatively new to engineering. In aviation it is for all practical purposes unknown. Development has taken place under the utterly artificial conditions imposed by war, where cost considerations can be neglected. As a result, the expense of using aircraft is prohibitive. To secure its reduction the fundamental need is a motor having a reasonable working life. This concerns the engine designer. The second is greater economy in the working of the machines themselves, and it is hoped that the lines here indicated may prove of some value in this direction.

COMMERCIAL AIR-TRANSPORT

BRIGHTON

One of the Avros took some visitors to a garden party at Reigate on Saturday—another example of the way in which the small aeroplane adds to the amenities of life. Flying was only possible on six days. The machines went over to Chichester on Thursday as usual, and took up passengers there.

CAMBRIDGE

During the week the Cambridge School of Flying gave their sixth exhibition show at Hardwick Aerodrome on September 20. Numerous passengers were carried on Avros and Airco 6's, and in the evening a lady flew to Skegness on an Avro. Lt. Ortweiler gave an excellent exhibition of stunt flying, the particular features of which were his successive loops and an exceptionally clever side-slip landing. Passenger flights were carried on by Capt. Birkbeck, D.F.C., and Lieut. Fresson, the latter of whom flew to Skegness in the evening to carry on passenger flying there.

HOUNSLOW

The variable weather of the past week seems to have affected the number of Avro flights at Hounslow. In course of time, no doubt, Londoners will realise that autumn flying can be just as enjoyable as going aloft in an August heat wave. In fact, a clear morning, with a touch of frost, may give a far finer view than one gets when a summer haze hangs over the earth—while as for a bright snowy morning, few things can equal the delights of flying on such a day. But the holiday spirit seems to wane with the passing of summer, and, in consequence, only 120 Londoners made flights during the week. Two cross-country journeys were made, to Stow-on-Wold and to Cambridge, both returns. Three aeroplanes arrived by air from Manchester during the week.

One of these was taken on by Capt. Bradley to Lausanne. He left Hounslow on Wednesday, 17th inst., at 2.15 p.m., and arrived safely on the shores of Lake Geneva on Saturday, 20th. No attempt was made to break records, the Alps were safely crossed, and the journey was uneventfully successful. The Avro will give demonstrations at Lausanne and take up passengers under an arrangement with M. Pethoud.

AVRO SEAPLANES AT BOWNESS, WINDERMERE: The pilot in charge is Capt. Howard Pixton, who won the Jacques Schneider Trophy at Monte Carlo in 1914.

WINDERMERE

This week has been a record one for passengers at Bowness. The Avro seaplanes have carried out 32 flights, totalling nine hours of flying. Several people have had half-hour flights. Excellent views were obtained of Scawfell, Langdale Pikes, Helvelyn, Kirkstone Pass, Thirlmere, etc.

In particular one lady and gentleman engaged a machine for a half-hour flight over Ulverston and Morecambe Bay, and from a height of between 3,000 and 4,000 ft. they enjoyed some especially splendid views of cloud effects.

A Canadian Airship Prize

By way of commemorating the visit of the Prince of Wales to Canada and to encourage the development of a new industry in the Dominion, as well as promoting better feeling between Canada and Japan, Mr. Norman Yarrow, head of Yarrow's, Ltd., Esquimalt, son of Sir Alfred Yarrow, has offered £10,000 for the first non-stop flight across the Pacific from Vancouver Island to Japan by an airship made in Canada and manned by Canadians. The flight must be made before December 31, 1921.

Any parts and materials which are not being made in Canada at the time the airship is constructed may be imported. Only lighter-than-air craft can compete.

New Height Record

On September 18, at New York, Mr. Roland Rohlfs claims to have reached a height of 34,610 ft. in a 400-h.p. Curtiss triplane in 78 min., thus bettering his previous figure. This flight was observed by officials of the Aero Club, who sealed M. Rohlf's instruments when he landed and sent them to Washington for verification. The pilot reported that he experienced trouble in breathing at 20,000 ft., being obliged to use his oxygen bottle. At the top of the climb the thermometer registered 43 deg. below zero. At 31,000 ft. the machine dropped 600 ft. vertically, as recorded by the barograph.

Swedish Aviator's Record Flight

The Swedish Army aviator, Rodehn, on September 21 established a Scandinavian record by flying the whole length of Sweden from Ystad to Haparanda and thence to Boden, a distance of 1,420 kilometres, in 7½ hours, without landing. He used a 260 h.p. Swedish aeroplane.

Personals

Deaths

Lieut. Arthur E. Rudge, R.A.F., 203rd Squadron, who was reported missing after an aerial combat on July 22, 1918, and is now presumed killed on that date, at the age of 19, was the younger son of J. E. and Julia Rudge, of Paris, and 9, Belsize Park, N.W.

Sec. Lieut. John Syers Walthew, R.F.C., who was reported missing on September 19, 1917, and is now officially presumed killed on that date, was the second son of Mr. and Mrs. Walthew, Harpenden.

Married

Lieut. Herbert Victor Albrow, R.A.F., eldest son of Mr. Albrow, Epsom, was married on September 17 at St. Columba's Church of Scotland, London, W., to Margaret Maxwell, younger daughter of the late Mr. John Small, of Wentworth, Jamaica, and Broughty Ferry.

Flight-Lieut. A. S. Ellerton, O.B.E., R.A.F., was married on September 13, at the Chapel Royal, Savoy, to Maureen Gilliland, daughter of Mr. T. F. Husband, I.S.O., M.A., and Mrs. Husband, of 69, Belsize Park Gardens, Hampstead.

Capt. Overton Preston, M.C., R.A.F., second son of the late Martin Inett Preston and Mrs. Preston, The Park, Nottingham, was married on September 8 in London to Victoria Mary, third daughter of the Rev. Peter Donaldson, M.A., B.D., late Pro-Consul at Salonika.

To be Married

The engagement is announced between Norman Sydney Beale, M.C., Légion d'Honneur, late Lieut., East Surrey Regt. and R.A.F., eldest son of Mr. and Mrs. S. B. Beale, of Sutton House, Sutton, and Margaret Eleanor St. Hill (Nora), youngest daughter of Mr. and Mrs. Arthur Brock, of Haredon, North Cheam.

The engagement is announced of Capt. William Barham Foster, late R.A.F., son of Mr. and Mrs. Frank Foster, of Buenos Aires, and Alice Margaret, daughter of the late Oswald Francis Stenning and Mrs. Stenning, and granddaughter of Sir Alexander Stenning, of West Hoathly, Sussex.

The engagement is announced between Alfred Cyril Spencer Hawkins (late R.F.C.), only son of Mr. and Mrs. Alfred Tolhurst Hawkins, of 42, Portland Place, W., and Beryl Sefton, younger daughter of Mr. and Mrs. Alfred Spencer, of 70, Inverness Terrace, Hyde Park, W.

The engagement is announced between Mr. W. A. Lyon, R.A.F., youngest son of the late Dr. Robert Lyon and of Mrs. Lyon, 10, Baskerville Road, Wandsworth Common, and Sylvia Ellen, younger daughter of Capt. and Mrs. E. U. Story, Cherry Garden House, Folkestone.

The engagement is announced between Capt. C. W. Mackey, R.A.F., younger son of Mr. and Mrs' W. J. Mackey, Highlands, Maidstone, and Kathleen, younger daughter of Professor and Mrs. H. Briggs, 3, Rodney Street, Liverpool. and Hoylake, Cheshire.

The engagement is announced between Wing-Com. Evelyn Hayley Sparling, R.A.F. (lieut-com., R.N.), younger son of William Sparling, of 10, Upper Maze Hill, St. Leonards, late Bogawantalawa, Ceylon, and Silvia Maud, only daughter of G. Thorn-Drury, K.C., of 42, Roland Gardens, S.W. 7.

THE AUSTRALIAN GOVERNMENT FLIGHT COMPETITION

The Air Ministry announces:—The flight for a prize of £10,000, which was offered by the Australian Government in March last, was the subject of a conference on September 19 between representatives of the Air Ministry, the Australian Commonwealth, the Royal Aero Club and the competitors.

It has always been recognised in official quarters that a flight between England and Australia would be a performance of very great difficulty in the present state of ground organisation, and that considerable time must necessarily elapse before the project could mature. Since little information was available on the proposed line of route beyond Calcutta, it was decided jointly by the Commonwealth Government, the Air Ministry and the Royal Aero Club that no competitor should be allowed to start until the Air Ministry had been able to obtain reliable data concerning the section of the route between Calcutta and Port Darwin.

Brig.-Gen. A. E. Borton, D.S.O., and Capt. Ross-Smith of the Australian Flying Corps were accordingly despatched without delay to carry out a special survey of this section, and to report on the possibility of the flight being successfully attempted. These two officers have now returned to England, and furnished detailed information regarding their investigations. They reported that beyond Calcutta the route lies over country far from favourable for aeroplane flying. Between Calcutta and the Dutch East Indies the only landing grounds suitable for immediate use are the racecourses at Rangoon and at Singapore. Beyond Singapore, where the route lies over the Dutch islands, the next place where good landing facilities exist is Bandoong, and thence no landing ground is at present available for the intervening 1,760 miles to Port Darwin.

As the weather after the end of November is most unfavourable, General Borton expressed the view that if the flight is to be made this year only aeroplanes possessing a range of at least 2,000 miles could make the attempt with any hope of success. He explained also that the difficulties would be considerably lessened if competing machines were fitted with floats at Calcutta and continued the journey as seaplanes, as there are several suitable harbours and inlets on the route to Australia.

With regard to the portion of the route between London and Delhi the same difficulties do not present themselves, as the organisation created by the Air Ministry for service flights is meantime available. Owing to the weather conditions after the beginning of November, however, it may be necessary for competitors to fly via Malta and the north coast of Africa to Cairo. From Cairo to India the difficulties to be faced are greater and vast stretches of uncivilised country have to be traversed. Although more than one flight has been made over this portion of the route, it cannot be said to be in regular operation.

The Air Ministry have placed all available information at the disposal of competitors, and are arranging for the granting of such facilities as have been created and exist, and to keep competitors posted with any progress or developments.

◆ ◆

Paris to Cairo and Back

Com. Vuillemin, who started on August 11 to fly from Paris to Cairo and back, landed safely at 7 p.m. on September 9 at the Villacoublay aerodrome.

The outward journey was effected without incident in 30 hours of actual flying. For the return Com. Vuillemin, after the first stage, Cairo-Constantinople, left the Turkish capital at 3 a.m. on September 8, and the same evening, after a halt at Naples, reached Istres, near Marseilles. The distance each way, is about 2,700 miles.

◆ ◆

A Height Record Prize

Carrying out a wish expressed by the late Leon Morane, his brother, M. Robert Morane, has presented to the Aero Club of France a challenge cup and a sum of 10,000 francs. The Leon Morane Challenge Cup will be given to the French aviator, who on a French built machine, holds the world's altitude record, and when the record is not held by a Frenchman the cup will remain in the custody of the Aero Club of France. Regulations for the cash prizes will be drawn up later.

THE ROYAL AIR FORCE

London Gazette, September 16.

The following officers have been granted short-service commns. in the ranks stated, with effect from Sept. 16. They will retain their seniority in the substantive rank last held by them prior to the grant of the short-service commn. :—

Squadron Leaders.—J. S. T. Bradley, O.B.E. (S.O.); H. E. J. Hewitt (Ad.).

Flight Lieutenants.—C. W. Bailey (A. and S.), L. F. P. Bawn (T.), A. M. Blake, A.F.C. (A.), L. O. Brown, D.S.C., A.F.C. (A. and S.), J. M. Burke (T.), D. K. Cameron (T.), B. E. Catchpole, M.C., D.F.C. (A.), H. L. Crichton, M.B.E. (S.O.), F. R. P. Dexter (Ad), W. M. Fry, M.C. (A.), H. H. James (A.), C. W. McCann (T.), P. H. Mackworth, D.F.C. (A. and S.), D. O. Mulholland, A.F.C. (A.), G. C. Rhodes (T.), P. D. Robertson (T.), W. G. Stephenson-Peach (T.), G. Stevens, O.B.E. (T.), C. A. Taylor (A.), B. C. Tooke (S.), C. J. Truran, A.F.C. (A.), S. R. Watkins, A.F.C. (A.), D. W. Wilson (S.O.), P. Worthington, M.C. (T.), T. K. Young (T.).

Flying Officers.—C. D. Adams (A.), J. M. Adams (Ad.), H. C. Atkin (T.), H. Auliff (Ad.), V. G. Austen (A.), H. B. S. Ballantyne (Ad.), J. F. T. Barrett (A.), H. F. V. Battle (A.), L. N. J. Bennett-Baggs (A.), W. Best (T.), A. T. Cooper (S.O.), E. D. H. Davies (S.), P. H. Davy (A.), D. W. Dean (S.O.), T. H. Evans (S.O.), A. L. Fiddament (A.), W. C. Green, M.C. (T.), J. D. Hewett (A.), R. V. J. S. Hogan (S.O.), A. Holmes (S.O.), W. E. Lunnon (A.), C. H. Masters (S.O.), J. V. Medcalf (A.), W. D. Miller (S.O.), F. J. Moule (A.), H. W. Prockter (T.), C. Rapley, M.S.M. (T.), D. B. Robertson (A.), W. A. Rochelle (A.), L. T. Sanderson, D.S.M. (S.O.), P. L. Sant (A.), J. T. Vernon (S.O.), W. W. Whitehead (T.), R. F. Wilson (T.), W. K. Yarnold (T.), R. W. G. West (A.).

Observer Officers.—R. B. Gordon, D.F.C., R. B. Hunter.

It is intended that officers employed as Stores Officers or on "Q" duties shall belong to the new Stores Branch when formed. Officers appearing in this *Gazette* who are at present so employed will be transferred to this Branch on its formation, and will accept these short-service commns. on that condition. They will then come on to the rates of pay of that Branch, but will meantime be permitted to draw the higher rates laid down in the new scheme for officers of the General List. Any officer posted to the Stores Branch on its formation will then have the option of declining his short-service commn.

Permanent Commissions

The notification appearing in the *London Gazette* Aug. 1 appointing the following officers to permanent commns, is cancelled:—Lieut.-Col. R. A. Bradley (A.), C.M.G., Maj. F. B. Binney (A.), Maj. A. Cleghorn (T.), Maj. E. J. Roberts (A.), Capt. L. I. Barker (A.), Capt. T. G. Bowler (Ad.), Capt. C. H. Dixon (A.), (D.F.C.), Capt. G. Donald (D.F.C.) (A. and S.), Capt. J. R. Howett (A.), Capt. H. L. H. Owen, A.F.C. (A.), Capt. G. W. Robarts, M.C. (A.), Lieut. C. R. Robbins, M.C., D.F.C. (A.), Lieut. F. N. S. Creek, M.C. (O.), Lieut. W. H. Date (S.O.), Lieut. H. G. W. Debenham (A.), Lieut. F. H. Eberli (A.), Lieut. C. F. Falkenberg, D.F.C. (A.), Lieut. W. W. Glenn, M.C. (Ad.), Lieut. C. Harrison (A.) (deceased), Lieut. S. Jones D.F.C. (A.), Lieut. C. S. T. Lavers, D.F.C. (A.), Lieut. D. F. Lawson (A.), Lieut. H. B. Maund (A.), Lieut. P. N. Melitys (O.), Lieut. F. G. Prince (A.) (deceased), Lieut. C. F. Smith (A.), Lieut. R. H. Somerset (A.), Lieut. C. A. Spence (A.), Lieut. A. G. Stradling (S.O.), Lieut. E. B. Wilson (A.), Lieut. D. Wood (A.).

The notification in *Gazette*, Aug. 5, concerning Capt. H. W. G. Jones is cancelled. The notification in *Gazette*, Aug. 1, is to stand.

The surname of Capt. R. T. Nevill (T.) is as now described, and not Neville as in *Gazette*, Aug. 1.

The surname of Lieut. D. N. Thomson, M.C. (S.O.) is as now described, and not Thompson as in *Gazette*, Aug. 1.

The following temp. appointments are made:—

Director of Operations and Intelligence.—Air Commodore J. M. Steel, C.M.G., C.B.E. (Sept. 8), vice Air Commodore R. M. Groves, C.B., D.S.O., A.F.C.

Staff Officer, 3rd Class.—Air.—Flight Lieut. G. W. Robarts, M.C. (Sept. 3), vice Squad.-Leader A. J. Currie.

Staff.—Lieut.-Col. A. E. Borton, C.M.G., D.S.O., A.F.C., is graded for purposes of pay and allowances as Brig.-Gen., Staff; May 1 to July 31.

The following temp. appointments are made:—

Staff Officers, 2nd Class.—Air.—Squad.-Leader D. L. Allen, A.F.C., from S.O.1 (Air); Sept. 15. Q.—Capt. F. P. Don (July 18), vice Maj. A. E. Loder.

Flying Branch.

Maj. (Hon. Lieut.-Col.) A. W. H. James, M.C., to be actg. Lieut.-Col. whilst employed as Lieut.-Col. (A.); July 19, 1918, to March 20.

Maj. W. B. Hargrave, O.B.E., is graded for purposes of pay and allowances as Lieut.-col. whilst employed as Lieut.-Col. (A.); May 1 to June 30.

Capts. to be actg. Majs. whilst employed as Majs. (A.):—C. M. Leman, M.C., D.F.C.; June 10. R. M. Drummond, D.S.O., M.C.; from May 1 to July 31.

The following Capts. are graded for purposes of pay and allowances as Majs. whilst employed as Majs. (A.):—C. J. Q. Brand, D.S.O., M.C., A.F.C.; to June 30. H. S. Lees-Smith, L. G. S. Payne, M.C., A.F.C.; to May 30. C. A. Ridley, D.S.O., M.C.; to June 30. E. Selby, O.B.E.; to June 30. G. A. Turton; to May 28 (May 1).

Lieuts. to be actg. Capts. whilst employed as Capts. (A.):—J. A. Craig, D.F.C., D. F. Lapraik, D.F.C., M. M. Freehill, D.F.C. (June 10 to July 31); May 1.

The following Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts. (A.):—F. J. Cunninghame, A. F. Hordern, H. J. Hunter, A. W. Vigers, M.C., D.F.C. (to May 11), (Hon. Capt.) L. W. Jarvis (to July 31), K. B. Lloyd, A.F.C. (to July 31), J. J. Williamson, A.F.C. (to July 31); May 1.

Lieut. P. L. Stephens to be Lieut. (A.) from (Ad.); April 19, 1918.

Lieut. (Hon. Capt.) G. M. Smyth to be Lieut. (Hon. Capt.) (A.) from (S.O.) May 18 (substituted for the notification in the *Gazette* of July 15).

Sec. Lieuts. to be Lieuts.:—I. B. Hyslop; July 18, 1918. R. Clark; March 26. E. Colvill; May 1. A. Russell; July 10. L. F. Homer; July 30.

P.F. O. J. B. Lynch (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A.); June 10, 1918.

D. J. Lewis is granted a temp. commn, as Sec. Lieut. (A.); June 27, 1918.

P.F.O. L. H. Kemp (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (O.); Sept. 14, 1918.

Sec. Lieut. W. D. F. Liston (Lieut., I.A.R.O.) relinquished his commn. on reversion to I.A.R.O.; Sept. 9.

The following relinquish their commns, on ceasing to be employed:—Lieut. G. C. Stemp (Lieut., E. Kent. R.); May 30. Lieut. H. L. H. Bousted (Lieut., Essex R.); June 11. Lieut. F. H. Prichard (Capt., R.G.A.); July 7. Lieut. C. T. Travers, A.F.C. (Sec. Lieut., Wilts R.); July 11. Lieut. (Hon. Capt.) E. R. Williams (Capt., Manitoba R.); Sept. 8.

(Then follow the names of 75 officers who are transfd. to the Unemployed List under various dates.)

Maj. L. F. Richard (Capt., R.G.A.) relinquishes his commn. on account of ill-health, caused by wounds; Sept. 30.

Capt. C. P. O. Bartlett, D.S.C., relinquishes his commn, on account of ill-health, and is permitted to retain his rank; Sept. 3.

Capt. J. D. Payne, M.C. (Sec. Lieut., Extra Regimentally Employed List) resigns his commn.; Sept. 17.

Lieut. G. P. Blake relinquishes his commn, on account of ill-health caused by wounds, and is permitted to retain his rank; Aug. 16.

Lieut. P. Goodbehere (Manchester R., T.F.) relinquishes his commn. on account of ill-health contracted on active service; Aug. 22.

Sec. Lieut. D. F. Dempster relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Sept. 4.

Sec. Lieut. (Hon. Lieut.) W. J. Bethune (Lieut., Cameron Highrs.) relinquishes his commn. on account of ill-health contracted on active service; Aug. 18.

Sec. Lieut. W. G. Edwards resigns his commn.; Sept. 17.

Sec. Lieut. H. T. Kempton is antedated in his appointment as Sec. Lieut. (A. and S.); May 10, 1918.

The initials of Sec. Lieut. L. G. Crossley are as now described and not "J. G." as stated in the *Gazette* of July 15.

The initials of Sec. Lieut. C. A. Farquharson are as now described, and not "C. D." as stated in the *Gazette* of July 29.

The initials of Lieut. G. H. Windsor are as now described, and not "G. J." as stated in the *Gazette* of July 29.

The surname of Lieut. J. Tomkins is as now described, and not "Tompkins" as stated in the *Gazette* of July 29.

The surname of Lieut. T. M. Johns is as now described, and not "Jones" as stated in the *Gazette* of Aug. 8.

The notification in the *Gazette* of June 17 concerning Sec. Lieut. (Hon. Lieut.) S. J. R. Simmons is cancelled.

The notification in the *Gazette* of July 4 concerning Capt. A. E. Godfrey, M.C., A.F.C., is cancelled.

The notification in the *Gazette* of July 22 concerning Lieut. C. Gilham is cancelled.

The notification in the *Gazette* of July 29 concerning Lieut. J. Coates is cancelled.

Administrative Branch.

The following Majs. are graded for purposes of pay and allowances as Lieut.-Cols. while employed as Lieut.-Cols.:—A. C. E. S. Bowlby, A. R. Woodland; May 1.

Capt. P. Gadsby, O.B.E., is graded for purposes of pay and allowances as Lieut.-Col. while employed as Lieut.-Col.; May 1.

Capt. H. C. Jones to be actg. Maj. while employed as Maj., from Sept. 28, 1918, to Dec. 5, 1918.

Lieut. (actg. Capt.) J. P. P. L. Biggs, M.B.E., to be actg. Maj. while employed as Maj., from Oct. 6, 1918, to April 30.

The following Capts. are graded for purposes of pay and allowances as Majs. while employed as Majs.:—G. B. Chainey, O.B.E., M. B. O'Brien; May 1. C. P. Cowper; to May 9. (Hon. Maj.) A. F. Morris; to May 31. T. L. Stevens; to July 31.

The following Lieuts, are graded for purposes of pay and allowances as Majs. while employed as Majs.:—(Actg. Capt.) J. P. P. L. Biggs, M.B.E., A. E. Worrall, M.C. (to Aug. 9); May 1.

Capt. F. P. Don to be Capt., from (S.O.); May 31..

Lieut. S. Saunders, M.C., to be actg. Capt. whilst employed as Capt.; from Dec. 14, 1918, to April 30.

Sec. Lieut. G. L. Grey to be actg. Capt. while employed as Capt.; May 1.

The following Lieuts. are graded for purposes of pay and allowances as Capts. while employed as Capts.:—H. Gwynne-Smith, C. A. Howe (Hon. Capt.) A. E. Miller, M.C., J. R. Nicholls, S. G. K. Rapley, A. W. Turner; to May 31. J. G. C. Williams; to June 30. (Hon. Capt.) A. D. F. Mackenzie; to Aug. 9. J. Mitchell; to Aug. 9. W. Pilkington, M.C.; to Aug. 9. R. H. Rook, M.C.; to Aug. 9. D. G. Sharp; to Aug. 9; May 1. W. Clay; July 1.

Lieut. H. H. Harman is graded for purposes of pay and allowances as Capt. while employed as Capt. from (O.); from May 1 to June 30.

Sec. Lieut. S. Tew is graded for purposes of pay and allowances as Capt. while employed as Capt.; May 1.

Lieut. L. J. N. Mackay relinquishes the grading for purposes of pay and allowances as Capt. on ceasing to be employed as Capt.; June 26.

Sec. Lieuts. to be Lieuts.:—(Hon. Lieut.) H. S. Gargett; Aug. 23. R. Craig; March 1.

Sec. Lieut. E. V. Evans to be actg. Lieut. while employed as Lieut.; from March 21 to April 30.

Sec. Lieut. E. G. Stott (late Gen. List, R.F.C.) on prob., is confirmed in rank of Sec. Lieut.; May 7, 1918 (substituted for the notification in *Gazette* of Aug. 20, 1918.

The following relinquish their commns, on ceasing to be employed:—Sec. Lieut. J. W. Shaw (Lieut., Oxf. and Bucks L.I.); July 23. Lieut. H. E. R. Twamley (Lieut., Notts and Derby R.); Aug. 12.

(Then follow the names of 15 officers who are transfd. to the Unemployed List under various dates.)

The following Sec. Lieuts. relinquish their commns, on account of ill-health, and are permitted to retain their rank:—C. McI. French; July 12 (substituted for the notification in the *Gazette* of Jan 21.) A. F. G. Ovenden (contracted on active service); Aug. 19.

Sec. Lieut. R. Parker (Sec. Lieut., K.R.R.C.) is removed the Service; Sept. 15.

The notification in the *Gazette* of May 23 concerning Sec. Lieut. (Hon. Lieut.) J. W. Gardner is cancelled.

Technical Branch.

Maj. W. J. D. Pryce is graded for purposes of pay and allowances as Lieut.-Col. whilst employed as Lieut.-Col., Grade (B); May 1.

Capt. W. J. Waddington, O.B.E., is graded for purposes of pay and allowances as Maj. whilst employed as Maj., Grade (A); May 1.

Lieut. H. G. Gibbs is graded for purposes of pay and allowances as Maj. whilst employed as Maj., Grade (A); May 1.

The following appointments are graded for purposes of pay and allowances as Majs. whilst employed as Majs., Grade (B):—R. G. L. Candy, W. Millett, W. Wade, O.B.E., H. E. F. Wyncoll, O.B.E., M.C. (to June 30); May 1.

The following Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (A):—B. C. Adamson, T. G. S. Babb, E. McR. Cockell, S. S. Dixon, A. R. Langton, F. D. Lugard, F. A. Omerod, E. Plimley, L. H. Straker, R. G. Whitcombe, W. Scott (to July 31); May 1. S. Empsall; June 1.

The following Lieuts, are graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (B) :—T. Bell, M.M., G. Bowen, F. Briggs, L. E. Carter, R. J. Copley, T. D. Jones, W. R. Lewis, F. G. Murray, (Hon. Capt.) J. Ramsay, M.C., H. J. Skingle, V. F. Spurgeon (to June 30) ; May 1.

The following Lieuts, are graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (B), from (Ad.) :—J. W. Gardner (substituted for notification in the *Gazette* of Aug 5), H. L. Woolveridge (to June 30) ; May 1.

Lieuts. to be Lieuts., from (Ad.) :—G. D. Daly, Grade (A) ; July 12. C. R. Pilcher, Grade (B) ; Nov. 28, 1918.

Lieut. W. W. Bull is graded for purposes of pay and allowances as Lieut. while employed as Lieut., Grade (A) ; May 1.

Sec. Lieut. H. B. Brown to be Lieut., without pay and allowances of that rank ; Nov. 24, 1918 (substituted for *Gazette* of Sept. 5).

Sec. Lieut. (Hon. Capt.) J. R. Cassidy to be actg. Lieut. while employed as Lieut., Grade (A), from Aug. 22, 1918, to Jan. 10.

The following Sec. Lieuts. are graded for purposes of pay and allowances as Lieuts. while employed as Lieuts., Grade (A) :—A. Bolton, F. C. North, R. L. Hartley ; May 1.

The following relinquish their commns, on ceasing to be employed :—Sec. Lieut. R. Burn (Lieut., N.Z., A.S.C.) ; June 2. Sec. Lieut. (Hon. Capt.) G. E. Allen (Capt., Manch. R., T.F.) ; Aug. 25. Lieut.-Col. G. B. Stopford (Maj., R.H. and R.F.A.) ; Sept. 1.

(Then follow the names of 18 officers who are transfd. to the Unemployed List under various dates.)

The following relinquish their commns, on account of ill-health, and are permitted to retain their rank :—Capt. H. G. Thomas (contracted on active service) ; Aug. 31. Lieut. P. H. S. Gwilliam ; Sept. 5. Sec. Lieut. I. G. Bethwaite ; Sept. 3. Sec. Lieut. A. W. Clare ; Sept. 8.

The notification in *Gazette* of May 23 concerning Sec. Lieut. R. Donald is cancelled.

Medical Branch.

Flying Officers to be Flight Lieuts. :—J. Ferguson ; Aug. 26. T. M. Davies ; Sept. 9.

Capt. W. H. H. H. Bennett, M.B. (Capt., R.A.M.C., T.F.), relinquishes his commn. on ceasing to be employed ; Dec. 10, 1918.

(Then follow the names of 8 officers who are transfd. to the Unemployed List under various dates.)

Dental Branch.

Flying Officers to be Flight Lieuts. :—S. C. Turner ; Aug. 26. A. Williams ; Sept. 2.

Memoranda.

Lieut. S. E. Mailer, A.F.C., to be Hon. Capt. ; April 1, 1918.

Sec. Lieut. S. J. Dodson to be Lieut. ; Jan. 30.

(Then follow the names of 25 Cadets granted hon. commns. as Sec. Lieuts.)

The following relinquish their commns, on ceasing to be employed :—Temp. Hon. Lieut. H. S. Porter ; Aug. 16. Maj.-Gen. E. B. Ashmore, C.B., C.M.G., M.V.O. (Brevet .Col., R.A.) ; Sept. 1. Temp. Hon. Capt. A. B. Rogers ; Sept. 13. Temp. Hon. Capt. E. W. Birch, Temp. Hon. Lieut. C. E. Marshall, Temp. Hon. Capt. R. S. Owen, Temp. Hon. Lieut. T. G. Rawson, Temp. Hon. Lieut. F. E. Woodward, Temp. Hon. Lieut. E. A. York ; Sept. 16.

(Two officers tranfd. to the Unemployed List.)

Lieut.-Col. C. F. de S. Murphy, D.S.O., M.C. (Maj., R. Berks R.), resigns his commn. ; Sept. 17.

The following temp. appointment is made :—

Staff Officer, 3rd Class.—(Tng.) Flight Lieut. L. G. S. Payne, M.C., A.F.C. ; Sept. 15.

Flying Branch.

Sec. Lieuts. to be Lieuts. :—J. Douglas ; April 23, 1918. J. H. W. Goodall ; Sept. 28, 1918. W. W. Smith ; May 9. L. H. Ridley ; June 20. J. M. Dandy ; June 24.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieuts. :—D. P. Fulton (A.) ; July 26, 1918. T. L. J. Jackson (A.) ; April 22. T. G. Brooke (A. and S.) ; Aug. 23, 1918.

The following relinquish their commns. on ceasing to be employed :—Sec. Lieut. A. C. Gill ; Jan. 13 (substituted for the notification in the *Gazette* of Jan. 28). Capt. D. B. M. Hume ; Jan. 15 (substituted for the notification in the *Gazette* of Feb. 25). Sec. Lieut. S. W. Gee (Lieut., Can. Supply Col.) ; Feb. 15. Lieut. L. de S. Duke (Lieut., actg. Capt.) Brit. Col. R.) ; June 21, Sec. Lieut. (Hon. Lt.) H. H. Heal (Lieut., Quebec R.) ; Sept. 1. Sec. Lieut- J. S. Blanford, D.F.C. (Sec. Lieut., E. Kent R.) ; Sept. 4. Lieut. D. A. A. Shepperson (Lieut., Som. L.I.) ; Sept. 10.

(Then follow the names of 62 officers who are transferred to the Unemployed List under various dates.)

The following relinquish their commns, on account of ill-health, and are permitted to retain their rank :—Capt. J. A. Hutchinson ; May 20 (substituted for notification in *Gazettes* of Jan. 24 and Aug. 8). Sec. Lieut. T. R. Adair (caused by wounds) ; July 10. Sec. Lieut. E. L. Goold ; Sept. 5.

Sec. Lieut. J. A. Griffin relinquishes his commn., being physically unsuited for the duties of Pilot or Observer ; Feb. 14 (substituted for notification in *Gazette* of Dec. 3, 1918.)

Sec. Lieut. O. F. G. Crosby is antedated in his appointment as Sec. Lieut. (A.) ; May 10, 1918.

The surname of Sec. Lieut. A. E. Amey is as now described, and not " A. E Amy," as stated in *Gazette* of Sept. 3, 1918.

The notification in the *Gazette* of April 1, concerning Lieut. B. N. Wills, is cancelled.

The notification in the *Gazette* of April 4, concerning Lieut. C. M. Shilcock, is cancelled.

The notification in the *Gazette* of July 15, concerning Sec. Lieut. J. A. Tomson, is cancelled.

The notification in the *Gazette* of July 29, concerning Sec. Lieut. J. P. Jones, is cancelled.

Administrative Branch.

Lieut. E. L. Ridley to be Lieut., from (A. and S.) ; Dec. 12, 1918 (substituted for notification in *Gazette* of Mar. 7).

Sec. Lieuts. to be Lieuts. :—H. V. Hall ; Aug. 27, 1918 (substituted for notifications in *Gazettes* of Mar. 7 and Aug. 15). D. J. Fryer ; Mar. 13. H. C. Bird ; April 19.

Sec. Lieut. H. J. Payne to be actg. Lieut. whilst employed as Lieut. (from Nov. 23, 1918, to April 30).

Sec. Lieut. H. J. Payne is graded for purposes of pay and allowances of Lieut. whilst employed as Lieut. ; May 1.

(Then follow the names of 21 officers who are transferred to the Unemployed List under various dates.)

Sec. Lieut. G. B. Blake relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; Aug. 14.

Technical Branch.

Lieut. A. C. Blackmore is graded for purposes of pay and allowances as Capt. whilst employed as Capt,. Grade (A.) ; from May 1 to July 2.

Lieut. J. D. Rohinson to be Lieut., Grade (B.), from (A.) ; Nov. 21, 1918.

Sec. Lieuts. to be Lieuts. :—(Hon. Lieut.) J. E. Spickernell ; April 2 ,1918 (without pay and allowances of that rank prior to Sept. 14, 1918). (Hon. Lieut.) G. A. Tilly ; April 2, 1918 (without pay and allowances of that rank prior to Feb. 9).

Sec. Lieuts. to be Lieuts., without pay and allowances of that rank :—F. Denham ; Mar. 13. A. R. Conder ; April 19.

Lieut. W. Barher (R.N.) relinquishes his commn, on ceasing to be employed; Aug. 21.

(Then follow the names of 21 officers who are transferred to the Unemployed List under various dates.)

Lieut. B. A. Hill relinquishes his commn, on account of ill-health, and is permitted to retain his rank ; Sept. 11.

Sec. Lieut. T. E. Lomas relinquishes his commn, on account of ill-health and is permtted to retan his rank ; Sept. 8.

The notificaton in the *Gazette* of July 22 concerning Capt. F. Reynolds, is cancelled.

Medical Branch.

Wing Comdr. (actg. Group Capt.) T. D. C. Barry is transferred to Unemployed List ; Aug. 31.

Memoranda.

90984 Cadet H. T. Collins is granted an hon. commn, as Sec. Lieut. ; April 2.

The following temp. Hon. Lieuts. relinquish their commns, on ceasing to be employed :—T. Leopard ; June 16. H. S. Burdett ; Sept. 16.

(Two officers transferred to the Unemployed List.)

The notification in the *Gazette* of Sept. 5 concerning Sec. Lieut. T. A. Bayly is cancelled.

* * *

Roll of Honour

Published September 8.

Previously reported missing, now reported killed.—McLaren, Sec. Lieut. F. M., R.F.C.

A Murmansk Success

In the announcement issued by the War Office on September 19 concerning operations in North Russia it was stated that the Bolshevist fleet of 15 vessels, which sailed north-east from Petrozavodsk to intercept one of our columns which was being landed on the west shore of Lake Onega, was attacked by our aircraft with machine-guns and bombs and forced to return to its harbour in confusion.

Raids on Kronstadt

On the night of September 13 British aeroplanes again bombed Kronstadt and although they were heavily fired on they did not suffer any loss.

The Finnish General Staff reports that on the night of the 15th inst. artillery fire was heard and fires were observed in the direction of Kronstadt. British aeroplanes were in action during the night. The General Staff adds that one machine fell into the sea while descending in the neighbourhood of Bjoerkoe, and the pilot was drowned.

A message from Helsingfors on September 18 stated that in the British raid on Kronstadt on the previous night both fighting and bombing machines took part. The night was dark, rainy, and windy. When starting, a small plane fell into 3 ft. deep of water. The airman was killed and the machine smashed. Two other machines subsequently came down and two officers are missing. The rest of the machines reached Kronstadt and fulfilled their task.

According to the Bolshevist version one bomb set fire to an empty barn. They also claim to have brought down an Ilia Murometz machine.

Airship Services to India

Two British flying officers, Lieut. Crichton and Lieut. Coombs, are reported to have arrived at St. Raphael (Var) from London by aeroplane on the evening of September 13 and to have left for Taranto on September 15 in connexion with the proposed London to Bombay service by dirigible.

New Use for an Aerodrome

The Huntingdon County Council is considering a proposal to purchase Wyton aerodrome from the Disposals Board. The aerodrome, which is four miles from Huntingdon, occupies a site of over 200 acres. It is equipped with many permanent buildings, as well as hutments, and it is suggested that the buildings might be used as a sanatorium and the land developed as a farm colony.

A Course in Aeronautical Engineering

Those who wish to study aeronautical engineering should note that the Regent Street Polytechnic have arranged a most comprehensive series of evening classes covering aero-mechanics, principles of aeroplane design and construction, workshop practice, aero-engine design, propeller design, draughtsmanship, etc., arranged so that it can be adequately completed in three years. The lecturers are Mr. E. P. King, B.Sc., Mr. F. S. Hill, B.Sc., Mr. H. Shaw, B.Sc., A.R.C.S., Maj. A. Graham Clarke, M.I.A.E., and Mr. H. S. Bourne. As the course commences on Monday, September 29, those who contemplate joining the classes should lose no time in obtaining the syllabus from the Polytechnic 307-311, Regent Street, W. 1.

LONDON–PARIS AIR SERVICE

On the completion of the first month of the daily aeroplane service between London and Paris, organised by Aircraft Transport & Travel, we have received from the Chairman, Mr. G. Holt Thomas, some particulars of the results obtained.

Mr. Holt Thomas started this service on August 25 to demonstrate to the business world, by actual daily flying, that aeroplanes will not only transport passengers and goods at 100 miles an hour, but will do so commercially to a fixed time-table, and the first month's work—which has demonstrated, day by day, the fact that, for the first time in the history of mankind, London and Paris are, by "air express," only 2¼ hours' distant from each other—is a record of which Aircraft Transport & Travel may well be proud. Out of a possible 56 flights between London and Paris during this first four weeks, they have satisfactorily completed 54. On one occasion, when there was a 100 miles an hour hurricane, it was considered advisable to divert the load of a machine to an alternative route; and on another occasion, after starting a flight rather late owing to atrociously bad weather, a pilot had a forced landing through oil pressure trouble, which so delayed him that he considered it unwise to proceed owing to the impending darkness.

As showing the dependability in operation which can be attained already with a suitable aeroplane, when handled with skill, it is emphasised that only twice, during 13,750 miles flying, has it been necessary for a pilot to make a compulsory descent; and in one of these two cases, after five minutes' delay, he was in the air again.

Mr. Holt Thomas has been asked why they chose London-Paris as a demonstration route, seeing that the weather encountered is probably the worst in the world. His reply is that they selected that route deliberately. They were confident of their pilots and machines. They knew the belief which was prevalent that commercial flying was only a fair weather proposition. They said to themselves, "If we can fly reliably on this route we can go with confidence anywhere else in the world." In the month's weather they have just flown through the official reports show that on only three days were conditions really favourable. On 13 days they were distinctly unfavourable, while on eight days, though their machines actually got through, the official reports showed that the conditions were considered "unfit" for flying.

Mr. Holt Thomas adds that the credit for this month's really wonderful flying, which has done more than anything else has ever done to convince thinking people that the era of commercial flying has already dawned, is due entirely to the ex-officers and pilots who, under his direction, have organised and flown this service. In their capacity as indefatigable organisers he pays sincere tribute to Brig.-Gen. F. L. Festing, C.B., C.M.G., who resigned his post as Deputy Master General of Personnel at the Air Ministry to join Mr. Thomas as Managing-Director of Aircraft Transport and Travel; also to Capt. D. M. Greig, O.B.E., late of the Department of Aircraft Production; while last, but far from least, he pays tribute to those pilots—the finest he is convinced in the world—who have flown through weather which even experts have considered impossible. To these pioneers of commercial flying—to Capt. Baylis, Capt. Riley, Lieut. Shaw, Lieut. Lawford and Lieut. McMullin—they owed a debt of gratitude it was hard to express in words. Their flying, their enthusiasm, their good judgment—these had been magnificent.

To use this 100 miles-an-hour service on urgent occasions when "time is money" is, as Mr. Thomas points out, not only a sound business proposition—as those who are now using it daily would be the first to testify—but it is something far more than this. It is a definite encouragement to British aviation, which, first as it was in war, is now faced with the task of maintaining that proud position during the days of peace, a task which it can only hope to accomplish by the interest and support of the public.

◆ ◆

London to Brussels Air Service

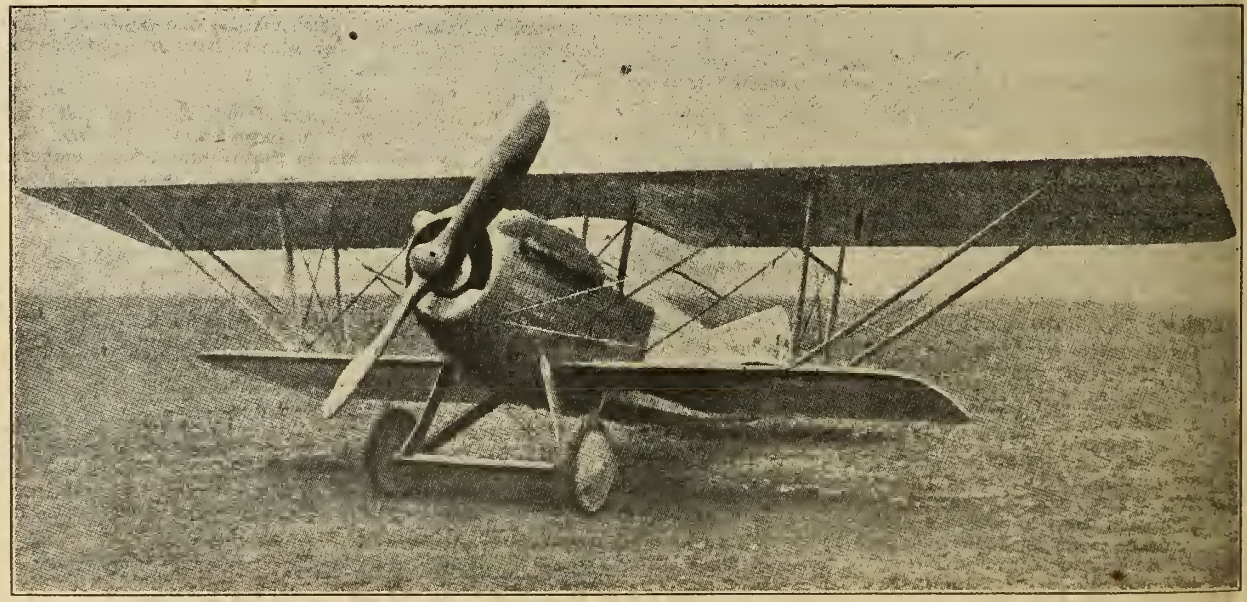
The Handley Page London-Brussels air service commenced on Wednesday, the same type of machine being used as that which is so successfully carrying on the London-Paris service. Ten passengers with 30 lb. each of personal luggage, in addition to 500 lb. of general freight, can be carried. The seats are numbered and can be booked at all the usual agents or at Handley Page Transport (Ltd.), Cricklewood. Private landaulettes will await the passengers at each aerodrome and convey them to the centre of the city. The service will leave London on Mondays, Wednesdays, and Fridays, returning on Tuesdays, Thursdays, and Saturdays.

◆ ◆

The Business Aeroplane

Having decided to employ an aeroplane as part of its regular organisation, Messrs. S. Instone and Co., steamship owners and general export and import merchants, of Cardiff, have purchased from the Air Ministry a large machine with Rolls-Royce engines, and have engaged as pilot Lieut. F. L. Barnard, who holds the record number of cross-Channel flights.

Besides using the machine for the purpose of transporting urgent papers, samples, etc., the firm intends that it shall be utilised to enable heads of departments to get into personal touch quickly with foreign buyers.



The Edmond de Marçay single-seater biplane, which, piloted by Lieut. Lebeau, at Villacoublay, attained speeds of 156 m.p.h. level, 147 m.p.h. at 10,000 ft., and 129 m.p.h. at 20,000 ft. It is fitted with a 300 h.p. Hispano-Suiza engine, and has a span of 30 ft. 4 ins., overall length of 21 ft. 4 ins., and a useful load of 745 lbs. Its factor of safety is 14.

SIDE-WINDS

Recently a new Order in Council was issued by the Home Office touching upon the regulations which govern the manufacture and supply of acetylene compressed in cylinders, known as dissolved acetylene. The Dissolved Acetylene Co., Ltd., formerly the Acetylene Equipment Co., Ltd., sole manufacturers of D.A. (dissolved acetylene) and who, we understand, are the largest suppliers of this gas in Great Britain have made careful tests and experiments in regard to the question of acetylene cylinders and gas, with the object of maintaining their standard of quality and adhering in all respects to the Home Office regulations.

* * *

Some time ago, acting upon Home Office recommendations, they commenced the reconstruction and re-testing of all cylinders with the object of improving their durability. They have now introduced an entirely new form of cylinder made from a steel shell solid drawn from one piece. This type of cylinder has previously been obtainable only in heavy sections, which would have made the cost of transport prohibitive. Final experiments, however, have now led to the production of this type of cylinder in a section light enough for transport, but at the same time heavy enough to withstand the hydraulic test pressure of 1,000 lb. per sq. in., which exceeds that specified by the Home Office regulations, *i.e.*, four times the working pressure, the latter being increased under the new Order from 150 lb. to 225 lb. per sq. in. These cylinders after testing, are filled with the necessary porous material and acetone, then fitted with valves and filled with acetylene ready for use. These processes are carried out at the company's works, the cylinder being thus manufactured entirely in Great Britain by British labour. The Dissolved Acetylene Co. supply their gas under a guarantee of purity, and it may be mentioned that the gas, after generation, is treated by six processes of purification, so as to extract all moisture and impurities.

* * *

"Summer-Time" ends during the night of September 29-30 and at 2 a.m. we resume normal time again. It will be necessary for clocks to be put back one hour, and for the information of the many users of "Pulsynetic" clocks we are informed by the makers that the best method of altering electric clocks of the "Pulsynetic" class is to stop the pendulum of the transmitting clock for one hour, and this recommendation also applies to ordinary domestic striking clocks, as in these it is fatal to put the hands backwards. "Pulsynetic" clock systems which include in their circuits public or turret clocks, should be altered after dusk on Sunday night; but works and factory systems—of which there is now a large number—can be more conveniently stopped on Saturday after closing time, provided, of course, that a public clock is not connected with the system.

* * *

An excellent suggestion in connection with watches—given by an expert watchmaker—is to put the watch quickly back to, say, seven or eight minutes beyond the necessary hour, then slowly turn the hands forwards to the correct time. When the watch is put back slowly to the correct time there is the danger of stopping the watch, and if not noticed the results may be, to say the least, inconvenient.

* * *

In order to cope with their greatly increased business—both export and in London and the Home counties—Messrs. Dunford and Elliott (Sheffield), Ltd., the well-known firm of steel manufacturers, have found it necessary to open their own offices in London, at 4, Copthall Buildings, Copthall Avenue, E.C. 2, and in future all communications in connection with steel, etc., for export or for delivery in London and the south of England, should be sent to the new address. The general management of the London office is in the hands of Mr. Ivor S. Winby, who has hitherto controlled Messrs. Dunford and Elliott's export business, whilst the services of their London agent, Mr. E. St. Clair Duncan, are retained in the capacity of sales manager.

* * *

In these days, when so much is heard of the lauded enterprise of almost every other country but our own, it is refreshing to record an instance of British brains, British capital and British inventiveness, making headway against all comers. Little more than two years ago Messrs. Madgwick, Ltd., patentees and proprietors of the well-known "M-Ten" crates and boxes, took in hand the problem of packing. They designed a collapsible crate or box so constructed that while it requires neither nails or screws, hinges or wires, it is capable when put together of holding any kind of merchandise, from the heaviest to the lightest. An ingenious system of interlocking the parts makes it perfectly rigid, therefore it can be used for packing goods in precisely the same manner as the ordinary nailed-up crate or box, and can be used time after time. When empty the case can be collapsed, and top, sides, bottom and ends fold up as flat as a book. Thus saving 80 per cent. storage room.

* * *

That this invention had a great future before it there was no doubt, but it is entirely due to the energy of the patentees and proprietors that, in the short space of time mentioned above, they have outgrown their original works at East Row, N. Kensington, and are removing to a splendid site in Sudbury, Middlesex. There they have erected large works to cope with the ever-increasing flood of orders. That these crates and boxes are appreciated alike by users and railway companies is evidenced by the fact that, first, they are being used by the leading firms in nearly every line of business, and, second, the railway companies will accept goods packed in these crates and boxes at company's risk. Messrs. Madgwick will be in their new premises in October, and will be glad to demonstrate their speciality to any manufacturer who desires to find an easy way out of the packing problem. The new premises will be know as "M-Ten" Works.

* * *

A method of "sealing" these cases has been adopted and has met with the unqualified approval of the Railway companies. Any ordinary rigid and nailed-up case—whether banded, wired or other means are used—is "easy" to the average railway thief armed with jemmy and nail-drawer, and not the slightest sign of pilferage is left behind. The "M-Ten" case, however, when sealed in the approved manner, is claimed to be positively pilfer-proof and will defy the efforts of the experts—goods cannot be extracted or tampered with without leaving behind the obvious signs that will "stop" the case in transit and on which the railway companies will make good losses, without demur.

* * *

Mr. Clarence Winchester's resignation from the Grahame-White Co., Ltd., Hendon, takes effect at the end of this month.

* * *

Capt. Truelove and his red and yellow Avro have arrived safely in Spain. Gen. Echague, commanding the Spanish Flying Corps, has been taken up by Capt. Truelove, and much enjoyed his flight. He displayed great interest in the type of machine on which the British fighting pilots were trained. It is understood that His Majesty King Alphonso is acquiring this Avro.

* * *

"La Société Française Barimar" is the title of a company which has recently been formed in Paris, with a capital of £5,000, to exploit the Barimar scientific welding processes in France, Tunis and Algeria. The factory, which is situate at 48, Rue d'Alsace, Clichy (Seine), is under the personal supervision of Mr. Cyril Rose, an assiduous engineer, deeply interested in metalliferous subjects. Mr. Rose, who has taken a leading part in the establishment of the new company, is constantly investigating the problems of metal fusion, with the one object of obtaining the very best results from modern scientific welding processes, and, under his able management, the French branch should speedily thrive.

* * *

The Lep Transport and Depository, Ltd., whose confidence in commercial aviation was manifested by the opening of their magnificent Aerial Travel Office in Piccadilly Circus on May 1—the opening day of civil aviation—have now opened a temporary office as aircraft brokers at Hounslow. The functions of the department are similar to those of a shipbroker, *i.e.*, clearing machines and their cargoes through Customs, both on outward and inward journeys, for which a scale of inclusive charges has been prepared. Mr. R. A. Loader, who is in charge of the department, will give all available assistance to aerial transport firms and their pilots, both in Customs formalities and in regard to the booking of passengers and facilities for collection, delivery and handling of freight.

* * *

A booklet which will be found of considerable use by those who use Exide Starting and Lighting batteries has just been issued by the Chloride Electrical Storage Co., Ltd. The booklet deals with the charging and operating of both Exide and Clifton batteries in ebonite boxes; it is written in very simple language, and a diagram showing the connections of the charging circuit, when using lamps as resistances, is given. A copy is sent out with each battery, but the Chloride Co. will be pleased to send a copy to anyone who would be able to make use of it if they address their application to the head office at Clifton Junction, Manchester.

Aeroplanes to Link the Nations

MR. F. HANDLEY PAGE was the guest of the Cheltenham Chamber of Commerce on Saturday evening, Sir J. T. Agg-Gardner, presiding over the gathering.

Mr. Handley Page, replying to the toast of "Our Guest," said that he felt the honour had been done him because he happened to have been associated with the heroes of one branch of the service—namely, the R.A.F., the great men who had fought for us in the air with undaunted courage and the boys from school who had given eyes to the Army. His particular part had been to supply the airmen with machines and in doing this it had been a most interesting thing to tackle the various problems one had to face.

Now they were turning their thoughts to peace, and these same big machines, which had been got ready for bombing Berlin, could easily be transformed into other uses. Already a service was running between London and Paris, carrying seven passengers a day and a considerable amount of goods, and before long week-end trips from Cheltenham to the Riviera should be possible at moderate cost. The greatest benefit from such a service as this, however, would be the increased knowledge one nation would gain of another. Wars arose out of misunderstanding. He believed the best League of Nations would be built, not out of paper, but out of the aeroplane, which would provide increased facilities for nations to know each other better and thereby promote a more perfect understanding the world over.

M. Fokker Talks

RECENTLY interviewed at Amsterdam Mr. A. H. G. Fokker stated that in 1916 the German Army authorities asked him to make a cheap aeroplane capable of flying about four hours, to be steered by wireless and to carry a huge bomb. It was intended to send these machines aloft in groups, to be controlled by one flying man. They had lost faith in big guns. Fokker says he prepared the plans but the German War Office decided to make the machines in Government factories, with the result that they bungled along for months. Then, in the summer of 1918, they gave a huge order for wireless-controlled aeroplanes to M. Fokker, and he was just ready to manufacture them in wholesale quantities when the Armistice was signed.

M. Fokker also spoke of his idea of gliders, which could be towed by an aeroplane, then cut loose and allowed to glide down to the particular place at which the passenger wished to alight.

Industrial Problems

THROUGH the courtesy of the Corporation of London, a series of fortnightly lectures on Industrial Problems will be delivered at the Guildhall, at 4,30 p.m., commencing on October 7. The speakers will include Mr. E. J. P. Benn, Professor Ripper, D.Sc., C.H., Dr. Russell Wells, the Rt. Hon. Sir Auckland Geddes, M.P., Sir George Paish and the Rt. Hon. Lord Emmott, G.C.M.G., G.B.E.

Tickets for this series can be had on application to the Secretary, Industrial League and Council, 66, Victoria Street, S.W. 1.

Whitley Councils

THE Industrial Reconstruction Council and the Industrial League, who are amalgamating under the new title of the Industrial League and Council, have arranged a series of fortnightly conferences dealing with the working of Whitley Councils set up in the road transport, silk, wool and allied textiles, pottery, building and glove industries.

The first of these conferences will take place on September 30 at 6 p.m., in the hall of the Institute of Journalists. All who are interested in the movement are invited to attend.

A similar series of conferences on scientific management will take place in the same hall on alternate Wednesdays at 5.30 p.m., commencing on October 8.

* * * *

PUBLICATION RECEIVED

Notes on the Variation of Atmospheric Conditions with Altitude. By C. F. Dendy Marshall, M.A., Munitions Inventions Department, Ministry of Munitions. London: His Majesty's Stationery Office. Price *6d.* net.

NEW COMPANIES REGISTERED

CLYNO ENGINEERING COMPANY, LTD.—Capital £120,000, in £1 shares. Acquiring business of an aeroplane, engine, and motor car manufacturer carried on at Wolverhampton, by F. Smith, as the "Clyno Engineering Company." First directors: H. B. Charles and F. W. A. Smith.

VINCENT FERRAND, LTD., Stockbridge Garage, Stockbridge, Keighley.—Capital £3,000, in £1 shares. Manufacturers and dealers, etc., in aeroplanes, airships, motor cars, etc. First directors: V. W. Ferrand, W. Leach and W. H. Deakin.

H. J. OAKLEY AND JONES AND CO., LTD., 156, Goswell Road, E.C.—Capital £20,000, in £1 shares (3,000 preference) Agricultural, aeronautical, etc., and general engineers, etc. First directors: H. J. Oakley and J. Horshurgh.

Artists Wanted

ARTISTS used to rapid free-hand sketching (motor car, chassis and mechanical details) are required immediately for several weeks' work in connection with the forthcoming Olympia Motor Show. Applicants should apply to the Editor of the AUTO., 36, Great Queen Street, Kingsway, W.C. 2.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published September 18, 1919.

10,270. S. A. FLOWER and E. E. W. BUTT. Airships. (131,397.)
10,391. SIR W. G. ARMSTRONG, WHITWORTH AND CO. and L. J. MESURIER. Apparatus for arresting of airships. (131,398.)
11,747. A. CARDOSO. Propulsion of air, etc., vehicles. (118,099.)
13,193. SIDDELEY-DEASY MOTOR CAR CO. and F. M. GREEN. Aircraft propellers. (131,419.)
13,205. M. F. HUXLEY. Aerofoils. (131,420.)
13,553. A. V. ROE. Extensible coupling for safety belts, etc. (131,450.)
16,283. C. BATES. Propulsion of aircraft. (131,497.)
16,295. G. E. DAVIES. Parachute. (131,498.)

Published September 25, 1919

9,089. J. HIGGINBOTTOM. Planes of aeroplanes. (131,627.)
10,218. H. F. WHITE and F. W. CHAPMAN. Strainers for tension-wires, etc. (131,630.)
10,862. A. J. A. W. BARR and H. LAZELL. Dopes. (131,641.)
10,904 and 10,907. PARNALL AND SONS and H. BOLAS. Mounting of aero engines. (131,645 and 131,646.)
11,090. P. LEVASSEUR. Aerial propellers. (131,648.)
11,094. W. G. TARRANT and W. H. BARLING. Framework of aeroplanes. (131,649.)
11,097. G. L. CABOT. Launching gear for aircraft. (131,650.)
11,251. J. L. L. A. A. MOULET. Pumps applicable to aerial-machine motors. (131,651.)
11,325, 11,326 and 11,327. S. A. FLOWER and E. E. W. BUTT. Airships. (131,654, 131,655 and 131,656.)
11,405. P. LEVASSEUR. Aerial propellers. (131,657.)
11,569. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Landing of flying-boats. (131,658.)
11,639. E. E. SMITH. Parachutes. (131,659.)
11,646. SOC. DES ATELIERS D'AVIATION BREGUET. Control of lateral stabilising planes of aeroplanes. (131,660.)
11,708. A. J. LIVERSEDGE. Cable bracing ties for aeroplanes. (131,661.)
12,485. A. J. GREENLY. Power controls for aircraft, etc. (131,679.)
12,577. A. J. HUGHES and H. HUGHES AND SON. Steering apparatus for aircraft. (131,687.)
12,578. A. J. HUGHES and H. HUGHES AND SON. Instrument for use in determining drift, ground speed, etc. (131,688.)
12,998. W. R. D. SHAW. Aeroplanes. (131,692.)
13,347. AERONAUTICAL INSTRUMENT CO. and G. BREWER. Inflation of balloons. (131,701.)
13,498. A. H. POLLEN and H. F. LANDSTAD. Apparatus for determining and correcting course of aircraft and for bomb dropping. (131,706.)
13,852. H. E. BROADSMITH. Planes and controlling-surfaces. (131,720.
14,082. G. A. EAGLES. Flying-machines. (131,738.)
14,550. A. A. LESSTER. Connections for traction haulage of aeroplanes. (131,746.)
14,964. H. E. WIMPERIS. Apparatus for determining directions and speeds. (131,757.)
15,882. A. H. F. HERN. Jacking arrangements for aircraft, etc. (131,773.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xliii, xliv, xlv and xlvi).

NOTICE TO ADVERTISERS.

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C.2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates*:—

UNITED KINGDOM.	s.	d.	ABROAD.*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 „ „ ..	14	1	6 „ „ ..	16	6
12 „ „ ..	28	2	12 „ „ ..	33	0

These rates are subject to any alteration found necessary under war conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 562 (No. 40, Vol. XI.) OCTOBER 2, 1919 [Weekly. Price 6d. Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY W.C. 2

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**

These rates are subject to any alteration found necessary under war conditions

**European subscriptions must be remitted in British currency.*

THE RAILWAY STRIKE

Owing to the closing of station bookstalls and the difficulties of utilising the usual channels of distribution, those who find it impossible to obtain their usual copy of FLIGHT should remit 7*d.* direct to the Publisher, 36, Great Queen Street, Kingsway, London, W.C. 2, where arrangements for a reserve of copies have been made for this purpose.

CONTENTS

	PAGE
Editorial Comment	
The Railway Strike	1301
The Virtue of Agreements	1302
Road and Aerial Transport to Break the Strike	1302
The Use of the Boycott	1302
Charting the Air	1304
Against Trusts and Combines	1304
Flight—and the Men: Major Heckstall-Smith	1303
The London–Paris Air Services	1306
Impressions of "E.L.T.A."	1310
The Linke-Hofmann Giant Machines	1311
French Naval Airships	1315
The Farman "Goliath" Aerobus	1318
Lord Weir at Glasgow	1321
Airisms	1322
Personals	1325
Royal Air Force	1326
Aviation in France	1327
Side-Winds	1327

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Oct. 5 ...	**Aviation Meeting at Barcelona.**
Nov. ...	**Entrance Examination for R.A.F. College.**
Dec. 19 to ... Jan. 4, 1920.	**Paris Aero Show.**

EDITORIAL COMMENT

The Railway Strike

IT is in no whit an exaggeration to say that, as a consequence of the insane action of a handful of extremists, the country is faced with a crisis only second in magnitude and gravity to that of the War itself. We can ignore for the moment the more controversial aspects of the demands formulated by the railwaymen's leaders, no matter what there is to be said for their point of view in so far as concerns the precise terms of the wages adjustments they were demanding. On the other hand, there was the point of view of the taxpayer to be taken into account. The railways are working at a huge loss, and it is the unfortunate taxpayer who has had to make good that loss, partly by way of direct taxation to adjust the Government accounts with the railway companies and partly by way of increased fares and rates. Obviously there must arise points of friction when two such conflicting sets of interests are to be discussed, and we may even, for the sake of argument, allow that, later on, it might have been necessary for one side or the other to proceed to extreme action. But in this case there was not an atom of need for undue haste. The existing wages agreement has another three months to run, which is surely a long enough period for negotiation and possible settlement of the points at issue. It did not suit the book of Messrs. Thomas, Cramp, Smillie and Co. to negotiate. It must be perfectly obvious to any thinking person that these gentry had already determined to paralyse the whole of the railway communications of the country before they entered into conference with the Government. They had deliberately determined, for their own sinister ends, to make the attempt to starve the community into submission to their terms. In other words, they went into the conference room with the fixed resolution to apply to the country the most extreme methods of their pattern, the Hun—in some cases it might be true to say, their paymaster. They recked nothing of the disaster they would almost assuredly bring upon the trade of the country, striving, as it is, to recover from the effects of five years of devastating war. They cared nothing for the suffering they would cause to their millions of fellow workers, deprived of the means of getting to and from their labour, or for the privations to be borne by women and children already sufficiently debilitated by the sufferings of war. They had determined to declare war on the community, and they have so declared war. Well, the community has accepted the gage of battle, and we shall see the result. What that result will be we have not the remotest shadow of a doubt. This is a bad country to fight, as many have found to their costly undoing. When the British people have made up their minds to see a fight through to a finish—as they most certainly have in this case—they will see it through, and the leaders of the present strike may gather what comfort they can from the reflection that this country has never been beaten yet. Nor will it be beaten now. That an eightieth of the population—which is just about the proportion the N.U.R. membership bears to the total—should be able to hold up the rest and impose its will upon Government and people is not only unthinkable, it is absolutely grotesque, and that is what the railwaymen will, to their lasting sorrow, discover before many more days or weeks have passed.

◆ ◆ ◆

The Virtue of Agreements

The Prime Minister has quite rightly described the strike as the outcome of an "anarchist conspiracy." That has been queried by Mr. Thomas, who poses as the leader of the misguided strikers. Now, he cannot have it both ways. It was only in August last that this person stated in a public speech that he believed that, "to avoid bankruptcy and national ruin, *agreements must be kept* and production increased." The question must arise whether Mr. Thomas spoke with his tongue in his cheek, having knowledge even then of what was to happen, speaking thus to disguise his real thoughts, or whether he was at the time sincere and has since fallen under the evil influence of his associates. Of the two, we believe the former explanation to be nearer the mark. We cannot but recollect that after the last sectional railway strike a few months ago this leader resigned his secretaryship of the N.U.R., ostensibly in protest against the irresponsible use of the strike weapon. He withdrew his resignation after having received satisfactory assurances that these things should not happen again. Now, if he felt so strongly in these matters, it was certainly open to him to have resigned again sooner than to plunge the country into an unnecessary crisis such as exists now. The plain inference to be drawn is that all along he had determined on the action now taken, and deprecated the sectional strike as too precipitate and likely to inflame public opinion before he and his fellow conspirators were ready for the great *coup*.

There is virtue in agreements where both parties to them are prepared to respect their terms. Thomas, only a month ago, professed to be the champion of such respect, but we now find him taking the lead in their repudiation. We do not hesitate to say that such leaders, commanding as they do the obedience of tens of thousands of workers, should be dealt with to the utmost rigour of the law. Traitors they are every bit as much as the miserable wretches who sell information to the enemy in time of war, and a common fate should be their portion, as well as that of the foreign agitators who are known to stand behind most of the labour troubles which have been rife during and since the War.

◆ ◆ ◆

Road and Aerial Transport to Break the Strike

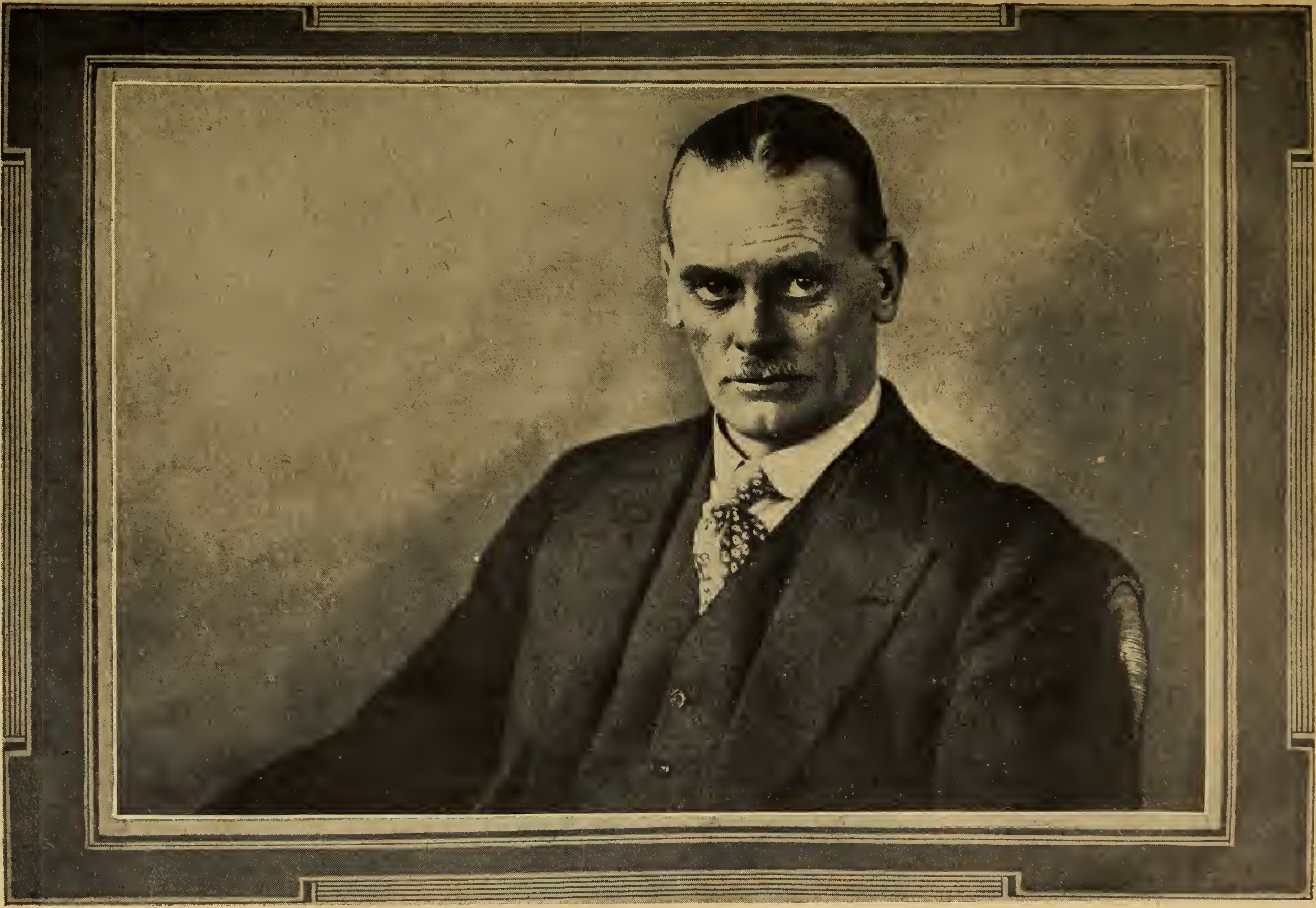
This is no ordinary dispute between employers and employed, but a deliberate attempt at revolution. We use the last word advisedly, because, if the strike should succeed, it means that for all time we are to have substituted for rule by the majority of the people the tyranny of a Terrorist junta which knows no law but its own desires. If that is not revolution, then we are at a loss to define the meaning of the word. This being so, the Government is most absolutely right in marshalling to the aid of the community the whole resources of the nation in order to break down this wholly iniquitous strike. No Government could fail to do this and live for a month. Fortunately, the Government has had prevision of events, and has been preparing for the emergency for months past, with the result that all the organisation for feeding the people and for keeping alive essential services is ready and to hand. Food distribution and the conveyance of troops and material are being undertaken by motor transport. Urgent mails, as well as a number of passenger services, are being taken by aeroplane, whereby the rigours of the situation are being vastly alleviated. It scarcely needs to be pointed out that were it not for the development in aerial and motor road transport brought about by the War, the fight between the forces of law and order and those of disruptive anarchy would be far more strenuous, and, truth to tell, would be waged with the initial advantage on the side of the extremists. Without adequate transport, the boast of the railway leaders that they would starve England to her knees in a week would have had a perilous amount of truth in it. As it is, these men have acted in apparent ignorance of the enormous potentialities now possessed by other forms of transport than the railways. By their aid we can carry on all the essentials of civilised life, and, if need be, can fight right through the winter. It is for the misleaders of their fellows to say whether they are as well situated. There is no need for them to answer the implied question—we know they are not, and that in a straight fight with the community they must lose—and, be it said, the sooner they admit the patent fact and return to sanity and work the less bitter will their reckoning be.

◆ ◆ ◆

The Use of the Boycott

The strikers have deliberately chosen to adopt the weapon of the boycott. They have a quarrel with the community, and they say, in effect, "Until you give us all we ask we shall boycott you. We refuse to carry you or your goods, and we shall do our utmost to prevent you from securing food to keep body and soul together." Very well. Then let the same methods be applied to themselves. That would drive home to them as nothing else would the fact that the general mass of public opinion is bitterly against their action. We shall probably be told that in tendering this advice we are embittering the strife. That we deny. The strife could

Flight—And the Men



Major S. HECKSTALL-SMITH, F.R.Aë.S., General Manager of the Nieuport and General Aircraft Co., Ltd.

"Flight" Copyright

hardly be more bitter than it is, and all we are advocating is that the general community should meet like with like. We had to do a great many things we had not thought possible when we were engaged in a life-and-death struggle with the Huns across the North Sea. Can we afford to boggle about methods when we are faced by the Prussianism of our own Huns? We are out to win, as we were in the War, and all and every method should be employed to make the victory of law over anarchy as swift and decisive as possible. To prolong the struggle by the use of kid-glove methods is the merest foolishness, which will recoil, in the shape of additional suffering and privation, on the heads of the innocent. If there is to be any suffering, then let the worst of it fall on those who have brought about the present state of affairs.

◆ ◆ ◆

Charting the Air

An international meteorological congress began its sittings in Paris on Tuesday last, at the invitation of the French Government. Its main duties, it is understood, were to be in the consideration of ways and means of charting the upper air in order to place aerial navigation in a position as nearly as possible to the present safety of the seas. Obviously, there are fundamental differences between the two, and it is quite impossible that we shall ever be able to obtain the same exact knowledge of air currents and the hidden dangers of the air generally as we have of those of the Seven Seas. In the one case we are dealing with a set of conditions which are more or less fixed. Ocean currents follow well-defined paths, and move, generally speaking, at a uniform and known rate. They are subject, of course, to certain variations, but these are quite relatively small, and for all practical purposes scarcely matter. In the air, on the other hand, these conditions do not obtain to anything like the same extent. True, the main air currents in high latitudes have a general direction which is more or less constant. That is to say, they have a general westerly direction, but this is subject at all times to change and even to complete reversal over greater or less periods of time. For instance, during the winter months in the North Atlantic the navigator should be able to anticipate with reasonable certainty a prevailing strong westerly wind, but it is not at all unusual for the prevailing winds to be dead easterly for a fortnight at a time. And so it is all over the world. The winds follow no set direction which can be anticipated with certainty. Nor are they directionally similar at varying altitudes. But while, as we have said, the conditions for investigation differ materially from the ocean currents, there is nevertheless a great deal of work which has to be done in the interests of aerial navigation. At the present moment the unknown dangers of the air on long-distance voyages form a serious barrier to aerial navigation as a commercial enterprise. The upper air requires exploration. This to some extent can be carried out from the surface, but in order to describe the daily happenings in the air and the effect they have on aircraft, technical experts must be sent into the air to examine its conditions at first hand. This must be done not in one locality or along a single air route, but all over the world wherever it is contemplated that now or later on it will be requisite to run aerial services. Obviously, this is a stupendous task, and one which cannot be undertaken by any single nation as its own proper cost and outlay. It is a matter of combination of resources, and it is for the Conference of Meteorologists now sitting to formulate ideas and schemes for submission to the various States composing the League of Nations, in order that the work of charting the air, so far as it is humanly possible to carry it out, may be adequately divided according to the varying aerial interests of the countries concerned.

◆ ◆ ◆

Against Trusts and Combines

It is with the greatest satisfaction the community will have read that a part of the Government programme for the autumn session is to devise ways and means of dealing with "trusts, combines and harmful trade combinations." The intention is expressed to collect fuller statistics of national trade, prices, costs, profits, etc., presumably with a view to legislating against the wholly immoral trust system. The Profiteering Act is so much "eye-wash." Public opinion had become so outraged by the wicked exploitation of the people that something had to be done to allay the grave unrest resulting, and that something was the Profiteering Act, which is utterly useless as a real check on the practices it is ostensibly designed to stop. Its great weakness is that it catches the small fish and allows the bigger ones to get away with virtual impunity, in spite of all that may be said to the contrary. So far as we can see, the only people it gets at are the retailers, who may not charge more for commodities than a certain "controlled" price, but it fails in practice to get at the manufacturer or the middleman. Even if it did, there would still be room for profiteering in the raw materials, which would be extremely difficult to get at. In fact, the Profiteering Act seems to be useful only as an earnest that there is a degree of sincerity in the asseverations of the Government that they are really desirous of putting a stop to the exploitation of the public by the profiteer.

There will be no real relief until trusts and combinations for the inflation of prices are made illegal and their establishment punished by imprisonment. Monetary penalties are no good at all, since they would be paid by the victims of the trusts, whereas the certain prospect of a long term of gaol would give pause to unprincipled financiers and traders who might contemplate the driving of the proverbial coach-and-four through the Anti-Trust law. Such trade combinations as we have in mind are illegal in America, which suffered for long enough under their depredations before anti-trust legislation was passed. Why, then, should we not take a leaf out of the book of the United States and make them entirely illegal here? We sincerely trust that the Government have some such course in mind.

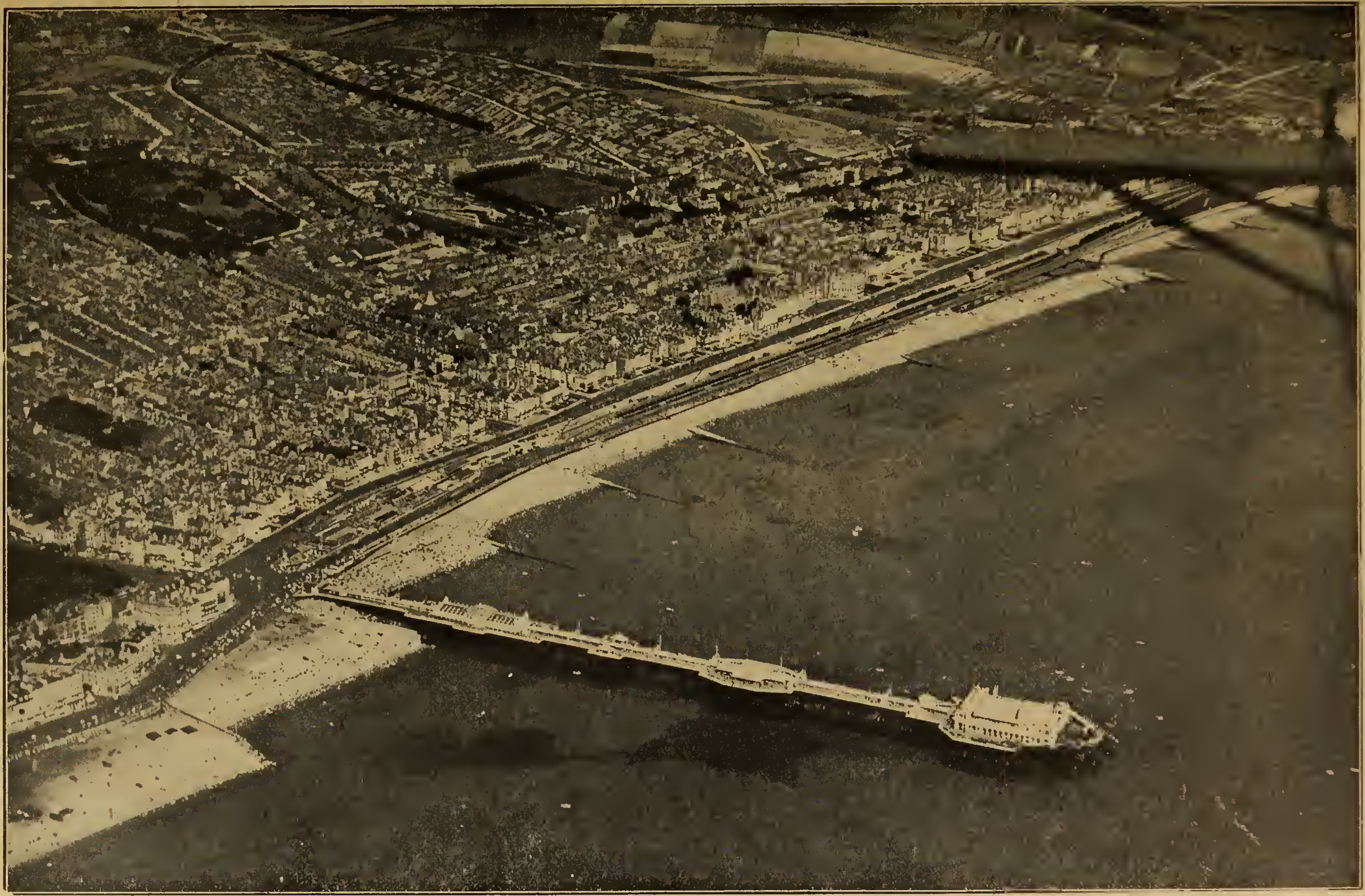
◇ ◇ ◇ ◇

R.A.F. Training Centres

It is understood that the R.A.F. stations at Halton Park and Uxbridge, of which the freehold has been purchased by the Government and the money that has been sunk in buildings is therefore a permanent asset to the State, are to be continued.

Halton Park, where the workshops are completed and paid for, will be the depot and technical training centre of the Royal Air Force in future for all ranks, and Uxbridge is to be the headquarters of the Southern Area, the School of Gunnery, and a concentration of various units which are at present distributed throughout the country.

The Camera and the 'Plane.



Brighton and the Pier as seen from an Avro passenger machine.

"Flight" Copyright.

THE "ARRIVAL" OF THE REGULAR AIR SERVICE

Among the main criticisms levelled against commercial aviation, perhaps it may even be considered the chief one, is that of unreliability. There are those who hold the view that the aeroplane, although admitted to be the fastest mode of transport, is not yet, and, they say, probably never will be, a business man's proposition, owing to the uncertainty of running. In the first place, aero engines are liable to breakdowns, which result in forced landings, sometimes resulting in crashes, often in landings far away from other means of locomotion, and always in delay to the passengers and goods carried. The second objection is that bad weather, chiefly fog, prevents flying altogether. On the face of it, both objections sound plausible. Aero engines do break down occasionally, and very dense fog does prevent flying—sometimes. We agree that these two factors do impose obstacles in the progress of commercial aviation, but we are sufficiently optimistic to think that both will be overcome in time. Fortunately, there are others besides ourselves who are of the same opinion and, what is of vastly more importance, have the courage of their convictions to the extent of setting out to prove that even at the present stage of development a commercial air service can be run, not intermittingly as conditions permit, but *regularly*. This, to our mind, is the all-important feature of the London-Paris air service, which has now been in operation for some considerable time. As already pointed out, few people deny the advantage which the aeroplane has over other means of locomotion in point of speed; the thing that is doubted is its reliability, and it is just by the proof which they furnish of very good reliability that these services are doing a tremendous amount of good in the cause of commercial aviation. Once the fact is clearly established that aviation is *not* unreliable, the advantages of aerial transport, be it of passengers, mails, or even certain classes of goods, are so obvious that they must be patent to all.

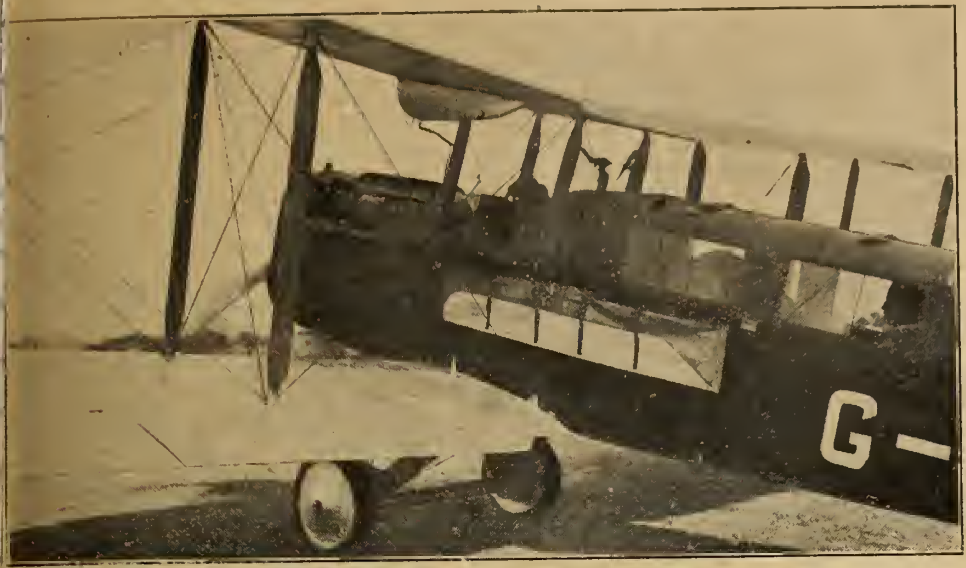
"Flight" Copyright

THE LONDON–PARIS AIR SERVICE: (1) Mr. M. D. Manton discussing matters with Capt. Baylis as the latter is leaving for Paris on a de H. (Airco) 4A. (2) Lieut. Eric Lawford has just arrived with the mail from Paris in a de H. (Airco) 4A. (3) The Airco 4A just before leaving for Paris.

In the case of the London-Paris service run by Aircraft Transport and Travel, Ltd., this service now extends over more than a month, and as pointed out last week, out of 56 possible flights 54 were carried out. In the case of the Handley Page service also, good regularity has been one of the features, and last week this firm's services were extended to include Brussels, while the London-Paris service is increased by a batch of French Breguet biplanes alternating with the Handley Pages, the former leaving London for Paris on Mondays, Wednesdays, and Fridays, while the Handley Pages leave London on Tuesdays, Thursdays, and Saturdays. We understand that already these services are being increased, while during the present abnormal conditions there is no doubt that others will be established. After over a month's proof of regular running we therefore feel justified in claiming that *regular* air transport has "arrived," in other words, that it has been proved to be on a level with other means of transport as regards reliability. The whole question is chiefly one of organisation, and as experience accumulates the organisation of air services will become better and better. The start already made, although small compared with what we shall see in the future, is, we think, distinctly promising, and those responsible for it deserve the greatest credit and support.

As the first regular air services to places outside the Kingdom, the Holt Thomas and Handley Page undertakings are by way of being historic events, and hence a few notes regarding the machines employed may not be without interest.

Of the Airco machines used on the London-Paris service the three most important types are the de H. 4A, the de H. 16, and the de H. 9. As the accompany-



"Flight" Copyright.

Hounslow–Switzerland: Mr. Stewart Wortley, who is the Swiss representative of Aircraft Transport and Travel, Ltd., about to leave for Switzerland.

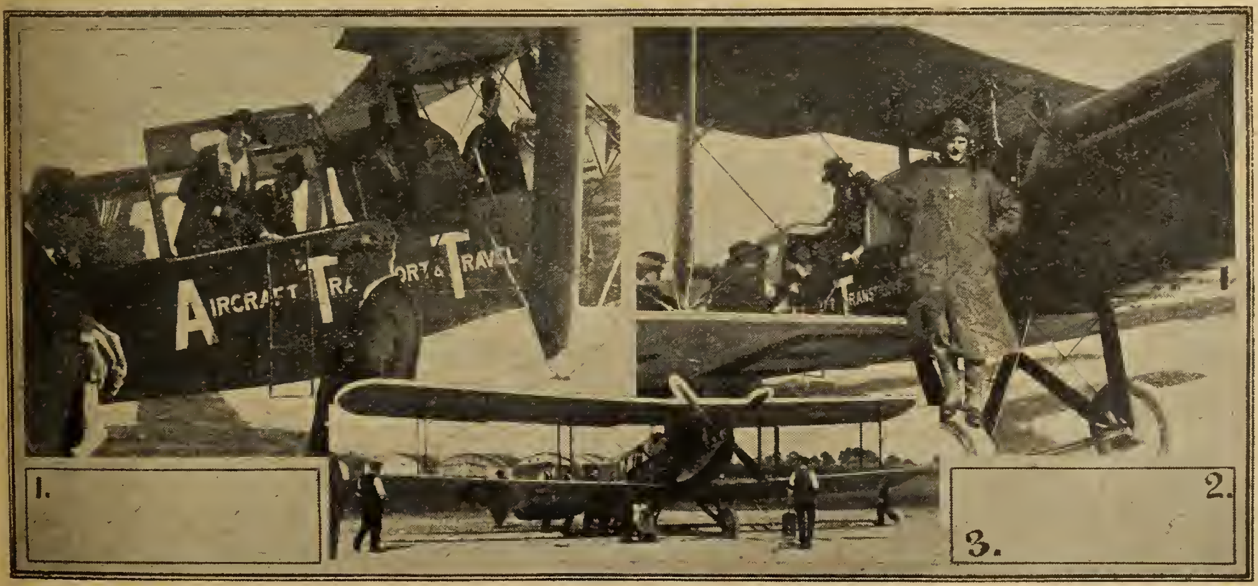
ing illustrations will show, the 4A and the 16 are developments of the original Airco 4 and Airco 9A respectively.

The de H. (Airco) 4A

has been altered for passenger-carrying by doing away with the stagger, and by raising the deck of the *fuselage* to form a roof over the cabin. The pilot occupies his original position between the planes, while the cabin is well aft, clear of the trailing edge of the wings. The two passengers face one another, the front one facing aft. Entrance to the cabin is obtained through the roof, which is hinged to fold back, and a short ladder of tubing leads up to the cabin. The engine is a Rolls-Royce "Eagle," mounted behind a nose radiator. As fitted up for the London-Paris service, the D.H.4A has a weight of 2,600 lbs. empty but including water, and with pilot, two passengers, and fuel for a 3-hours' flight, the weight "all up" is about 3,720 lbs. This gives a loading of about 8.6 lbs. per sq. ft., so that the machine does not land at an unusually high speed, although the loading is by no means light. However, at the end of the journey the fuel will have been used up and the loading be somewhat heavier.

The D.H. (Airco) 16

is a development of the original D.H. 9A. This machine also is fitted with a Rolls-Royce "Eagle," but is of considerably greater area and carries four passengers in addition to the pilot. One of these machines was exhibited at the E.L.T.A. show at Amsterdam, when we referred to it briefly. As in the Airco 4A the pilot sits between the planes, which are, however, staggered and project, in the case of the lower one, some little distance along the sides of the cabin. In this, which is formed similarly to that of 4A, are housed four passengers. The seats are slightly staggered in relation to each other, the first passenger facing aft, the second forward, the third aft, and the fourth forward. The weight of this machine is approximately 3,000 lbs. empty but



"Flight" Copyright.

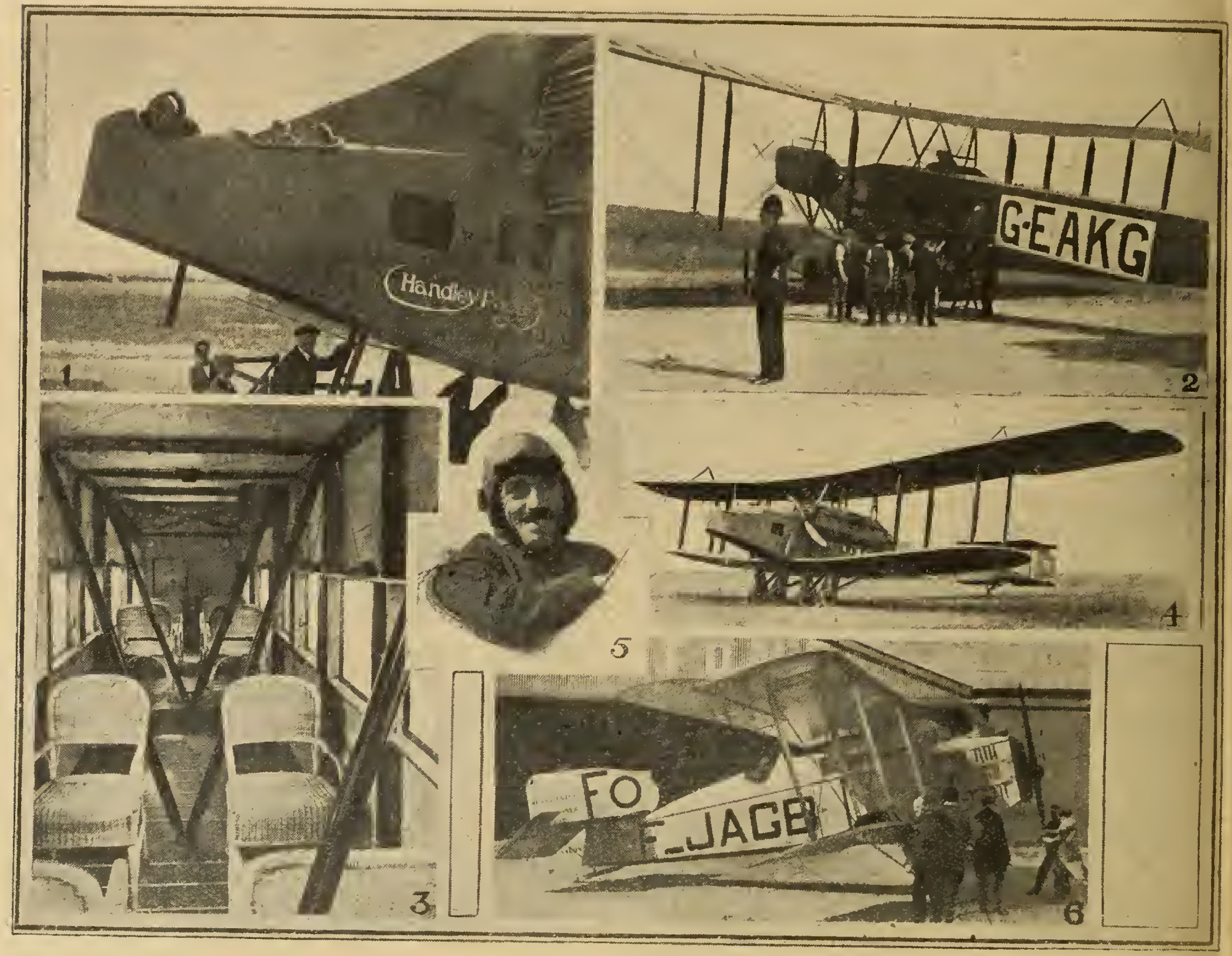
THE LONDON-PARIS AIR SERVICE: (1) A de H. (Airco) 16 arrives from Paris, carrying, among others, Miss Edie Thomas, the American concert singer. (2) Lieut. H. Shaw descending from his Airco 16 after piloting a load of passengers safely across from Paris. (3) One of the Airco 16 machines used on the London-Paris service.

including water, while with full load of pilot, 4 passengers, and fuel for about 3 hours, the total weight is about 4,400 lbs., or 10 lbs. per sq. ft.

In addition to the 4A and 16, a certain number of D.H.9's are also used. These are of the open type, and in the main differ from the original D.H.9 in that three seats are fitted instead of two. The engines fitted are Siddeley "Pumas."

The Handley Page Machines

Both the London-Paris and the London-Brussels machines used by the Handley Page Company are of the O0/400 type, modified, of course, to accommodate passengers instead of the "eggs" which this type used to lay on the Huns during the War. As many as 18 people can be carried, 14 inside the cabin and 4 outside. As used for the Paris and Brussels services, however, 10 passengers are carried with their luggage, and the machines have a further disposable lift of 500 lbs., which may take the form of mail, general freight, etc. The passengers' cabin is comfortably fitted out, as shown in one of the accompanying photographs, wicker seats being provided along each side. Through windows in the side of the cabin an excellent view is obtained of the country over which the machine is passing. The two Rolls-Royce engines are placed between the planes, and drive each a tractor airscrew.

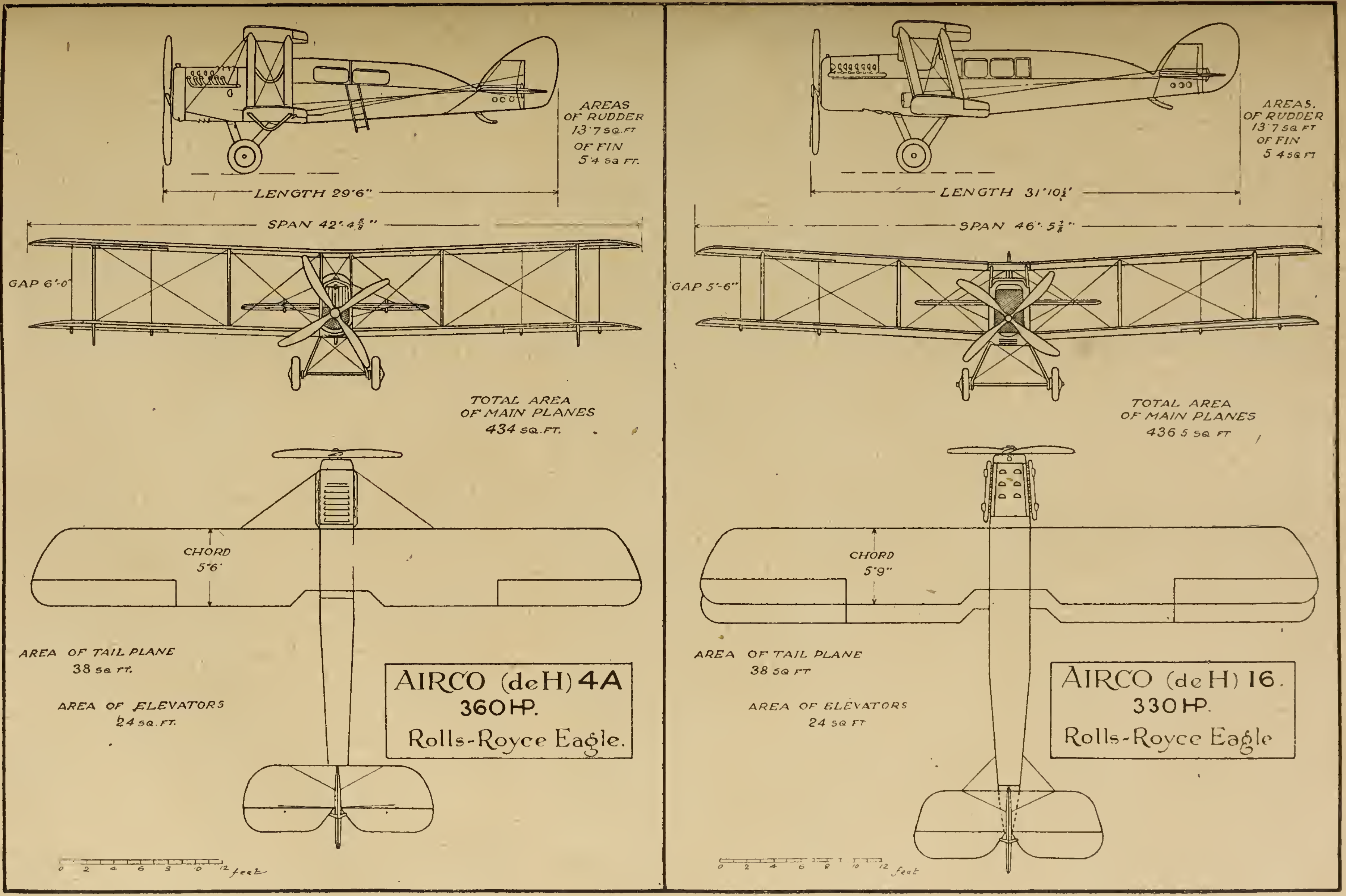


"Flight" Copyright

LONDON–PARIS AND LONDON–BRUSSELS: The Handley Page firm are now running two continental air services, one to Paris and one to Brussels. In connection with the Paris service Breguet biplanes now alternate with the Handley Pages, the British machines leaving London on Tuesday, Thursday, and Saturday, the French machines on Monday, Wednesday, and Friday. The Paris–London service is in the reverse order. Our photographs show: (1) Passengers in the nose of the Handley Page which opened the London–Brussels air service on Wednesday of last week, piloted by Capt. Shakespear. (2) Passengers entering the Handley Page. (3) The interior of the Handley Page, which carries 10 passengers and 500 lbs. of general freight. (4) The Handley Page biplane, two Rolls-Royce engines, used on the London–Paris and London–Brussels routes. (5) M. Patin, the pilot of one of the Breguet biplanes. (6) One of the Breguet biplanes alternating with the Handley Pages on the London-Paris service.

The Breguet Biplane

As already mentioned, the service has now been extended by the addition of a batch of French Breguet biplanes, which alternate with the Handley Pages on the London-Paris route. The Breguet biplanes used are of the single-engine tractor type, with Renault water-cooled engines. As distinct from the Airco machines, the pilot is placed far back in the *fuselage*, behind the passengers' cabin. This is entered through a door in the starboard side, and comfortable seats are provided inside. Although possibly not quite so good as that obtainable in the Aircos, the view from the cabin of the Breguet is by no means bad, in spite of the placing of the cabin farther forward in relation to the wings. Generally speaking, the Breguet may be said to be similar to the machines which did such good work in the French Air Service during the War.



THE D.H. (AIRCO) 4A AND 16 MACHINES USED ON THE LONDON–PARIS ROUTE: Plan, side and front elevations to scale.

IMPRESSIONS OF "E.L.T.A."

By Mr. R. KENWORTHY, The Blackburn Pilot

No doubt many of our readers will be interested to hear the views, on the "Elta," of Mr. R. Kenworthy, the well-known pilot of Blackburn machines, who is just back after having been in Holland for over six weeks.

As regards the Dutch themselves, his impressions were very favourable. Of course, Holland has been out of aviation to a large extent during the War, and one must allow something for this. But even so, their enthusiasm for the Elta was enormous. All classes patronised the show, and the joy flips to an extent were fully up to the most sanguine hopes. The millionth visitor passed the turnstile a few hours before closing time. The Dutch are very good sports, and very open-handed, though Hinchcliffe's sad accident was resented rather much. In fact, the populace as a whole were very much like an English crowd at a 1913 meeting in this country.

The Dutch Court and Government also showed great interest. Both the Queen and Prince Consort visited the show, and the Services were very much in evidence. Kenworthy had the honour of giving the Secretary of State for War his very first joy ride—incidentally the only one he had time to take—and the Minister was very much pleased with it.

As regards Dutch aviation, this is very little in advance of 1913 practice. Spyker's, the big Amsterdam engineers, seem to be the only firm seriously in the field now, though one or two minor firms are alleged to have built copy machines for the Huns while the War was on. Spyker's are taking the job seriously, but show every sign of having been cut off from progress during the last five years.

The show itself was of a truly international character. France was represented by the Caudron, Breguet, Farman and twin Farman; the last being a fast machine for its size, but not capable of taking as good a percentage of useful load as similar English types. On behalf of Italy, the Caproni, S.V.A, and Fiat were there. Kenworthy speaks highly of all these as being good workmanlike jobs. Fokker turned out, but was not a great success—apart from the natural coolness with which many regarded him, the actual impression made by his exhibit was that it showed very little advance on the mid-War model.

England was well represented, though one or two prominent firms (*e.g.*, Sopwith) made no appearance. The Avro machines had bad luck, especially in Hinchcliffe's accident, mainly owing to engine trouble. Aircraft put up a good show, though the D.H. 10 was not at all happy on the local soil—a trouble shared by the Vimy. In fact, the aerodrome was, perhaps, the feature which hampered flying most. The Elta Committee had taken enormous trouble, but with the best efforts it still remained soft and sandy. This is a point which may have a deal of effect on Dutch aviation, as the swampiness of the country makes the provision of decent grounds very difficult—the natural result would be to give the seaplane a distinct advantage for commercial use.

The Blackburn record at Amsterdam has been satisfactory. Three Kangaroos have been out, one for six weeks, one for a fortnight, and the third for a short week, piloted respectively by Kenworthy, Woolley and Veale. They had no accident either to machines or passengers, and carried 1,400 paying passengers (roughly 40 per cent. of the total paying passengers for the 32 machines flying there), as well as numerous complementary passengers. Their record day was 90, of whom 73 were revenue passengers; this was a record for the whole show. Everyone liked the machine, and many had repetition flights. Further, while up, they showed absolute lack of nervousness; they stood up, tried to talk up wind, hung overboard to a ghastly extent. On one occasion Veale found the whole crowd standing up, so he locked the controls, turned round and had a good chat. Perhaps Veale's testimony to the machine is most valuable, because until the day before he started he had never been in a Kangaroo, and was by conviction a small-machine man. That day he took a short run round, and the next day put off from Brough, with Mrs. Veale, luggage, mechanics, etc. Today nobody can speak too well of the machine to Veale.

In all, Kenworthy covered 8,000 miles, and would have done a good deal more had not the aerodrome sand necessitated a five days' stop owing to the covering of the propellers suffering from attrition. He regarded his run home as one of the best performances—3 hours from the Elta to Lympne, and two hours from Hounslow to Brough, with a consumption of only 25 galls. per hour for the two Eagles.

The Blackburn firm report that financially they are pleased with the expedition. The receipts and expenses on the first two machines showed such a favourable balance that they judged it worth while for the third machine to go out and back for a bare week's work—and it was worth while, even after allowing an ample overhead figure. Kenworthy says that he thinks they were the only people to make an actual profit all in, but, of course, this is only an estimate.

* * *

Cross-Channel Mails, etc.

A start was made on September 29 with the air transport of mails to the Continent. Those for Paris were carried in Airco machines, and Messrs. Handley Page took the official mails to Belgium and Holland.

On Monday 12 bags left for Paris and 45 bags for Belgium and Holland *via* Brussels, while yesterday 31 bags were dispatched to Brussels on their way to Norway and Sweden.

Both the Airco and the H.P. services to the Continent have been doubled this week.

The records of the Customs officials at Hounslow show that since August 1, when the service started, up to midday Tuesday 111 machines had left Hounslow for the Continent, among the points to be visited being Paris, Brussels, Amsterdam, Rome and Madrid, while there had been 81 arrivals.

A Grahame White nine-seater aeroplane left Hendon with two lady passengers and a large amount of luggage. Their destination was Havre, whence they will embark for America.

Parcels for Continental Plane Post

In response to requests from a number of our readers we give the following information relating to the collection of parcels, etc., for transportation by the cross-Channel air services:—

The Handley-Page air service collects from the following addresses at 11.15 a.m. for the service starting from Hounslow at 12 noon:—

Messrs. Leopold Walford, 29, Great St. Helen's, E.C.
The Continental Daily Parcels Co., 53, Gracechurch Street, E.C.
Messrs. Carter, Paterson's offices at 128, Goswell Road, E.C., and Market Place, Oxford Street, W.
The Lep Transport and Depository, Ltd., Castle Street, Long Acre, W.C.
The American Express Co., 6, Haymarket, S.W., and 64, Queen Street, E.C.
Messrs. Lavington Brothers, 68, Old Bailey, E.C.

The Aircraft Transport and Travel (Ltd.), collect at 10.30 a.m. from the following addresses for the service starting from Hounslow at 12.30 p.m.:—

The American Express Co., 6, Haymarket, S.W., and 84, Queen Street, E.C.
Messrs. Carter, Paterson's offices at 6, Cannon Street, E.C., and at Maddox Street, Oxford Street, W.
Messrs. Hernu, Peron and Co., Ltd., 98, Queen Victoria Street, E.C.
The Lep Transport and Depository, Ltd., Castle Street, Long Acre, W.C.

Consignments should be handed in at 10.30 a.m.

Charting the Air

The five-day conference of meteorologists of the British Dominions held last week should have far-reaching results. Sir Napier Shaw, F.R.S., Director of the Meteorological Office, and acting Controller of the Meteorological Service of the Air Ministry, presided throughout.

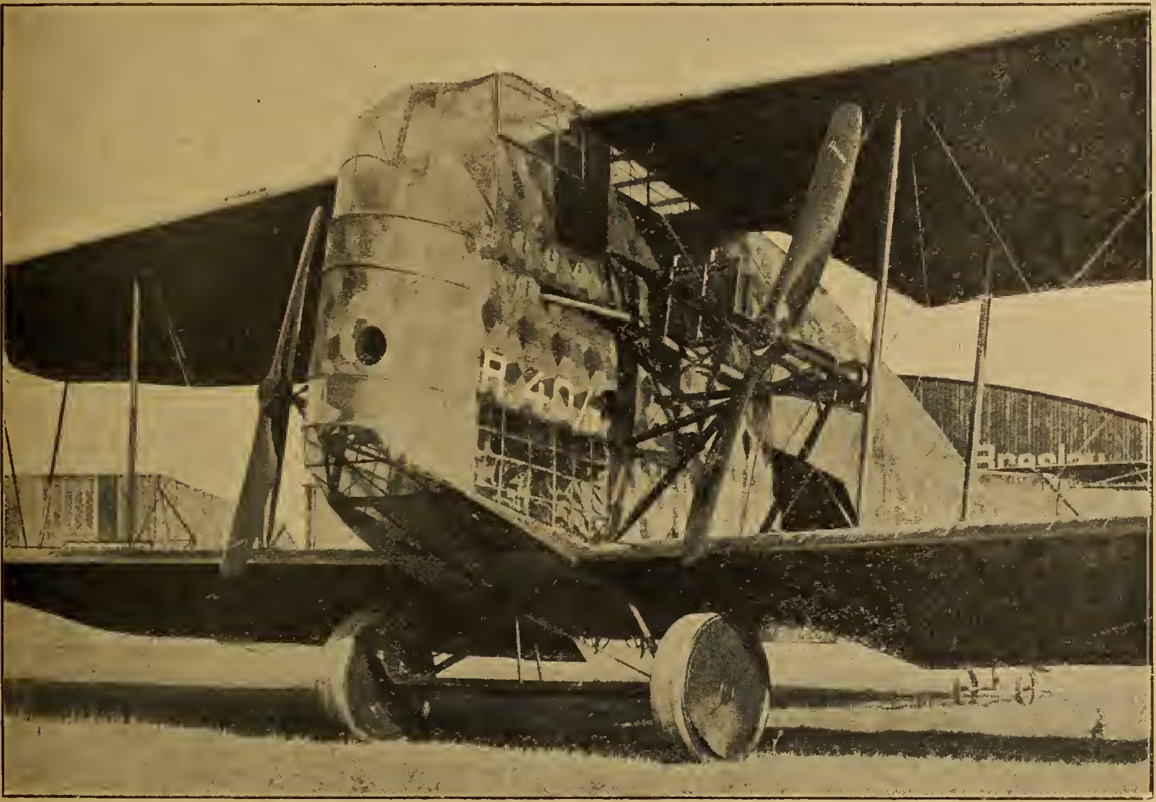
The conference was arranged in order to consider the problems that will come before the International Conference in Paris. Representatives were present from all the self-governing Dominions except Newfoundland, and from one Crown Colony—Ceylon.

Among the subjects which have been considered are the proposed air routes from the Cape to Cairo and from Cairo to Karachi, and the opinion was expressed that the routes would be practicable from the weather standpoint.

THE LINKE-HOFMANN GIANT MACHINES

Of the firms that have designed and constructed large, multi-engined aeroplanes during the War, special interest attaches to those created by the Linke-Hofmann Works, Breslau, not only on account of their size, but also because their designer has evidently attempted to get away from the stereotyped design in which a multiplicity of engines are simply dumped on the wings and made to drive, direct, tractor or pusher airscrews. That placing the engines on the wings in this manner is a short cut to high-power propulsion is admitted, but it does not by any means follow that this is the type of multi-engined machine that will survive. It is therefore of interest to examine what others have done in their attempts to effect improvements. In our issue of last week we published particulars of some German D.F.W. multi-engined machines in which the engines were placed in the *fuselage* and which had shaft and bevel drives to airscrews placed on the wings. The following notes, which are translated from a descriptive article in *Flugsport*, deal with a similar subject, and show how another firm has tackled the problem in a somewhat different way.

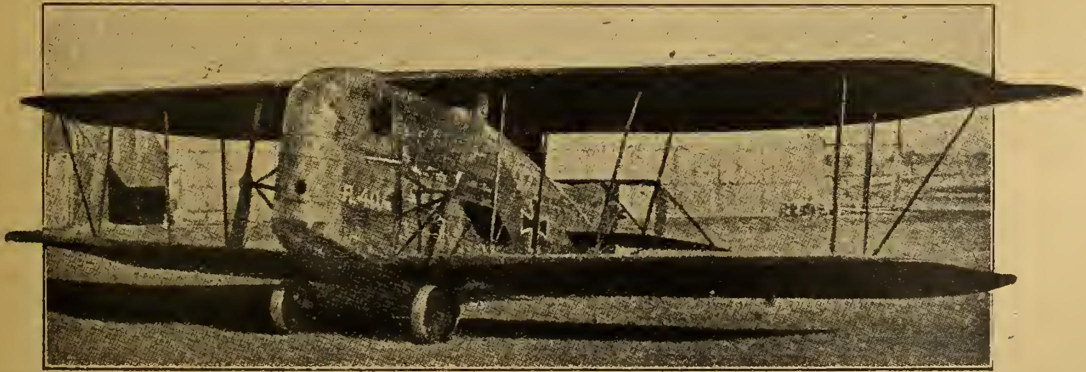
"The Linke-Hofmann Works, of Breslau, took up the design and construction of Giant aeroplanes (Riesenflugzeuge) under the direction of their chief engineer Paul Stumpf, who was formerly chief engineer to the Allgemeine Elektricitäts Gesellschaft (A.E.G.). Two types were built, the R I and the R II, both of which had the engines placed in the *fuselage*.



THE LINKE-HOFMANN R 1: View of the cabin and airscrew mounting.

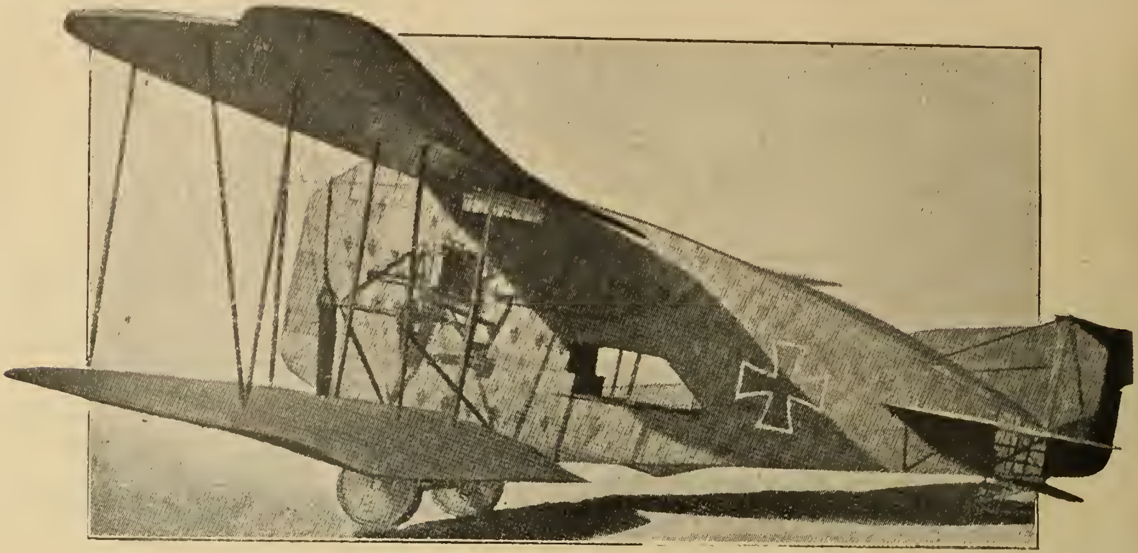
The Linke-Hofmann. Type R I.

"This machine, which is shown in the accompanying photographs, had two tractor airscrews driven by four Mercedes engines of 260 h.p. each, giving a total

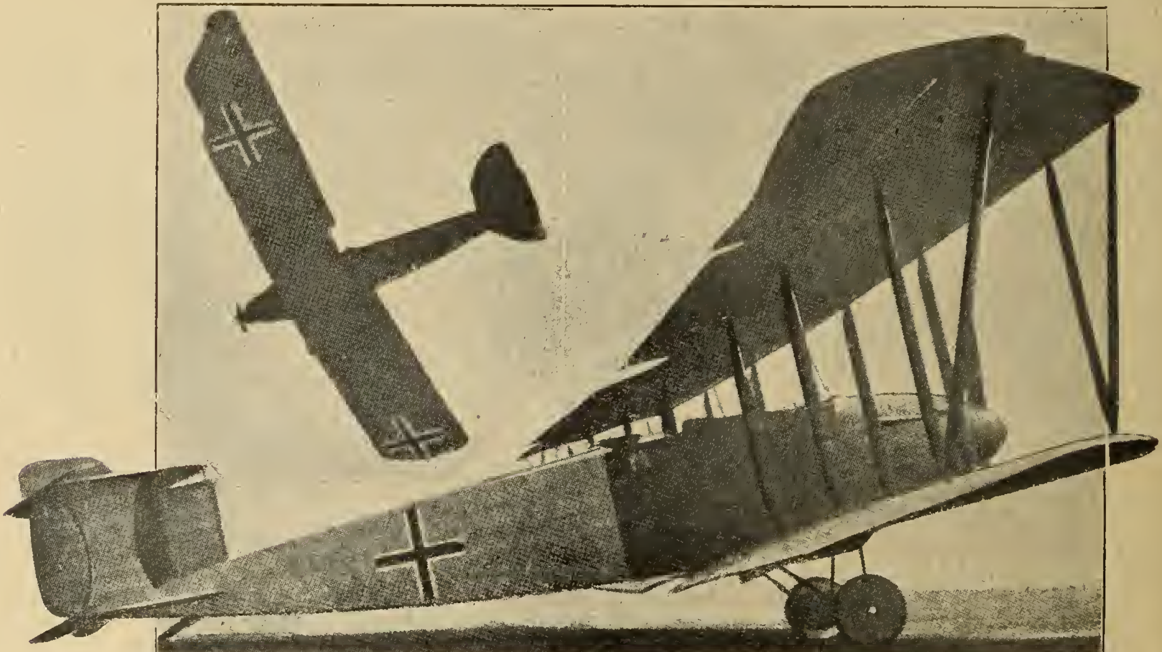


THE LINKE-HOFMANN R 1: Three-quarter front view.

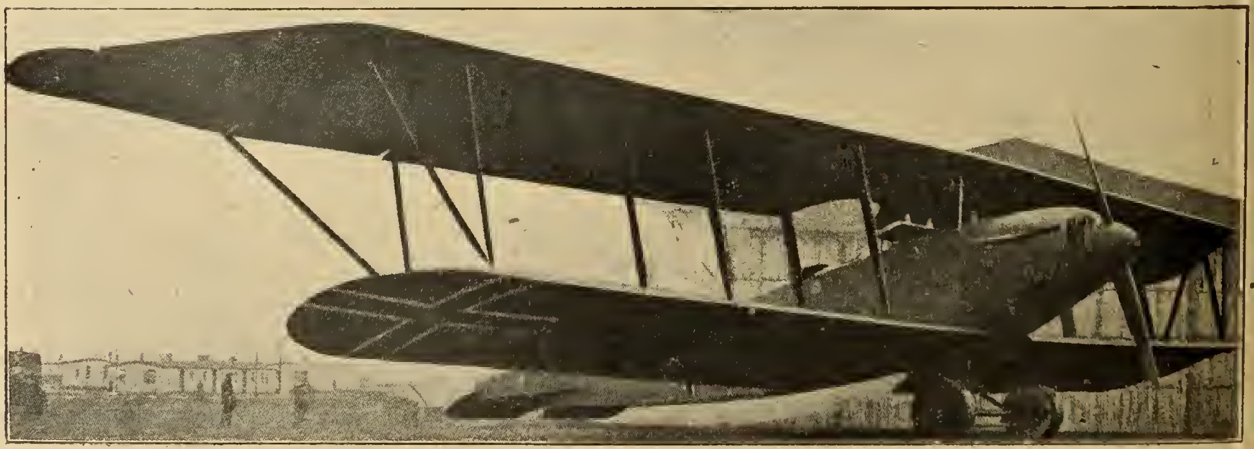
of 1,040 h.p. The dimensions and weights of the machine were as follows :—Span, 109 ft. 6 in., length o.a. 51 ft. 6 in. ; chord, upper plane, 16 ft. 6 in. ; chord, lower plane, 15 ft. 6 in. ; height, 22 ft. ; wing area,



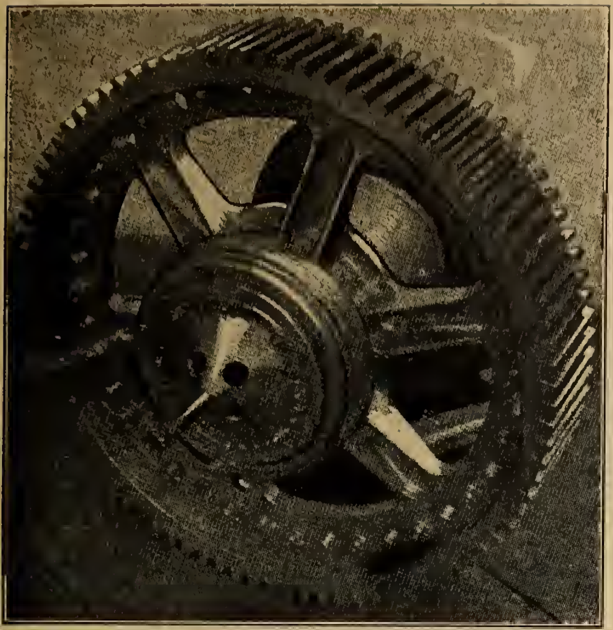
THE LINKE-HOFMANN R I : Three-quarter rear view.



THE LINKE-HOFMANN R II : Three-quarter rear view. Inset: The machine in flight.



THE LINKE-HOFMANN R II : Three-quarter front view.



THE LINKE-HOFMANN R II: The central spur wheel drive.

2,850 sq. ft.; weight empty, 17,600 lb.; useful load, 7,000 lb., including fuel for 5 hours' flight. The machine attained a speed of 80 m.p.h. and with a useful load of 7,000 lb. climbed to 9,900 ft. in 2 hours. The slow glide in which the machine landed was very peculiar. As the pilot's seat was placed very high, it required a good deal of practice to learn to land the machine successfully. The rudder and elevator control was satisfactory, but the machine was somewhat sluggish on the *ailerons*. When taxying on the ground she answered the rudder very well.

" The effort required on the part of the pilot for rudder, elevator, and *aileron* control was little greater than in the case of a small machine, and the R 1 was flown often by only one pilot. The very deep *fuselage* did not appear to have any adverse effect on either the flying or the steering of the machine, On the contrary, the machine was found to have much of the stability of the old Tauben. This was thoroughly tested during an hour's flight in a wind of 50 ft. per second.

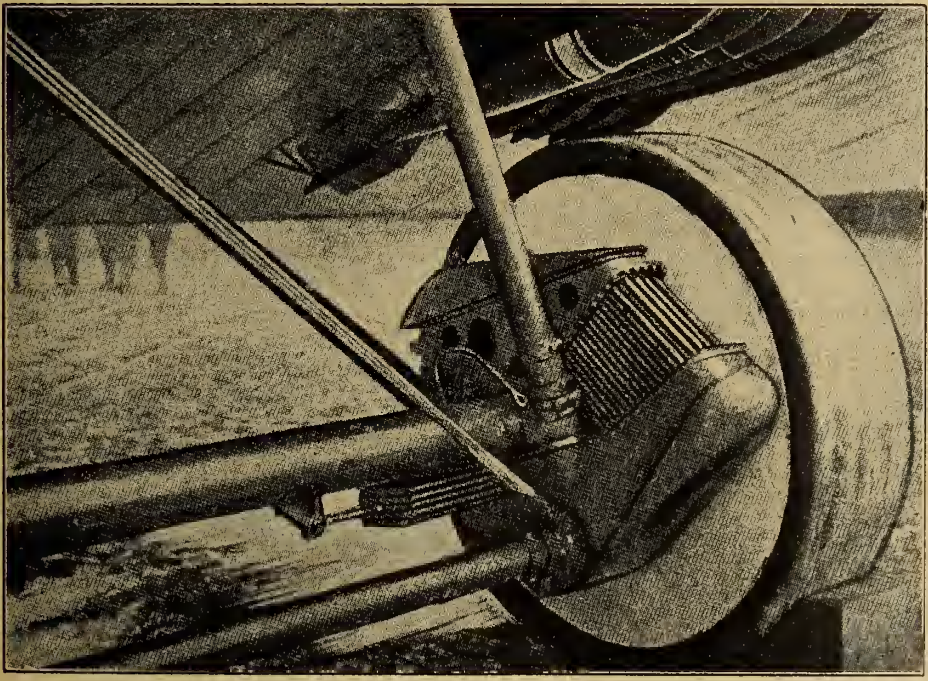
" As a result of model tests at the Göttingen laboratory, the *fuselage* was carried right up to the top plane. The increased lift resistance ratio of the complete machine which the model tests appeared to promise as a result of this deep body did not, unfortunately, materialise in the actual machine.

" The ventilation of the engine room was very good, and on account of the accessibility of the engines during flight, minor defects could easily be remedied. The undercarriage was of the same simple Vee type as that of smaller machines, and was found to be very light and at the same time strong. During a series of test flights, including a number of heavy landings, any minor defects in it were discovered and put right. The wheels were of iron, and were fitted with solid tyres.

" The experience obtained with the Linke-Hofmann R I was taken advantage of in the design of

The Linke-Hofmann, R II,

the chief feature of which was a single tractor airscrew, driven by the four 260 h.p. Mercedes engines. The main figures relating to this machine are as follows:—Span, 138 ft. 6 in.; length, 67 ft.; height, 23 ft. 6 in.; wing area, 3,440 sq. ft.; weight empty, 17,600 lb.; useful load, 9,000 lb., including fuel for 7 hours' flight. The speed was the same as that of R I, *i.e.*, 80 m.p.h.; with a useful load of 9,000 lb. the climb was 11,550 ft. in 2 hours. The airscrew, which was of 22 ft. 8 in. diameter, was driven by four Mercedes engines through a central drive. Even with only two engines running the machine flew well. For long-distance flying, by doing away with the

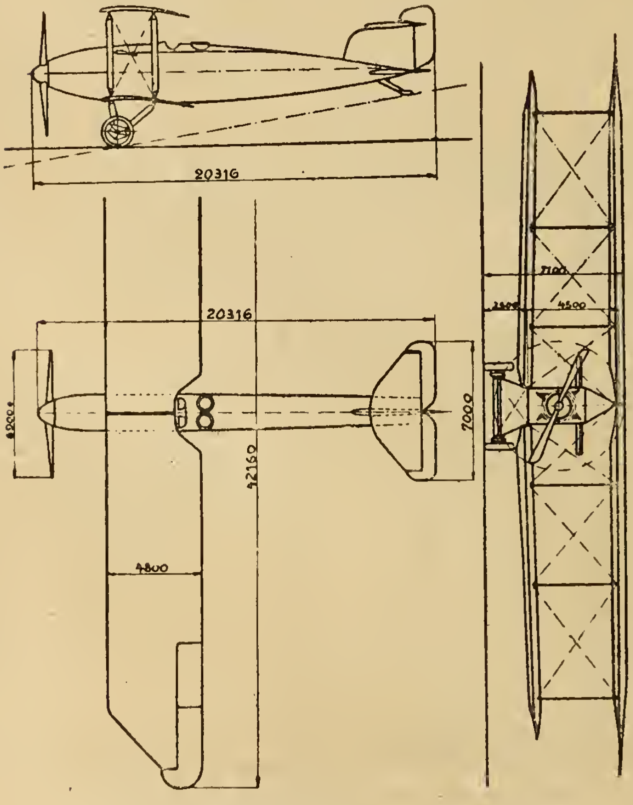


The Linke-Hofmann R II: View of the undercarriage, with shock-absorbers.

military loads, and with the following crew, the range can be greatly increased ; 2 pilots and luggage 440 lb., 2 engineers with luggage 440 lb. ; 2 navigators with luggage 440 lb. ; instruments and wireless 660 lb. ; total, 1,980 lb. The machine is still capable of carrying another 13,400 lb. of fuel and oil (probably by sacrificing performance during the earlier part of the flight—Editor, FLIGHT), which is sufficient for a flight of 30 hours' duration at a cruising speed of 74 m.p.h., which would give it a range of 2,225 miles."

Flugsport then gives a glowing account of the ease with which the Linke-Hofmann R II starts and lands, these operations being, it is stated, quite unlike those of ordinary large machines and more like the handling of an ordinary two-seater. It is also pointed out that during flight there is a marked absence of vibration. All control organs are running in ball bearings so that they are very easy for the pilot to handle It is said that on a cold day in January the machine was cruising round and round over the aerodrome in order not to lose itself, when one pilot put both his hands into his fur-lined boots while the other put his left hand into his pocket, the machine being steered in a circle by means of one hand. The view from the pilot's seat is said to be exceptionally good, owing to the high position, and the machine is very easy to land, partly on account of the good view, and partly because of the excellent gliding angle of the machine.

" The passengers," *Flugsport* continues, " are accommodated in an enclosed cabin behind and underneath the pilots' cockpit, this position being one of the safest in the whole machine in case of a crash. All the main weights being in front of the cabin, the safety of the passengers is assured, and in the case of the machine turning over on landing, or striking with a wing tip first, there are no heavy engines or tanks to fall on them. At present accommodation is being provided for 12 passengers.



THE LINKE-HOFMANN R 11 : General arrangement drawings.

" The risk of fire has been reduced to a minimum by placing all petrol leads and petrol pumps underneath the floor, where they are well away from any part of the engines which might give external sparks. A thorough ventilation of engine room and tank compartment ensures that there are no petrol vapours about, and any petrol leaking out of pipes, etc., flows through the bottom of the *fuselage* out into the open.

" The undercarriage, which is of the same simple Vee type as that of the Linke-Hofmann RI, has proved to be immensely strong. During a landing in the snow the wheels broke through the thin frozen crust and sank into the snow as deep as 12 in., the machine rolling over two ditches and coming to a standstill without turning over. Although the snow was shovelled away in front of the machine it was not possible to move it under its own power, and a snow plough had to be employed to get it back to its shed. According to all the experts who witnessed the landing, any other machine would have turned over. It will be seen from the above examples that the general reliability of the machine is excellent. It may further be added that not only can the machine remain in horizontal flight with only two engines running, but she has actually been known to climb on two motors. The useful load in that case was 5,300 lb.

" The advantages of multi-engined machines with only one airscrew may be summarised as follows : The propeller efficiency is very high, owing to the large diameter and slow running. The drive is of the simplest possible type, with only three spur wheels, which makes for greater reliability. The machine can continue its flight with three or even two engines running. On account of the central placing of the airscrew the danger of breakage of outrigger or interplane struts—in machines where the screws are so mounted—does not exist, and the head resistance is considerably smaller. The single-screw type gives less weight. For instance; a multi-engined machine with shaft drive to two airscrews on the wings has 10 spur wheels and 9 shafts. The single screw type has three spur wheels and four shafts. The engine power is only transmitted through one pair of spur wheels ; whereas in the twin-screw type it is transmitted through two pairs. This alone means a gain in efficiency of 3 to 5 per cent., or in other words, a gain of 30 to 50 h.p. The large propeller has stood up to its work splendidly, while, owing to its strong construction, it is practically weather-proof.

" A further great advantage is the simple two-wheeled Vee undercarriage, which gives small weight and also small air resistance. Springing is by means of steel springs instead of rubber shock absorbers. The undercarriage is absolutely reliable, even in heavy landings, with a side wind. The wheels are so large that the machine can even taxy across small ditches.

" The placing of the whole crew in the *fuselage* makes it possible for them to communicate with each other and to make themselves understood, which has the advantage of offering possibilities for reducing the number of the crew to a minimum. As there is only one central drive with four spur wheels, it is possible to build this so strong, without any undue addition in weight, that absolute reliability is provided.

Even after allowing for a certain amount of patriotic enthusiasm, it would appear that the Linke-Hofmann R II is really a very serious attempt at improving the existing type of multi-engined aeroplane.

AIRSHIPS

FRENCH NAVAL AIRSHIPS

Their Development During the War

By **RAFEX**

In view of the fact that the exhibition of "Airships in Peace and War," now open at the Prince's Galleries, contains a number of photographs and other exhibits of various types of French airships, the time may not be inopportune for giving a short account of the development of the French Naval Airship Service during the War, from details which have just become available.

While hostilities continued, it was naturally impossible to publish even the somewhat meagre information which reached us as to the doings of our French Allies. As, however, the French Government are taking active steps towards the development of commercial aircraft, both aeroplanes and airships, the details of what has been done in the way of design during the War are not without interest, giving, as they do, an idea of what may be expected in the future. An additional reason for giving the subject some close consideration is afforded by the fact that the Government of the United States purchased a number of airships from France; which may be expected to have an influence on Transatlantic progress and design in the future.

The French Naval Airship Service was formed in 1916, the British airship station at Marquise, near Boulogne, being taken over on January 1 in that year. Its real progress did not begin, however, until 1917, and it would not have reached its full development until the campaign of 1919.

In the early stages great assistance was derived from the collaboration of the Military Airship Service, which had been in existence for many years, and the union of the two services was rendered complete by the formation at the end of 1917 of the Under-Secretariat of State for Military and Naval Aviation.

Airship Stations

On the inception of the Service in 1916, three airship stations were commissioned: at Bizerta, Havre and Marquise; while two further stations were commenced at Rochefort and Aubagne, near Marseilles. In October of the same year a programme was laid down for the establishment of further stations at Montebourg (Cherbourg), Guipavas (Brest), Oran and Alger (both in Africa). The position was, then, at this time that nine stations were proposed, of which three only were in existence, there being one shed at each station.

In July, 1917, a further programme was approved involving the construction of stations at Paimbœuf, Arcachon, Ajaccio and Corfu. At the same time the number of sheds at most of the stations previously mentioned was doubled, the size of the new sheds being 79 ft. by 92 ft. by 492 ft. in place of the 65½ ft. by 72 ft. by 492 ft. of the earlier type. In addition, doors were provided at both ends and windscreens were fitted.

In January, 1918, the programme was again increased from 13 to 17 stations, by the laying down of a new station at Treport, the taking-over of a portion of the military stations at St. Cyr and Issy-les-Moulineaux, and the establishment of an American airship station at Brest. At the time of the Armistice, 14 out of this total of 17 stations were in commission, with 22 sheds in all; the stations at Ajaccio, Treport, and Arcachon (American) not having been completed.

Airships

At the end of 1916 there were six airships in commission:—

Four scouts; three S.S. type, purchased from Great Britain, of 60,000 cub. ft. capacity, and one Zodiac of 70,000 cub. ft. which had been presented to the Service.

One "Coastal" of 170,000 cub. ft. capacity, purchased from Great Britain.

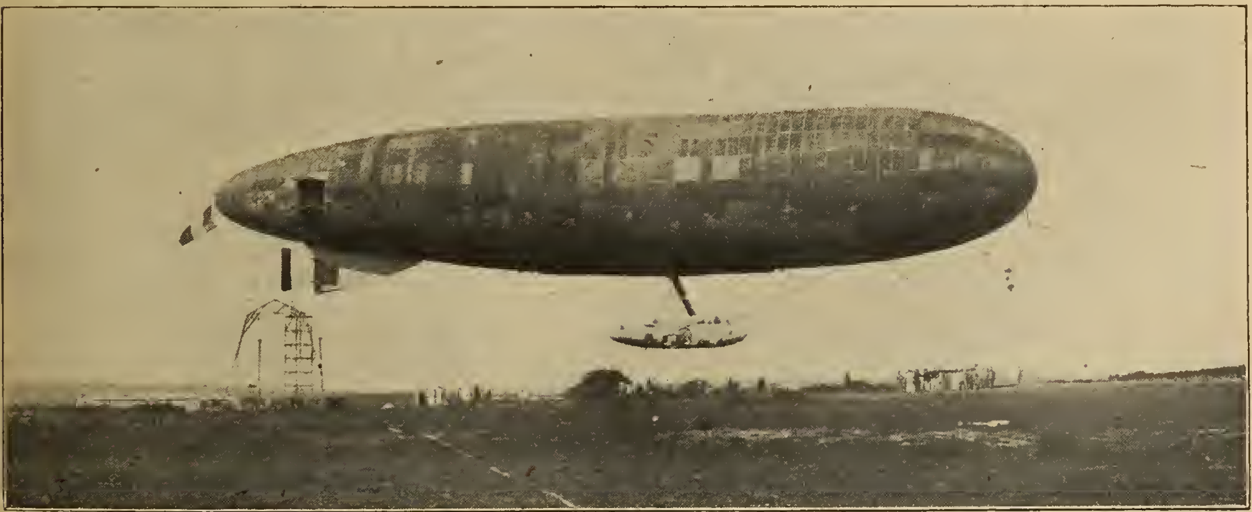
The "Tunisie" of 370,000 cub. ft. capacity, taken over from the military authorities.

This was a somewhat heterogeneous collection, and it was, therefore, decided to evolve classes of ship suitable for the particular work required of them.

The general functions for which the airships were to be used were threefold: submarine patrols, escort of convoys, location of mines. The matter was further complicated by the fact that the airships would be required to operate in different localities: in narrow seas with moderate temperatures, such as the Channel; over seas where high temperatures would be met with and of considerable width, such as the Mediterranean, and in the Atlantic for the protection of convoys of troops and munitions coming from America.

The airships for use in the Channel must be handy, numerous and fast; while their range need only be small. The following specification was evolved to fulfil these requirements:—

Engines.—Two 80 h.p. Renault.



The car of the "Capitaine Caussin."

Range.—Six hours at a full speed of 45 m.p.h., or 12 hours at cruising speed (35 m.p.h.).

Weight of bombs.—220 lbs.

Ballast.—800 lbs.

Total lift.—2,500 lbs.

This involved a capacity of 90,000 cub. ft. This "Scout" type was designed to do the work carried out by the British "S.S." of 70,000 cub. ft. capacity, but it had the advantage of being provided with two engines instead of one, which gave greater security.

Five of these scouts were ordered in 1916, and commenced operations in 1917. Ten more of the same type, ordered at the end of 1917, were put into service during 1918, while an additional eight, of slightly larger size (110,000 cub. ft.), fitted with larger engines, totalling 300 h.p., were ordered at the beginning of 1918, and began to come forward in December of the same year. These airships were known as the "V.Z." (Vedette Zodiac) type, and were numbered 1 to 23.

Counting the two British "S.S." already mentioned, and two more of the "S.S. Zero" type bought from England in 1917, France then put into commission about 20 non-rigid "Scouts" before the signing of the Armistice. These airships located and attacked, during the ten months of the 1918 campaign, about 15 submarines, in addition to their ordinary patrol and convoy work. These Scouts were, however, of insufficient range for seas less narrow than the Channel, and also carried too few bombs, so a larger type was found to be necessary. For this work greater range was necessary, besides a general increase of weatherworthiness, and improved comfort for the crew.

The Zodiac scouts had been based upon the British "S.S." type, but there was in existence no prototype for the special requirements of these larger airships: Italy, for example, using her airships almost solely for bombing purposes, while the British ships were (at that time) only used for patrols near the coast-line.

Owing to the urgency of the need it was decided to appeal again to the French military authorities, pending the time when a suitable type could be evolved. In addition to the "Tunisie," which had been based upon Bizerta, the military airship service accordingly handed over six further airships in April, 1917. These were: The "Champagne" and "d'Arlandes" (500,000 cub. ft.); the "Lorraine" (370,000 cub. ft.); the "Caussin" (320,000 cub. ft.); and the "Fleurus" and "Montgolfier" (training ships of no military value).

These six airships permitted of the immediate equipment of Corfu and Paimbœuf, the completion of Bizerta, and the establishment of a training centre at St. Cyr.

The work which was done by these six airships is evidenced by the fact that in one month (October, 1917) the "d'Arlandes" alone discovered 18 mines at Corfu in the course of her duties in escorting convoys of troops for the East.

The military establishment at Chalais-Meudon further produced, commencing from the end of 1916, four airships of 200,000 cub. ft. capacity, which were commissioned at the beginning of 1916. These were to a similar specification to the Astra airships, of which mention will be made shortly.

The Military Airship authorities thus in a period of two years provided 11 airships for the use of the Naval branch.

At the same time the Naval Service turned their attention to the evolution of airships specially designed for their purpose. In the first place, four experimental airships ("A.T." 1–4) of the Astra-Torres type were ordered from the Astra Co. of Billancourt to the following specification:—

Capacity.—230,000 cub. ft.

Engines.—Two Renault of 150 h.p. each carried on gantries.

Range.—Ten hours at full speed (50 m.p.h.) or 20 hours at cruising speed (30-35 m.p.h.).

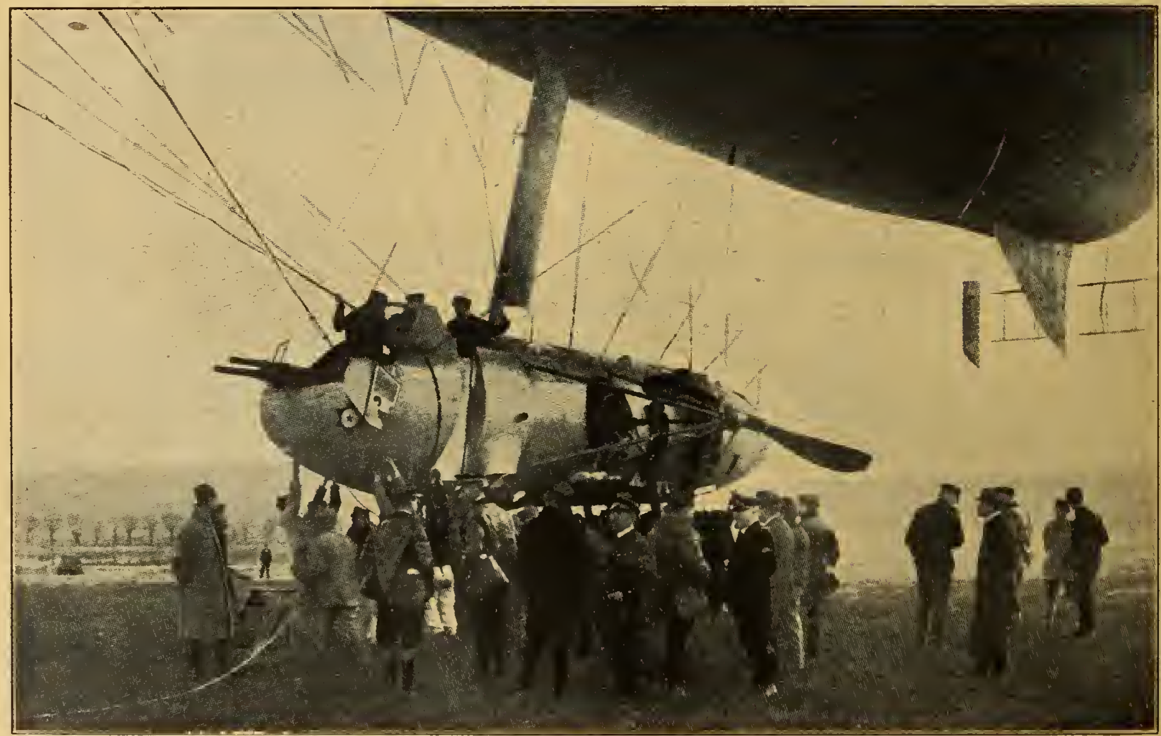
Weight of Armament.—260 lbs.

Ballast.—1,500 lbs.

It was found that the weight of bombs was insufficient, and consequently in the 10 further ships ("A.T." 5–9, of 260,000 cub. ft., and "Z.D." 1–5) ordered from the Astra and Zodiac companies respectively, in October, 1916, this was increased from 260 lbs. to 550 lbs. These 10 airships were commissioned at the end of 1917 and beginning of 1918.

It was then found that submarines were frequently able to submerge and escape before the airships could arrive in position for bombing, and it was decided to fit a 47 mm. gun with a muzzle velocity of 1,000 ft. per second. This was tried experimentally in the "Caussin," "A.T. 9" and "Z.D. 5," with such success that eight airships of 300,000 cub. ft. capacity fitted with these guns were ordered under the 1917 programme. These airships, which came into service at the beginning of 1918, carried 800 lbs. of bombs in addition to the gun and ammunition.

It was still found, however, that the German submarines of the cruiser class which had 6-inch guns could drive off attacks from these airships, and accordingly still larger airships with bigger guns and increased range were ordered. A total of 13 were commenced in 1918, due for delivery at the end of 1918 and beginning of 1919. Of these six were built by the Astra Co., three by the Zodiac Co., and four at



C.M. 1. The first of the Chalais-Meudon type airships.

Chalais-Meudon. Eight of them were sold to the American Navy.

All these airships, of which the capacity varied according to the constructor from 360,000 to 420,000 cub. ft., were built to the following specification :—

Engines.—Two of 250 h.p., each fitted on gantries.

Range.—14 hours at full speed (50 m.p.h.), or about 30 at cruising speed.

Crew.—Ten.

Armament.—75 mm. airship gun with a muzzle velocity of 880 ft. per second, and 880 lbs. of bombs.

Ballast.—1,500 to 1,800 lbs.

They were provided with an enclosed pilot's cabin fitted with windows and sleeping quarters. The first ships of this class were ready for inflation at the date of the signing of the Armistice, and they were, therefore, never actually used on service.

In conclusion, it may be recapitulated that during the War, in addition to the 20 scouts, 39 airships (23 Astra, 8 Zodiac, and 8 Chalais-Meudon) were specially built for the French Navy, of which about 25 were actually commissioned, in addition to six bought from England and 11 taken over from the Army.

At the cessation of hostilities there were 14 airship stations in existence. More than 60 submarines were located and attacked, whilst upwards of 100 mines were destroyed. Five airships were delivered by air from Paris to Algeria, the normal duration of patrols being 12 to 15 hours. In October, 1918, "A.T. 11" carried out a flight lasting for 36 hours.

During 1917 a rigid airship of 2,000,000 cub. ft. capacity was ordered, fitted with a 75 mm. gun and to have an endurance of 20 hours at full speed (55-60 m.p.h.), while being capable of remaining in the air for three days at cruising speed. In 1918 plans were prepared for 11 more rigids of similar design, and for the building of three rigid airship stations (one on the Atlantic, and two in the Mediterranean). None of these have, however, yet appeared, though it is reported that the French Government propose to use at any rate three of them for running an experimental mail service.

For convenience of reference, the information set out above is collected in tabular form below :—

Details of French Airships

Type ..	V.Z. 1-15.	V.Z. 16-23.	Tunisie.	Champagne and d'Arlandes.	Lorraine.	Capitaine Caussin.	Fleurus and Montgolfier.
Capacity ..	90,000 c.f.	110,000 c.f.	370,000 c.f.	500,000 c.f.	370,000 c.f.	320,000 c.f.	—
Engines ..	2 80 h.p. Renault	2 150 h.p. Hispano	2 220 h.p. Clément	2 220 h.p. Zodiac	—	2 240 h.p. Salmson	—
Full speed ..	45 m.p.h.	50 m.p.h.	44 m.p.h.	44 m.p.h.	—	55 m.p.h.	—
Cruising speed	35 m.p.h.	40 m.p.h.	—	—	—	—	—
Range at full speed ..	6 hours	6 hours	12 hours	15 hours	—	12 hours	—
Range at cruising speed ..	12 hours	12 hours	—	—	—	—	—
Armament ..	220 lbs. bombs	220 lbs. bombs	1,760 lbs. bombs 2 47 mm. guns	2,200 lbs. bombs 1 47 mm. gun	— —	1,760 lbs. bombs 1 47 mm. gun	— —
Crew	3	3	7	7	—	6	—
Useful lift ..	2,000 lbs.	2,240 lbs.	—	—	—	—	—

Type ..	C.M. 1-4	A.T. 1-4	A.T. 5-9	Z.D. 1-5	A.T. 10-17	Z.D. 6-8	C.M. 5-8
Capacity ..	190,000 c.f.	230,000 c.f.	260,000 c.f.	217,000 c.f.	300,000 c.f.	330,000 c.f.	320,000 c.f.
Engines ..	2 150 h.p. Salmson	2 150 h.p. Renault	2 150 h.p. Renault	2 200 h.p. Hispano	2 200 h.p. Hispano	2 250 h.p. Renault	2 230 h.p. Salmson
Full speed ..	50 m.p.h.	50 m.p.h.	50 m.p.h.	50 m.p.h.	50 m.p.h.	50 m.p.h.	50 m.p.h.
Cruising speed	30-35 m.p.h.	30-35 m.p.h.	30-35 m.p.h.	30-35 m.p.h.	—	—	—
Range at full speed ..	7 hours	10 hours	10 hours	10 hours	14 hours	12 hours	10 hours
Range at cruising speed ..	15 hours	20 hours	20 hours	20 hours	30 hours	—	—
Armament ..	550 lbs. bombs	260 lbs. bombs	550 lbs. bombs	550 lbs. bombs	1 75 mm. gun 880 lbs. bombs	1 75 mm. gun 1,760 lbs. bombs	1 75 mm. gun 1,320 lbs. bombs
Crew	5	5	5	5	6	10	8
Useful lift ..	4,500 lbs.	4,880 lbs.	5,800 lbs.	5,400 lbs.	6,900 lbs.	9,500 lbs.	8,200 lbs.

CIVILIAN LANDING GROUNDS

The following lists of aerodromes are issued as an addition to the lists already published. It will be seen that some of the aerodromes can only be considered as possible emergency landing-grounds. These lists are purely provisional and subject to alteration or amendment from time to time.

List D (*d*).—*Aerodromes licensed as suitable for "Avro* (504 K) *and similar types of aircraft" only. Except in very few instances accommodation does not exist. The licences have also in the majority of cases been issued for limited periods only.*

Aerodrome.	Location of aerodrome.	Nearest large town.
Blackburn ..	Finiscliffe Bridge, Blackburn.	Blackburn.
Cathcart ..	Adjoins Konnishead Junction.	Glasgow.
Cheltenham ..	Between villages of Swindon and Uckington.	Cheltenham.
North Berwick	Adjoins railway station.	North Berwick
Walsall ..	Millish Road, near Rushall Canal.	Walsall.
Wolverhampton	Bridgnorth Road, Perton	Wolverhampton

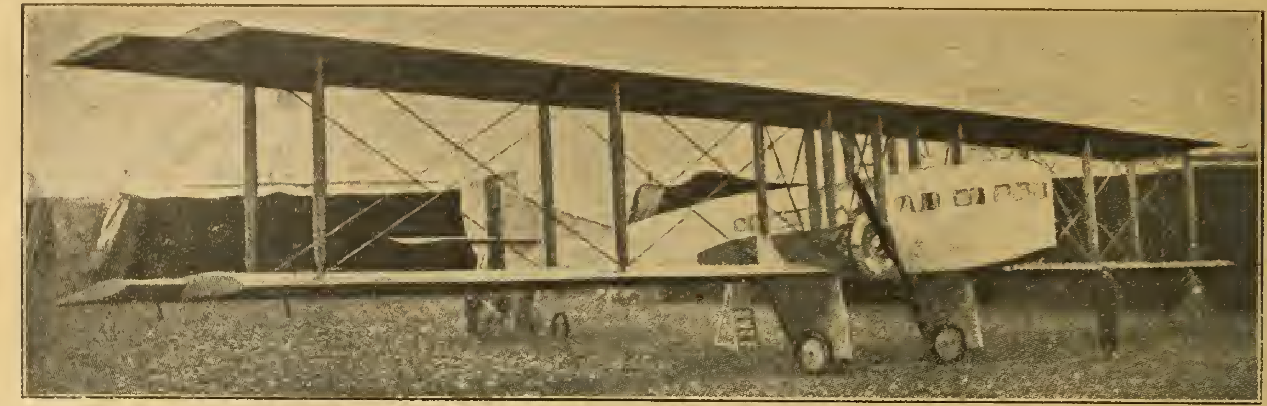
List E (*b*).—*Stations no longer in use by the R.A.F.*

These stations have been passed to the Government Surplus Property Disposal Board. They will be relinquished as soon as the Government property thereon has been disposed of. In many cases the aerodromes are now under cultivation, but it is probable that the sites still form the best emergency landing-grounds in the immediate neighbourhood.

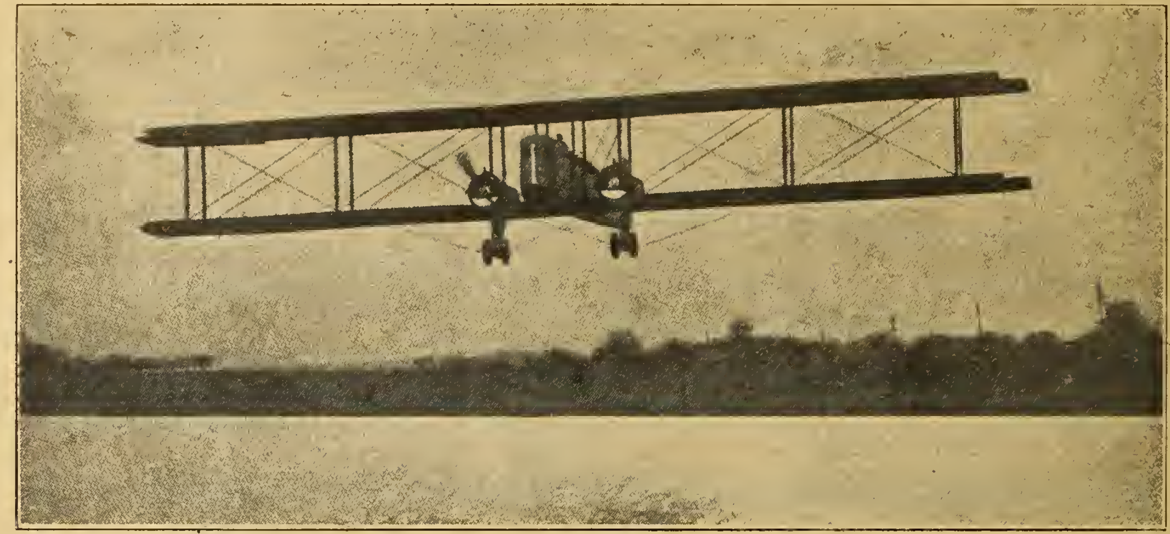
Aerodrome.	Nearest railway stations and distance in miles.	Nearest town and distance in miles.
Beverley ..	Beverley N.E.R. (1) ..	Beverley (1).
Chattis Hill ..	Stockbridge, L.S.W.R. (2)	Winchester (10).
Doncaster ..	Doncaster, N.E. and G.N.R. (1½).	Doncaster (1).
Elsham ..	Barnetby, G.C.R. (2¾) ..	Barton-on-Humber (5).
Penston ..	Macmerry, N.B.R. (1) ..	Haddington (5).

THE FARMAN "GOLIATH" TYPE F-60 AEROBUS

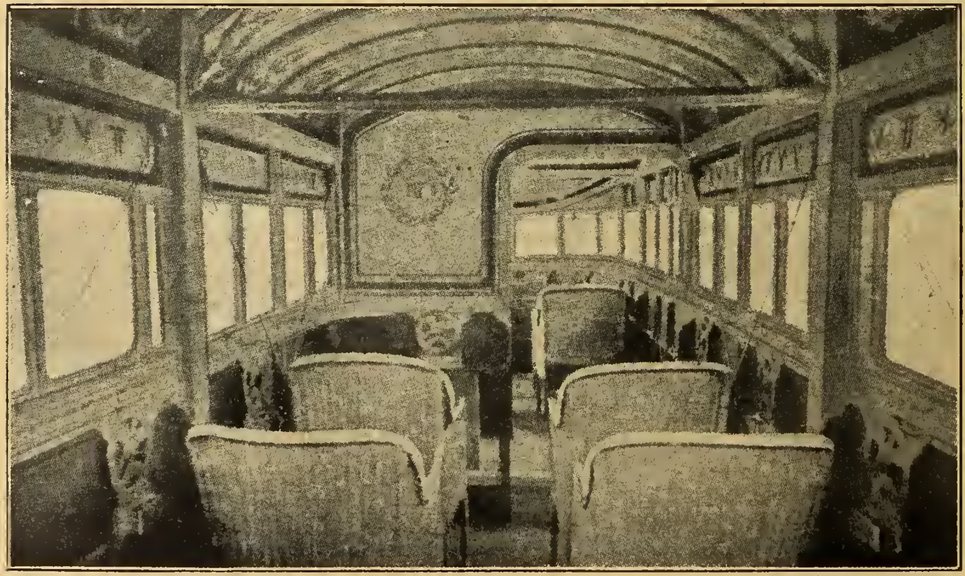
IN view of the recent exciting adventure of the Farman "Goliath," which, it will be remembered, left Paris with eight passengers on August 10 last for Dakar (some 2,800 miles), and after a record non-stop



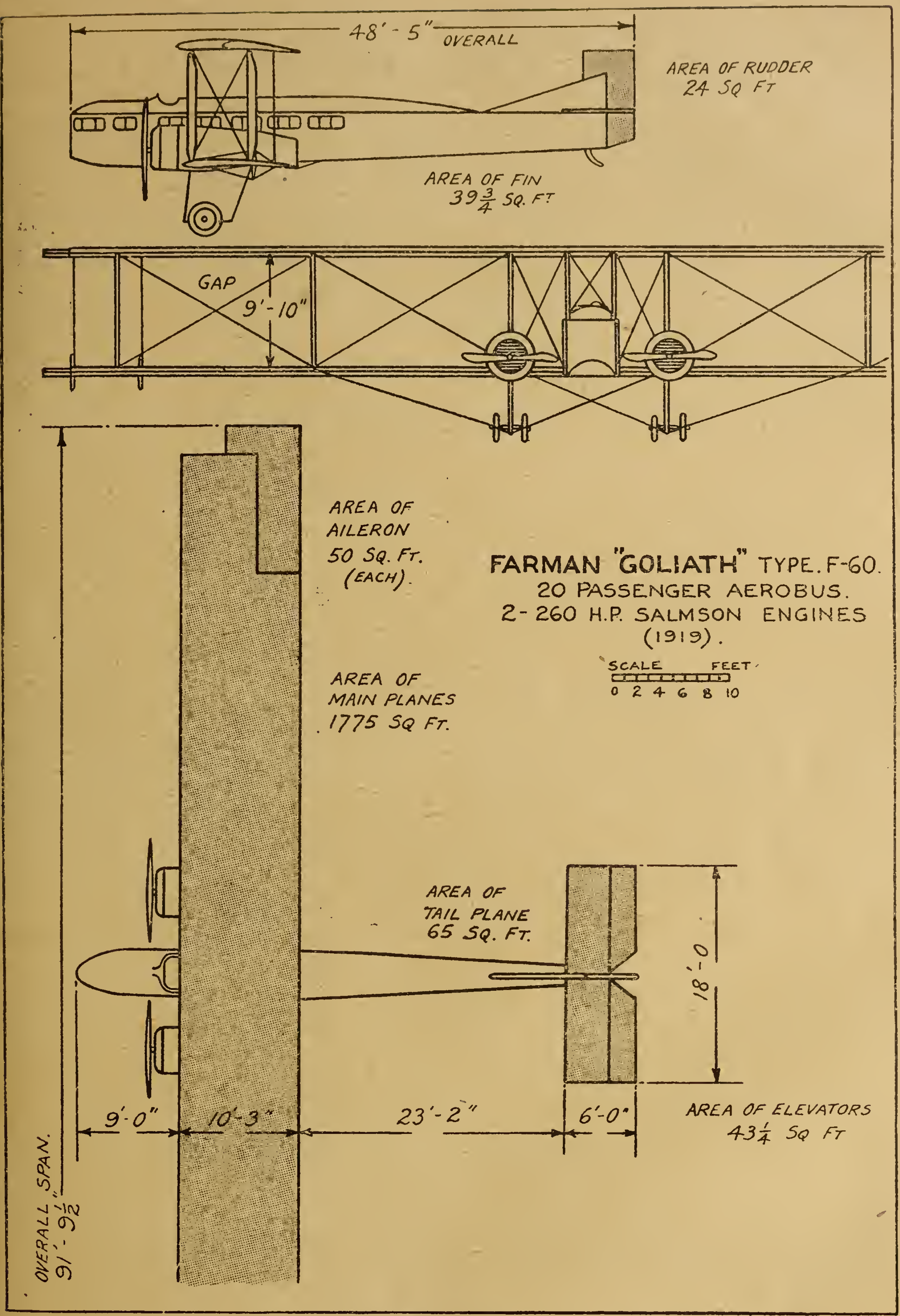
Three-quarter front view of the Farman "Goliath" aerobus.



The Farman "Goliath" aerobus in flight.



View of the interior of the passengers' cabin of the Farman "Goliath" aerobus.


48'-5" OVERALL
AREA OF RUDDER 24 SQ FT
AREA OF FIN 39¾ SQ. FT
GAP 9'-10"
AREA OF AILERON 50 SQ. FT. (EACH).
FARMAN "GOLIATH" TYPE. F-60.
20 PASSENGER AEROBUS.
2- 260 H.P. SALMSON ENGINES
(1919).
SCALE FEET
0 2 4 6 8 10
AREA OF MAIN PLANES 1775 SQ FT.
AREA OF TAIL PLANE 65 SQ. FT.
18'-0
9'-0"
10'-3"
23'-2"
6'-0"
AREA OF ELEVATORS 43¼ SQ FT
OVERALL SPAN. 91'-9½"

THE FARMAN "GOLIATH" AEROBUS: Plan, front and side elevations to scale.

A "night" view of the Farman "Goliath" aerobus, taken at midnight on August 10th, just before the start for its flight to Dakar.

flight to Casablanca (1,280 miles) got lost in the Sahara for over a week, and was found eventually some 500 miles from Dakar with its crew hungry but intact, the following particulars, with scale drawings, may be of interest.

The F-60 is a comparatively large *fuselage* twin-engine biplane, with an enclosed cabin accommodating 20 passengers. The interior of the cabin is handsomely finished, and is provided with comfortable light wicker arm-chairs arranged on either side of the cabin alongside the windows. The pilot's cockpit, which is open, is located on the roof of the cabin, just forward of the main planes, where the range of vision is good. It was a machine of this type that was employed on the first civilian passenger service between Paris and Brussels, inaugurated last March.

The upper and lower planes are of equal span, and are without dihedral and sweepback. They are rectangular in plan form, and have balanced *ailerons* fitted to both upper and lower surfaces. In all there are eight pairs of interplane struts, two pairs of which run up from the *fuselage* and one pair being located at each engine. The intermediate and outer pairs are spaced 16·4 ft. apart. The overhang of the main planes, not including the *ailerons*, is 4 ft. The *ailerons* are 11 ft. 5 ins. long by 3 ft. 4 ins. wide.

The engines are Salmson 9-cyl. "Star" type, developing 260 h.p., and are mounted on the lower plane close up to the *fuselage*. They drive 8 ft. tractor screws, and are enclosed in streamlined *nacelles*, with a circular radiator in the nose.

The landing chassis is typically Farman, consisting of a pair of wheels located under each engine, and carried by "trouser" struts.

The general specifications of the F-60 are as follows:—

Span (top and bottom)	91 ft. 9½ ins.	Area of fin ..	39¾ sq. ft.
Chord ..	10 ft. 3 ins.	Weight, empty ..	4,409·24 lbs.
Gap	9 ft. 10 ins.	Useful load	4,409·24 lbs.
Overall length	48 ft. 5 ins.	Fuel, etc. ..	1,126·24 lbs.
Overall height	16 ft. 5 ins.	Weight, fully loaded ..	9,964.88 lbs.
Area of main planes ..	1,775 sq. ft.	Speed range	37-99 m.p.h.
Area of *ailerons* (4), each	50 sq. ft.	Climb in 4 mins. ..	1,600 ft.
Area of tail plane ..	65 sq. ft.	Climb in 10 mins. ..	3,200 ft.
Area of elevators ..	43¼ sq. ft.	Climb in 25 mins. ..	6,500 ft.
Area of rudder	24 sq. ft.		

◆ ◆ ◆ ◆

Inland Mails by Air

THE Postmaster-General gives notice that, by arrangement with the Air Ministry, services by aeroplane for the conveyance of letters only will begin today between London and the following towns:—Bristol, Birmingham, Newcastle, Manchester and Glasgow.

Letters intended for conveyance by these services should be prepaid at the ordinary inland rate of postage, and, in addition, a special fee of 2*s*. an ounce for each letter should be prepaid in stamps at the time of posting. Such letters should be handed in over the counter at the offices shown below not later than the times stated. They will be sent out by the next ordinary delivery after arrival at the post office of destination:—

	Latest time of posting.
G.P.O. (King Edward Building)	9 p.m.
Western Central District Office (High Holborn)	8 p.m.
Western District Office (Wimpole Street) ..	8 p.m.

The present service is experimental, and the arrangements will be subject to modification in the light of experience. If the service is found to meet public needs it is hoped to extend it to other large towns.

A Royal Air Force aeroplane left Kenley at 5.40 a.m. on Monday with the King's mail, landed at Newcastle-on-Tyne, and returned with other mails to Kenley by 1.40 p.m.

The scheme for the conveyance of urgent dispatches by air has now been extended to include the Irish mail service.

On Monday urgent Government mails were delivered by R.A.F. aeroplane service (under the Home Office organisation) to main centres—five machines making outward and return journeys. Sub-distribution was arranged from these centres by subsidiary services of aeroplanes.

An Indian Aerial Mail

FROM Simla comes word that the Government of India are advocating the formation of a big company, independent of any aircraft construction company, with a monopoly for the carriage of mails for ten years on the same lines as the P. and O.

The Board to advise the Commerce Department has sanctioned the proposal to establish aerodromes at Calcutta, Bombay, Karachi, Nagpur, Madras, Rangoon, Singapore and Delhi.

To Fly to Timbuctoo

Two French flying officers are to make prospecting flights in West Africa from Dakar to Timbuctoo, and from Dakar to French Guinea and back.

LORD WEIR ON FUTURE DEVELOPMENT

By way of affording a public welcome to the officers and crew of the R 34, and also to inaugurate the Scottish Section of the Royal Aeronautical Society, a meeting was held in the St. Andrew's Hall, Glasgow, on September 24, at which Sir William Beardmore presided. Lord Weir was to have read a paper on aviation, but as he was detained in London, the notes of his speech were read by his brother, Gen. Jas. A. Weir, R.A.F.

The chief deduction Lord Weir drew for the future was one which the War had made perfectly clear—namely, the supreme necessity of the strictest vigilance in the development of research and experiment. Whatever influence the exigencies of the moment might exercise on retrenchment, there must be no reduction of our expenditure on technical development. War was the compelling influence on the intensification of our technical effort.

Referring to the immediate future of civil or commercial aviation, Lord Weir confessed that he was a genuine believer in the future of civil aviation. He accepted flying seriously, as an ultimate invaluable system of achieving high speed transport for goods and passengers. He had an unflinching faith that aircraft comprising heavier-than-air and lighter-than-air machines would ultimately confer a genuine boon on civilisation. Early progress in civil aviation would to the uninitiated appear slow and unsatisfactory. An aerial transport company today was like a merchant shipping concern without ports or harbours. Regarding commercial aviation he thought only of the practical and utilitarian aspect of regular services carrying goods and passengers.

He fully recognised that the immediate developments were admirable and profitable. He looked for a considerable development on the sporting side and in the personal use of aeroplanes, by the not inconsiderable number of those who were pilots during the War. For photographic and survey work a definite field of enterprise and usefulness was open; an increase in the rapidity of communication and of transport would be one of the most definite aids to the progress of civilisation. Mail matter would represent the most favourable class of work as a source of revenue. Thereafter would come the urgent and emergency passenger traffic and the carriage of goods of a light, valuable and specialised nature. The vagaries of our climate and the highly developed and speedy existing mail transport rendered the immediate application of aerial mail carrying in the United Kingdom improbable.

After referring to the performances of the new London to Paris service and the American mail, Lord Weir wrote that they must also realise the tremendous usefulness and value of obtaining actual experience on a more ambitious scale as early as possible. With that in view one visualised the problem of handling, say, a part of the Indian mail over the section of the route where weather conditions are favourable and uniform at an early date. If that route were started from Egypt to Karachi that would constitute the initiation of a chain of Imperial air routes connecting by trunk lines the main units of the British Empire, and they would foresee in addition auxiliary feeder lines to and from the smaller centres.

There were also many independent services. The most favourable he considered to be the coastal work service in Australia and the West Indies. At present he had the greatest faith in the usefulness for the coastal sort of flying boats. As regards Imperial air routes and civil aviation, there entered into the problem the important factor of the future military aerial activities of the Empire. Whatever sum might be apportioned for the defence of the Empire it would be allocated between air, sea and land power, and it was clear that air power was the developing factor of the three. Accordingly, for strategical reasons alone, the different units of the Empire would require to be linked up by definite aerial routes, which would be found to a great extent to coincide with the commercial routes. The best ends of civilisation would not be served by keeping civil aviation for a Government monopoly. Co-operation between the activities of the State and of private firms would produce the finest results. The State must be the pioneer. It must help, build, encourage and exercise control, but emphatically it must not monopolise.

The King sent the following telegram in response to a loyal message:—"The King has received with much pleasure and satisfaction the loyal message from citizens of Glasgow assembled at the invitation of the Scottish branch of the Royal Aeronautical Society to do honour to the first British airship to cross and recross the Atlantic. His Majesty heartily joins in congratulating the designer and all those associated with the construction of this airship on the remarkable success it has achieved. He is glad to think that the Clyde has played so prominent a part in establishing this fine record in the annals of British history. The King much appreciated the kind allusions to Prince Albert."

On the same day the officers and crew of the R 34 were entertained at luncheon at Glasgow by Sir William Beardmore, whose firm built the airship.

Proposing the health of the guests, Sir Robert Horne emphasised that the public never realised how much was done during the War by airships. The Admiralty started with eight of these vessels, and ended with about 100. The work these accomplished in the War was incalculable. We were always beaten by the Germans by rigid airships until the R 34 had proved that, even starting with a great leeway to make up, we had beaten Germany in the ship which was her own special pride.

Maj. Scott said he thought that civil airships would for a long time run along with military or naval airships. There could not be very much difference between them for several years to come. In a few days any civil ship could be converted into a warship. That was much more so with an airship than with any other type of craft. The conversion of civil airships, for the next six or seven years, to a military use would be a very simple matter. That was a thing to be remembered, because he thought that the development of airship construction to civil uses would do a great deal for the development of the airship as a whole.

COMMERCIAL AIR TRANSPORT

HOUNSLOW, ETC.

At dawn every morning four Avros leave Hounslow for Cardiff, Birmingham or wherever they are wanted to go, carrying newspapers, etc. They return home by mid-day, and after lunch machines often leave for Manchester. One of the machines returned from Manchester to London in two hours, at a speed of 100 miles per hour, which shows that, while the comparatively low-powered engines used are economical to run, the Avros can on occasions show a very respectable turn of speed. Sir William Crossley is among those who have chartered an Avro for a journey from Manchester to London.

The crisis has demonstrated the results of the missionary work which Messrs. A. V. Roe and Co., Ltd., have been doing throughout the summer in popularising flying in so many parts of Great Britain. People stroll in or ring up and ask for an Avro with the same easy confidence with which they would call a land taxi. In consequence the transport department has been snowed under with demands, and has been quite unable to meet all the calls made upon it. What the public does not seem to realise is that the company must charge for the full journey made by the machine. If a traveller would arrange with one friend or three friends to travel together, the expenses would be halved or quartered. It would be a good thing for enquirers to ask at the ticket agencies if they know of anyone else who is desirous of travelling in the same direction. In the same way enquiries might be made at the town of destination as to the chances of getting the seats booked for the return journey.

The Blackburn Aeroplane Co. are running a service between London and Leeds. Eight passengers and 400 lb. private mails or merchandise can be carried. The fare is 15 guineas single or £30 return.

The British Aerial Transport Co. started a service from London to Birmingham on September 29. The B.A.T. saloon machine carried four passengers.

NOTTINGHAM

Lieut. Macrae, M.C., and his travelling circus of Avros have been at Nottingham during the past week, but previous to the outbreak of the strike the weather was not very favourable for flying. When the crisis came, fine weather returned, and the Avros got busy. One notable journey was made to Grantham and Lincoln, taking the local representative of Messrs. Boots' and a supply of drugs. The latter were delivered in shops in both Grantham and Lincoln within an hour of the start.

AIRISMS FROM THE FOUR WINDS.

Congratulations to Lieut.-General Sir David Henderson upon his promotion by M. Poincaré to the rank of Grand Officer of the Legion of Honour.

* * *

Ditto to our British pilots, who, according to advice from Viborg, are keeping the nerves of the Bolshies in Kronstad upon the rack every minute of the day and night. So far our men are reported to have distributed about 180,000 lbs. of explosives as the rations of the Kronstadt "reds."

* * *

That the railway hunnish hold-up should materially assist aviation to fill the bill of emergency is pretty prominently apparent from the use which has been made of it to "carry-on" in certain directions. The mails should particularly have benefited from its mobility. Maybe the Postmaster General will have a little more sympathy in the future to seeing after its development somewhat more generously than has hitherto prevailed in that quarter. After all a service, and by way of a reserve force, that is always "right there" under stress, should be worthy of a *little* consideration during normal happenings.

* * *

Give aerial-post a real chance and its making good is a foregone conclusion.

* * *

In all directions, besides mail-work, those firms which have been able to keep going in anticipation of the bettering of commercial aviation, have not been idle. It has been quite surprising to note the number of planes which were flitting about the country right away from early Saturday onwards. It's a good omen, and—in conjunction with its elder sister-industry, automobilism — looks like crashing badly the venomous omnipotent power which the Bolshie element on British soil flattered itself it possessed to model the Government plus the Nation to its own ghastly shape.

* * *

No longer, with mechanical transport even at its present stage, can the Nation be held to ransom by the "anarchist conspirators" who have been tolerated only too long on the hospitable shores of guileless Albion. Out the blighters, lock, stock and barrel, and if it be possible "lose" them on the way out. Then, and not till then, will the Empire have a chance of recuperating after its unexampled and successful effort to save humanity. But the real British workmen will find in their absence the opportunity to come into their own, by securing the real fruits of their individual efforts instead of being "vampired" to death by the incompetent slackers led by these foreign blood-suckers. Huns should be treated as Huns.

* * *

Mr. M. Anderson, a representative of Aerial Service, Ltd., who has just returned to Melbourne after an inspection of the Malayan Archipelago, is reported to have confirmed the opinion that the London-Australia flight is at present a difficult undertaking necessitating a series of prepared landing-stations at various sites in Asia. Darwin, in the norther territory of South Australia, he states, is clothed with dense jungle or loose rocks, and the clearing of a landing-station would take months. The Australian end of the Archipelago presents the most serious obstacles, and between Darwin and Sydney landing sites must be carefully selected to avoid the danger of forced landings, where low bush masks the dangers. The safest time for the flight, he insists, is mid-year.

* * *

We are evidently not far off warning notices at the prominent commercial aviation centres, conveying the information that "Passengers must not attempt to board the planes when in motion," judging by the following little story going the rounds of the Press. "One gentleman," so the tale runs, "who had an important business journey to make to Paris, and decided to travel by air, arrived at Hounslow Aerodrome by motor precisely at 12.30 today as the aeroplane was in motion on the ground in the preliminary stage of the flight. With a special effort the attendants succeeded in hoisting him up and bundling him almost head first into the well of the machine, to the amusement of all concerned."

Some R.A.F. Impressions

Major H. G. Smart, R.A.F., who commanded a squadron of Snipes at Cologne.

* * *

The business trip—London-Nice-London—recently completed by aeroplane by Col. G. L. P. Henderson, is all the more noteworthy by reason of its being a private flight. Following Col. Henderson's arrival back in London, in an interview, he said: "The trip was a private affair made without any organisation, and proves the reliability of the aeroplane for this kind of journey. I flew my own machine, an Armstrong-Whitworth with Beardmore 160 h.p. engine, and it was not necessary to undo the engine-covering during the ten days I was absent from London. I had Maj. Lloyd as passenger. We left Nice on the return journey on Tuesday night, and came through to London with two stops."

* * *

As a reminder of aerial-post flips in the past, and by way of an expert's summary of recent happenings during the War, embodying the issue of special air-mail stamps, an article by Mr. F. J. Melville in the *Daily Telegraph* is of more than passing interest to many concerned with aviation in its various aspects. Mr. Melville mentions that the first aeroplane mail was an experimental one conducted in connection with the United Provinces Exhibition at Allahabad, in February, 1911, when Capt. W. G. Windham was the first "air postmaster." The same officer was the organiser in September, 1911, of the well-remembered first United Kingdom aerial post, which conveyed letters from London to Windsor in honour of King George's coronation.

* * *

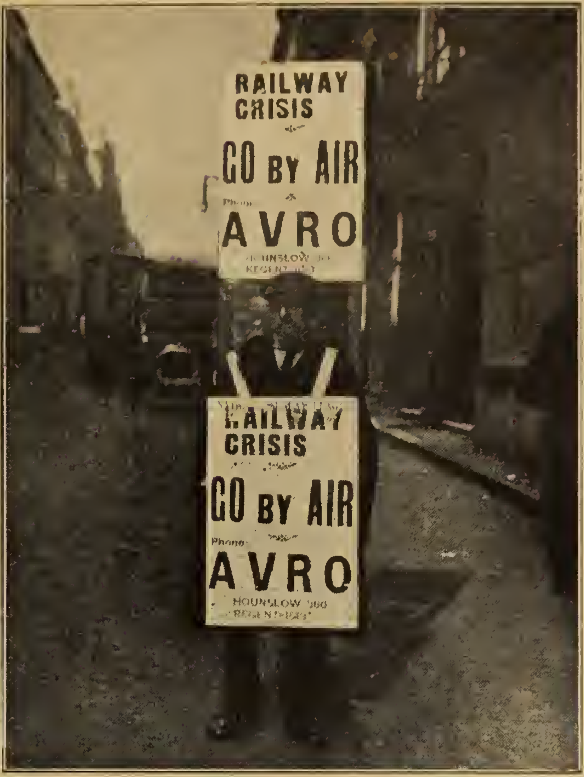
During the War the rapid development in airship and aeroplane construction led to the creation of numerous War services by aircraft of all descriptions. A Taube carried mails out of Przemysl early in the War, and in due course aircraft became the means of rapid transmission of despatches and official mail. These early air mails did not require the issue of special stamps, but so soon as the air services were opened to meet the requirements of the public distinctive aerial post stamps came into use.

* * *

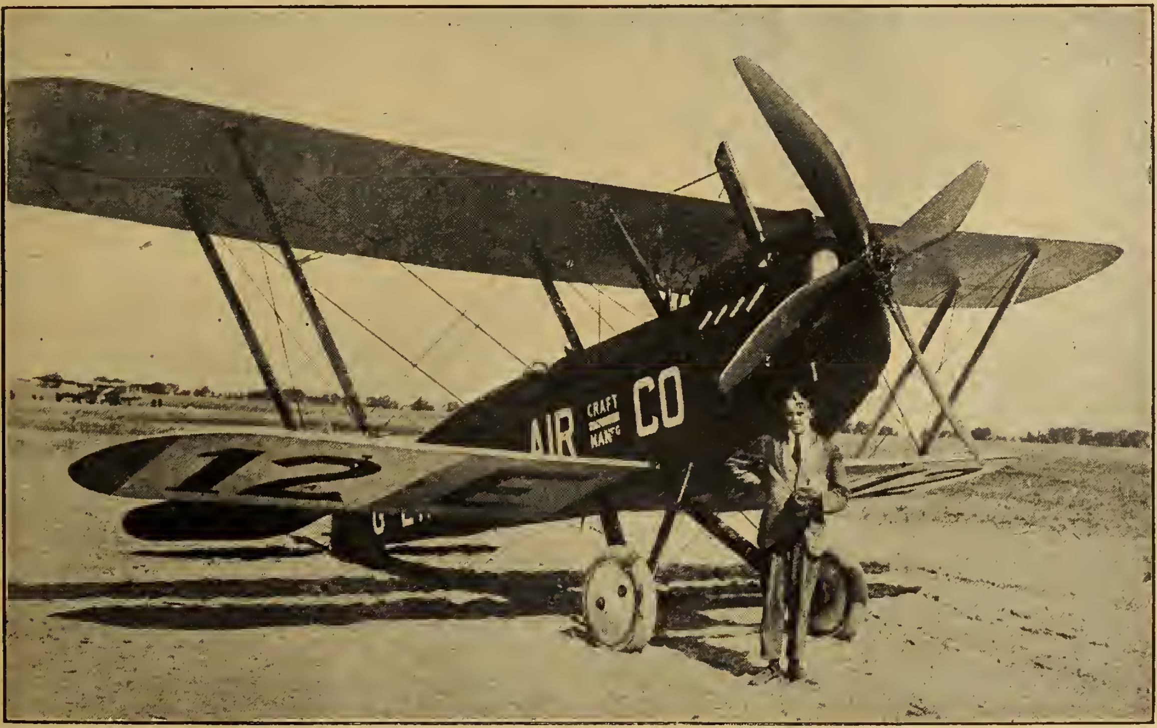
In May, 1917, the Italians started an aeroplane mail between Rome and Turin, and the 25 centesimi rose express-letter stamp was specially overprinted "Esperimento Posta Aerea, Maggio, 1917. Torino-Roma, Roma-Torino." Shortly afterwards another air service was established by means of seaplanes, to avoid the submarine menace, between Naples and Palermo, and the stamp used for this was the 40 centesimi violet express stamp, surcharged "25 cent.," and overprinted "Idrovolante. Napoli-Palermo-Napoli."

During the War Austria and Hungary had public aerial posts, the Austrians using their current stamps surcharged 1½, 2½, and 4 kronen, and overprinted "Flugpost," and the Hungarian stamps of 1½ and 2½ kronen were overprinted "Repülő Posta." On May 15, 1918, the first regular United States "air-line" started between Washington, Philadelphia and New York, and the special aerial stamp of 24 cents, red and blue, was issued on that date. The rate was subsequently reduced to 16 cents, and a 16 cents green stamp in the same design was issued. A further reduction in the charge for air transmission to 6 cents led to the issue of a 6 cents orange stamp, and now there is a report that the air post is in such demand that it will henceforth be possible to carry letters by airline at the ordinary 2 cents or penny postage rate.

In May last the first regular Swiss air post started between Zurich and Lausanne, with one intermediate stop at Berne, and for this a 50 centimes stamp has been overprinted with a propeller device. Similarly for the recently-started Tunis air post, the current 35 centimes stamp has been overprinted with "wings" and the inscription "Poste Aerienne."



An example of Avro up-to-dateness to help in overcoming the difficulties in connection with transport arising out of the railway strike.



THE AIRCO 4 R: This machine, fitted with a 450 h.p. Napier Lion engine, is a development of the machine on which Capt. Gathergood won the Aerial Derby, which flight is officially declared a British Speed Record for a flight in a closed circuit. On this machine Capt. Gathergood, who is shown in the photograph, flew to Amsterdam in 2 hours 10 mins., which is, we believe, the fastest time for this journey. While at Amsterdam Capt. Gathergood won a race in a closed circuit, his speed working out at 145 m.p.h. The Napier Lion is rapidly building up for itself an excellent reputation, having established these fast times. It also has the distinction of having been up to an altitude of nearly six miles in an Airco (De Havilland) machine, as well as a non-stop flight from London to Madrid in 7¾ hours.

THE great and successful Transatlantic flights during the present year have been made the occasion for experimental mails, and in the case of those starting from Newfoundland they have used distinctive stamps. The Sopwith Aviation Co. received a nominal subsidy of one dollar from the Colonial Government to carry mails to England, and the current 3 cents brown stamp of Newfoundland was specially overprinted "First Transatlantic Air Post, April, 1919." The mail carried by Mr. H. G. Hawker was franked with this stamp, and it was salved with the aeroplane by the United States steamer, *Lake Charlottesville*, and the letters were duly delivered. It was one of these "Hawker" stamps, unused, that was sold recently in London for £210 in aid of a Newfoundland War charity.

The mail carried over by Sir John Alcock and Sir A. Whitten Brown, also bore a special stamp, the 15 cents of the 1897 or Jubilee issue of Newfoundland being overprinted "Transatlantic Air Post, 1919. One dollar." This mail was delivered in London within three days of leaving Newfoundland. It is not generally known that a more elaborate stamp issue was prepared and used for franking the mail to be carried by Mr. Raynham. This issue comprised four denominations of adhesive stamps, 1, 2, 3, and 24 cents (Caribou issue), the 3 cents embossed envelope, and the 1*d*. Universal Postal Union postcard, all overprinted "1st Transatlantic Air Post, Martinsyde, Raynham, Morgan." As the mails carried by each of the three machines were extremely limited in bulk, the stamps used on the original letters are scarce, and form valuable records of a truly great adventure.

- - -

WHERE the true poetic touch came in! From a *Daily Chronicle* correspondent the following touching episode in the disentanglement of the Fiume complications is set out, dating from Milan on September 27:—

"Casagrande, the patriot aviator, has forsaken his newly-wed bride at Nice, France, and gone to Fiume, stirred by the poet's brave deeds and eloquent words. He arrived at Venice, and thence proceeded by motor launch to Pola. His friends, abetting him, released three hydroplanes, and flew to Fiume. D'Annunzio, delighted, kissed his noble recruit, making him Commander of Fiume's Air Fleet."

We may be old-fashioned, but personally we would even prefer to have a poet render his own version of his pet poem to us. There *are* limits.

- - -

IT is hardly surprising to learn officially that although it is only a few weeks since the R.A.F. opened its special recruiting campaign recruits have come forward in such numbers that the Force is now up to its present authorised strength. Accordingly all recruiting has now been suspended except for carpenters, cooks and clerks, for which trades, a certain number of vacancies still remain. The attractive new conditions of service and rates of pay are, of course, largely responsible for this satisfactory result and the authorities are, we learn, extremely pleased with the class of men who have come forward. As the number of applications still being made shows no sign of diminishing, men of the trades for which vacancies still exist and who desire to enter the R.A.F. would be well advised to apply without delay.

- - -

WHAT appears to be a very practical proposition, and one deserving every encouragement, comes from Capt. (temporary Lieut.-Col.) J. T. Halligan, R.D.F., ex-Q.M.S., Irish Guards, for the founding of a "Rankers' Club" in London. The War has created quite a new set of conditions and "atmosphere," to provide for which there is plenty of room.

Col. Halligan's scheme, which embraces the R.A.F., as put by himself, is as follows:—

BLACKLEGS!—OUT OF REACH: During the railway strike aeroplanes do much to relieve the mail and other traffic tension, and are not interfered with by the strikers, needless to say.

> It has occurred to me that if a "Rankers'" Club was established in London it would prove a great boon to all rankers, both those who are now civilians and those who are still serving. If you would be good enough to insert this letter in your paper, so that it can get to the notice of all rankers and those persons who are interested in rankers, and the scheme meets with approval, arrangements could be made to hold a meeting in London at an early date to discuss the project. I consider that the club should be established and run on the following lines:—
>
> To be a residential club in London for all those who have obtained commissions from the Regulars, Territorials, or New Army, and for all those who obtain similar commissions in the future. Town and country members to pay different subscriptions.
>
> All our distinguished rankers to be asked to serve as presidents or vice-presidents.
>
> The chairman and committee to be selected annually. The committee to be comprised of equal numbers of civilian and serving members.
>
> A public subscription list to be opened for the foundation of the club; the subscribers' names to be inserted on a tablet and placed in the club after it has been opened.
>
> Some arrangements to be made to record and place in a conspicuous position the names of all those rankers who have given their lives for their country. One room in the club to be set aside for this sole purpose.
>
> The club would serve as a memorial for those who have made the greatest of all sacrifices, and would provide a place where all those members who are now civilians could meet one another, and also get in touch with their comrades who are still serving.
>
> As soon as the club has been established a Rankers' Association could be formed to give assistance and advice to all members.

- - -

FOR the carrying-out of these laudable objects, Col. Halligan, who invites correspondence to A.P.Q., S. 19, Zeneghem, France, writes further:—If any "ranker" (civil or military) who is stationed at home will volunteer to take on the duties of secretary for the purpose of organising the meeting referred to in para. 2 above, and any others will also offer their services for the committee, and will all forward their names and addresses to me, I will endeavour to get the organisation started.

PERSONALS.

Married

Maj. **HENRY COCKERELL**, O.B.E., R.A.F., son of the late Henry Cockerell and Mrs. Cockerell, of Osterley Park, was married on September 24 at Ufton Church, Warwickshire, to **AMY GERTRUDE**, daughter of Mr. and Mrs. **REED**, of Ufton.

NOEL MANSFELD DALES, late R.A.F., youngest son of the late Eli Dales and of Mrs. Dales, of Bishops Wilton, Yorks, was married on September 23 at St. Nicholas, Kenilworth, to **WINIFRED ALICE**, only daughter of the late Maj. J. C. **STRINGER**, Royal Warwickshire Regt., and of Mrs. Stringer, of Park Hill, Kenilworth.

Capt. G. R. A. **DEACON**, M.C., R.A.F., younger son of Mr. A. W. Deacon, J.P., of Swindon, was married on September 25, at Moreton-in-Marsh, to **EDITH MARY RIDDEY**, elder daughter of Mr. J. A. Riddey, of Moreton-in-Marsh, Glos.

Capt. **HUBERT E. GODDARD**, R.A.F., late East Yorks Regt., younger son of Col. W. E. Goddard, J.P., V.D., D.L., and Mrs. Goddard, of Thwaite House, Cottingham, Yorks, was married on September 16 at Durley Church, to **ENID BERNARD**, daughter of the late Mr. **EDMUND BERNARD**, J.P., and Mrs. Bernard, of Snakemoor, Botley, Hants.

Capt. **WILFRID CHARLES GREEN**, M.C., R.A.F., late Royal Fusiliers, elder son of Mr. and Mrs. A. E. Green, Datchworth, Herts, was married on September 23 at St. Peter's, Sudbury, to **PHYLLIS**, second daughter of Mr. and Mrs. H. H. **BAKER**, Sudbury.

Capt. **BERNARD ARCHIE TAYLOR**, R.A.F., only son of Mr. and Mrs. A. Taylor, of Dunollie, Crawley, was married on September 20 at St. Margaret's, Angmering, to **KITTY**, third daughter of the late Capt. H. F. **LEICESTER LOCOCK**, and of Mrs. Leicester Locock, of Pooks Hill, Angmering, Sussex.

To be Married

The engagement is announced between Capt. O. H. **FROST**, B.E., M.C., R.A.F., only son of the late Mr. Robert Frost and Mrs. Frost, of 11, Coleherne Road, S.W., and **PAMELA LUCY MARY**, elder daughter of the late Mr. **HERBERT SNOWDEN** and Mrs. Snowden, of 80, Elm Park Gardens, S.W.

A marriage has been arranged, and will shortly take place, between Lieut. **KENNETH MILNER HARRIS**, the Suffolk Regt., attached R.A.F., youngest son of the Rev. Charles P. Harris, M.A., B.C.L., LL.D., Oxford, of Staplegrove Rectory, Taunton, Somerset, and of Mrs. Harris, and **ALYS**, elder daughter of Mr. H. B. **BURNS** and Mrs. Gower-Burns, Christchurch, New Zealand.

The engagement is announced between Capt. C. N. **JONES**, A.F.C. (late R.A.F.), only son of the late Alfred G. Jones, of Shantung, China, and of Mrs. Jones, Elmhurst, Lonsdale Place, Derby, and **DOROTHY**, elder daughter of the late **GEORGE M. STAFFORD**, of Sydney, Australia, and of Mrs. Stafford, 68, Holland Park Avenue, W. 11.

The engagement is announced between **KENNETH CHAPELOW LESLIE**, late lieut., R.A.F., of Launceston, Cornwall, and **DORIS ELLEN**, only daughter of Mr. and Mrs. **TAYLERSON**, of Stranton, Reigate.

The engagement is announced between Capt. **GARTHSHORE TINDAL PORTER**, R.G.A. and R.A.F., eldest son of the late T. P. Porter, Esq., Government Surveyor, Queensland, Australia, and of Mrs. Porter, late of Cheltenham, and **CHRISTINE CECILIA**, elder daughter of Mr. and Mrs. **ALBERT STEPHENS**, Gloucester.

The marriage between Lieut. R. J. **RODWELL**, R.A.F., and **MARGERY**, eldest daughter of Mr. and Mrs. **LIVOCK**, of Newmarket, will take place on Tuesday, October 21, at the Roman Catholic Church, Newmarket, at 2.30.

Item

Lieut.-Gen. Sir **DAVID HENDERSON** has been promoted by M. Poincaré to the rank of Grand Officier of the Legion of Honour.

◆ ◆

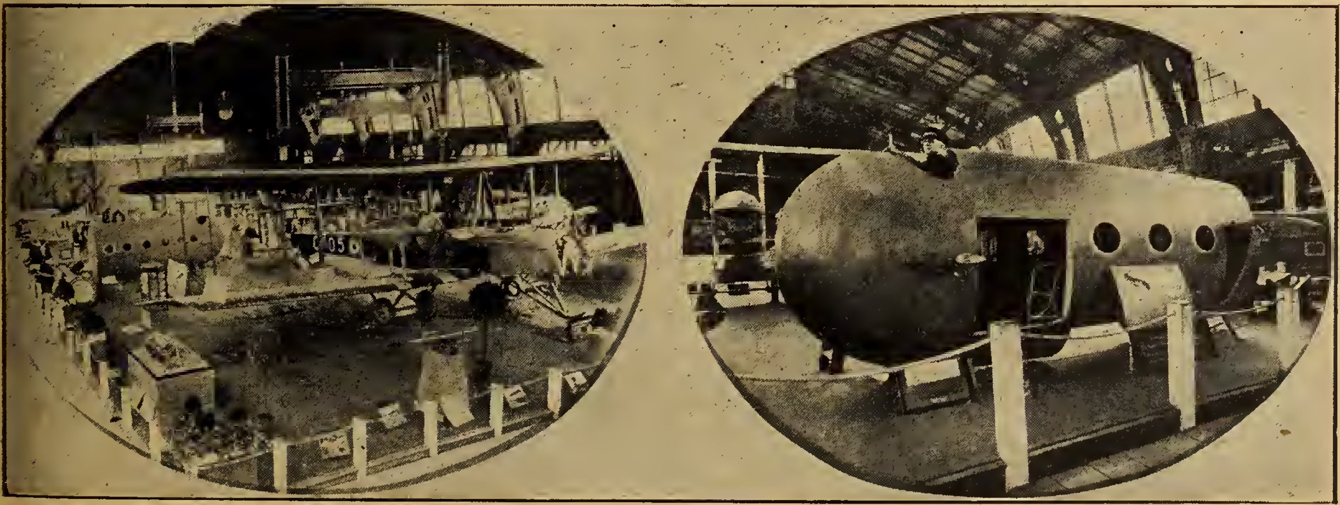
Fast Flying in France

A BRIEF message from Paris on September 25 stated that the aviator Lecointe had beaten the speed record, exceeding 265 km. (about 166 miles) an hour, but the effort does not appear to have been officially observed.

◆ ◆

A Fatality in Italy

ACCORDING to the Rome journal, *Epoca*, a British aeroplane *en route* for Rome and Cairo, when near Lake Bracciano, crashed and caught fire, Capt. C. H. Darley, the pilot, being burned to death, and Capt. Chas. Darley injured.



VICKERS IN HOLLAND: Two views of the Vickers stand at the E.L.T.A. show at Amsterdam. On the left a general view of the stand, showing the Vickers-"Vimy," and on the right the front portion of the *fuselage* of a Vickers-Vimy commercial.

THE ROYAL AIR FORCE

London Gazette, September 23

Permanent Commissions

The notification appearing in the *London Gazette* of Aug. 1, appointing the following officers to permanent commns., is cancelled :—Lieut.-Col. A. E. Cairnes, D.S.O., Maj. W. D. S. Sanday, D.S.O., M.C. (A.) ; Capt. C. H. Darley, D.S.C., D.F.C. (A.) ; Capt. E. J. L. Gilchrist, M.C., D.F.C. (A.) ; Capt. T. E. B. Howe, A.F.C. (A.) ; Capt. P. E. M. Le Gallais, A.F.C. (A.) ; Capt. A. S. Redfern (A.) ; Capt. G. M. T. Rouse (A.) ; Lieut. N. S. Dewey, M.C. (A. and S.) ; Lieut. R. R. Evans (A.) ; Lieut. G. G. G. Graves (A.) ; Lieut. H. N. Loch (A.) ; Lieut. D. S. Robertson (A.) ; Lieut. A. W. Simon (A.) ; Lieut. P. L. Stephens (Ad.) ; Lieut. W. F. Williamson (A.).

The surname of Lieut. E. J. D. Townesend (S.O.) is as now described, and not "Townshend," as in *Gazette* of Aug. 1.

The initials of Lieut. J. W. Nixon (Ad.) are as now described, and not "L. M.," as stated in *Gazette* of Aug. 1.

The following temporary appointments are made at the Air Ministry :—

Staff Officers, 2nd Class.—Air.—Flight Lieut. D. S. K. Crosbie ; Aug. 27 ; Flight Lieut. F. N. Halsted, D.S.C. ; Sept. 15.

The following temporary appointment is made :—

Staff Officer, 1st Class.—Air.—Wing Comdr. A. W. Bigsworth, C.M.G., D.S.O., A.F.C. ; Sept. 17, vice Sqdn. Leader C. E. Maude.

Flying Branch

The following Majs. are graded for purposes of pay and allowances as Lieut.-Cols. whilst employed as Lieut.-Cols. (A. and S.) :—J. S. Mills, D.S.C. (from April 22 to July 31) ; S. H. B. Harris, A.F.C. (from May 1 to Aug. 9).

The following Capts. are graded for purposes of pay and allowances as Majs. whilst employed as Majs. (A.) :—I. N. C. Clarke, D.S.C. (to May 17), C. J. Truran, A.F.C. (to June 30), J. H. D'Albiac, D.S.O. (from July 24 to July 31) ; May 1.

Capts. to be graded for purposes of pay and allowances as Majs. whilst employed as Majs. (K.B.) :—A. T. Moore, O.B.E., M. H. Spencer (to June 29) ; May 1.

Capt. K. B. Harborn to be Capt. (A.), from (S.O.) ; March 15 (substituted for the notification in the *Gazette* of July 15).

Lieut. (Hon. Capt.) C. E. Holman to be actg. Capt. whilst employed as Capt. (A.), from Oct. 31, 1918, to April 30.

The following Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts. (A.) :—J. D. Seal (from May 1 to June 30 ; S. B. Collett (from May 17 to July 31) ; C. G. Mathew ; July 8.

Lieut. (Hon. Maj.) (actg. Capt.) G. T. Barry to be Lieut. (Hon. Maj.) (K.B.), and relinquishes the actg. rank of Capt. on ceasing to be employed as Capt. ; June 1.

Lieut. G. H. Langley relinquishes the grading for pay and allowances as Capt. on ceasing to be employed as Capt. (A.) ; June 24.

Flying Officer H. B. Pett, M.C., relinquishes the grading for pay and allowances as Flight Lieut. on ceasing to be employed as Flight Lieut. (A.) ; Sept. 1.

Flying Officer M. A. Benjamin, M.C., to be Flying Officer (A.), from (S.O.) ; Aug. 19.

Sec. Lieuts to be Lieuts.—H. C. Wright ; April 28, 1918. C. E. Tidy ; March 23. P. J. Dowell ; March 27 (substituted for the notification in the *Gazette* of July 29). Alex. Shepherd ; May 4 (substituted for the *Gazette* of July 29, wherein this officer was described as "Arthur Shepherd").

Sec. Lieut. D. O. Onslow-Carleton (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (A.) ; Feb. 11.

W. R. Wood (Temp. Sec. Lieut., Manch. R.) is granted a temp. commn. as Sec. Lieut. (O.) ; May 18, 1918.

The following relinquish their commns. on ceasing to be employed :—Lieut. W. B. Ferrier (Lieut., Cent. Ont. R.) ; Sept. 10. Capt. J. H. C. Minchin (Capt., Sco. Rif.) ; Sept. 15. Sec. Lieut. N. Cave (Lieut., R. Sussex R.) ; Sept. 16.

(Then follow the names of 69 officers who are transfd. to the Unemployed List under various dates.)

Maj. F. W. Honnett relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; Sept. 9.

Lieut. W. E. Joseph (R.F.A.) relinquishes his commn. on account of ill-health caused by wounds, and is granted rank of Capt. ; Aug. 22.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—K. D. MacLeod ; July 12 (substituted for notification in *Gazette* Feb. 28). L. A. Bushe (contracted on active service) ; July 19. R. S. V. Morris ; Aug. 3, 1918.

Lieut. E. R. Gunner resigns his commn. ; Sept. 24.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—E. S. Noble ; July 12. P. V. Tempest ; Sept. 13.

Sec. Lieut. G. Hughes to take rank and prec. as if his appointment as Sec. Lieut. bore date Jan. 11.

Sec. Lieut. S. N. Giroux to take rank and prec. as if his appointment as Sec. Lieut. bore date Oct. 24, 1918.

The notification in *Gazette* July 16, 1918, concerning Sec. Lieut. M. E. Miller is cancelled. The notification in *Gazette* April 9, 1918, stands.

The notification in *Gazette* April 11 concerning Lieut. E. F. Jones is cancelled.

The notification in *Gazette* of July 11 concerning Sec. Lieut. A. G. Ely is cancelled.

Administrative Branch

Maj. R. Cockburn, O.B.E., is graded for pay and allowances. as Lieut.-Col. whilst employed as Lieut.-Col., from May 1 to July 30.

Maj. A. E. Loder to be Maj., from (S.O.) ; July 18.

Sqdn. Ldr. G. H. Thomson, O.B.E., to be Sqdn. Ldr., from (S.O.) ; Aug. 29.

Flying Officer (Hon. Flight Lieut.) D. C. G. Sharp to be actg. Sqdn. Ldr. whilst employed as Sqdn. Ldr. ; Aug. 1.

Capt. H. C. Mallett, M.B.E., is graded for pay and allowances as Maj. whilst employed as Maj. ; May 1 to July 12.

Flight Lieuts. to be Flight Lieuts., from (S.O.) :—F. J. Gray, O.B.E. ; Aug. 1 (substituted for notification in *Gazette* of July 4). G. M. Broadburn, A. Warnock ; Aug. 15.

The following Lieuts. are graded for pay and allowances as Capts. whilst employed as Capts. :—L. B. Nicholls ; May 1. A. H. Tarper, from May 1 to 19. F. W. H. Durrant, from (T.), from May 1 to Aug. 16.

Lieut. (Hon. Maj.) A. J. Battine is graded for purposes of pay and allowances as Capt. whilst specially employed ; June 8.

Lieut. H. Gwynne-Smith relinquishes grading for purposes of pay and allowances as Capt. on ceasing to be employed as Capt. ; June 30.

Lieut. A. Eggar to be Lieut., from (S.O.) ; July 5 (substituted for notification in *Gazette* of July 22, wherein this officer was described as L. A. Eggar).

Flying Officers to be Flying Officers., from (S.O.) :—J. A. H. Savage ; Aug. 15. H. C. Pyper ; Sept. 1.

Sec. Lieuts. to be Lieuts. :—(Hon. Lieut.) L. B. Clarkson ; April 2, 1918. W. Simmonds ; Jan. 10. W. R. Wood ; Feb. 1 (substituted for notification in *Gazette* of Feb. 4). E. P. Woodman ; June 20.

Sec. Lieut. W. R. Wood to be Sec. Lieut., from (O.) ; Oct. 8, 1918 (substituted for notification in *Gazette* of Nov. 5, 1918).

Sec. Lieut. H. Preston (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. ; Sept. 28, 1918.

Lieut. D. S. Cairnes (Lieut., Rif. Bde.) relinquishes his commn. on ceasing to be employed ; June 17.

(Then follow the names of 22 officers who are transfd. to the Unemployed List under various dates.)

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—K. D. Kayler ; May 20 (substituted for notification in *Gazette* Jan. 10). G. J. Murphy (contracted on active service) ; July 12. C. W. Tuck ; July 12 (substituted for notification in *Gazette* of Jan. 7).

The notification in *Gazette* July 22 concerning Sec. Lieut. G. J. Murphy is cancelled.

The notification in *Gazette* Feb. 28 concerning Lieut. B. W. Blayney is cancelled.

The notification in *Gazette* Aug. 9, 1918, concerning Lieut. C. R. Ansell (R.W. Surr. R.) is cancelled.

The notification in *Gazette* Aug. 2, 1918, concerning Sec. Lieut. R. S. V. Morris is cancelled.

The notification in *Gazette* Feb. 21 concerning Lieut. N. Smith is cancelled.

The notification in *Gazette* May 23 concerning Sec. Lieut. C. H. Marston is cancelled.

The notification in *Gazette* Oct. 15, 1918, concerning Sec. Lieut. H. Preston is cancelled.

Technical Branch

To be actg. Majs. whilst employed as Majs., Grade (A.) :—Capt. K. D. Abercromby, from (Ad.) ; April 1, 1918 (substituted for the notification in the *Gazette* of April 19, 1918). Lieut. T. L. F. Burnett, M.B.E. ; May 1 (substituted for notification in the *Gazette* of July 15).

The following Capts. are graded for purposes of pay and allowances as Majs. whilst employed as Majs., Grade (A.) :—J. Stewart, E. Holloway, O.B.E. (to May 21) ; May 1.

Capt. W. J. Waddington relinquishes the grading for purposes of pay and allowances as Maj. on ceasing to be employed as Maj., Grade (A.) ; July 25.

Flight Lieut. N. V. Wrigley to be Flight Lieut., Grade (B.), from (S.O.) ; Aug. 1.

Lieut. (actg. Capt.) A. W. Furbank to be Lieut., Grade (B.), and to relinquish the actg. rank of Capt. on ceasing to be employed as Capt. ; Dec. 1, 1918.

Lieut. W. R. Lewis relinquishes the grading for purposes of pay and allowances. as Capt. on ceasing to be employed as Capt., Grade (B.) ; May 29.

Lieut. R. G. Whitcombe relinquishes the grading for purposes of pay and allowances as Capt. on ceasing to be employed as Capt., Grade (A.) ; July 21.

Lieut. K. I. Goodman to be Lieut., Grade (A.), from (Ad.) ; May 17, 1918 (substituted for the notification in the *Gazette* of Sept. 3, 1918).

Lieut. (Hon. Capt.) G. M. Nobbs is graded for purposes of pay and allowances as Lieut. whilst employed as Lieut., Grade (B.) ; Nov. 26, 1918.

Lieut. B. S. S. Rockey to be Lieut., from Unemployed List ; Feb. 7, with precedence next below Lieut. A. S. Dunn.

Sec. Lieuts. to be Lieuts. :—(Actg. Capt.) W. W. Hammond ; April 2, 1918, and to retain the actg. rank of Capt. until April 30 (substituted for notification in the *Gazette* of Aug. 29) : E. A. Cater, May 3 (substituted for notification in the *Gazette* of July 29).

V. G. Darrington (Lieut., R.F.A.) is granted a temp. commn. as Lieut., Grade (A.) ; Nov. 5, 1918, with seniority from April 1, 1918 (substituted for notification in the *Gazette* of Nov. 26, 1918).

Sec. Lieut. (Hon. Lieut.) H. R. Sterrett to be Lieut., without pay and allowances of that rank ; April 2, 1918.

(Then follow the names of 22 officers who are transfd. to the Unemployed List under various dates.)

Lieut. C. M. Kelly relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank ; Sept. 9.

The following are removed the Service, His majesty having no further occasion for their services as officers :—Lieut. A. C. Hankey, Sec. Lieut. C. J. Young ; Sept. 24.

Medical Branch

Transferred to Unemployed List :—Capt. W. H. Payne ; Feb. 24. Sqdn. Leader (actg. Wing Comdr.) F. F. Muecke, C.B.E. ; Aug. 31.

Memoranda

The following relinquish their commns. on ceasing to be employed :—Temp. Hon. Lieut. F. W. Hedgecock ; Aug. 20. Temp. Hon. Lieut. H. Bedson ; Sept. 16.

(Then follow the names of six officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. A. L. Maquard is dismissed the Service by sentence of a General Court-martial ; Aug. 20.

The notification in the *Gazette* of Aug. 8 and Aug. 19 concerning Capt. P. P. C. Penberthy are cancelled.

The notifications in the *Gazette* of Aug. 22 concerning Sec. Lieut. R. J. Walker and Pilot Officer C. A. Russell are cancelled.

The notification in the *Gazette* of Sept. 9 concerning Capt. S. M. Wood is cancelled.

◆ ◆ ◆ ◆

To Fly to the Philippines

TENTATIVE plans are now under consideration for a seaplane flight from San Diego (California) to the Philippines, *via* Hawaii and Wake Island (north of the Marshall Islands), and Guam.

Lively Times at Kronstadt

BRITISH flying officers, according to reports from Viborg, are keeping Kronstadt uninterruptedly in suspense. From 140,000 to 180,000 lbs. of explosives are reported to have been dropped on the fortress.

FOSTERING AVIATION IN FRANCE

What France is doing to encourage aeronautics was admirably summarised the other day by Gen. Duval, in an interview with *The Times* correspondent in Paris. Gen. Duval, who was once commander of all the French military air forces of the armies on the Western front, is now in charge of the main organising body for French flying, which holds its authority from none but the Cabinet. The General said :—

"Flying here has been classed into four groups : military, naval, colonial and ordinary civil flying. The third type so far exists purely in theory. Such separation into classes will, we hope, prevent the abuse of 'red tape.' You will notice the flexibility of the system, which fact, we expect, will encourage initiative and progress through rivalry.

"Over the first three official classes there is this office which I govern. Here is a service dealing with technical matters, and another which is responsible for the placing of all orders with manufacturers on behalf of the flying forces of the Army, the Navy, or Colonial aviation. The third service studies and undertakes on behalf of the Government construction of all national air routes. It is the duty of our technical body here to supply the chiefs of the Army or Navy with all the results of its research, such research being no longer undertaken by themselves.

"Our connection with civil flying is very slight, and that with a purpose. Private initiative is free to do what it likes, untrammelled by Government restrictions. Government will not control by 'don'ts,' but only by repeating 'If you act as we prefer you will receive help in the form of a premium.' It is with the above principle in view that there are no postal letter services owned by the State, for State monopolies would arrest progress. On the contrary, all services of public convenience are to be in the hands of private companies. All we do is to give encouragement.

"Premiums are given for all sorts of things. Aeronautical companies are allowed so much for the following items :—Possession of machines of special speed or weight-carrying power and machines of special durability (400 hours' flight is considered to be standard A 1) ; employment of good pilots and a percentage of craft which on an average could be at a moment's notice, in case of war, requisitioned with their pilots by the Government ; good motors and good material in general ; and good hours of flight. A firm in a first-class way, it is estimated, has thus at the present moment half its running expenses repaid by the Government. It rests with its own energy to make a firm a paying concern.

"The premiums system has already been organised for the benefit of manufacturers of motors, aeroplane parts, and entire machines. Parliament has already made a grant of 9,000,000 f. (£360,000) for this purpose. A general competition is to be started in Jaunary, 1920, and will be open till the end of next July, during which period premiums can be won by any French firm.

"The novelty in the scheme lies in this :—Instead of a premium being paid only to a firm which has produced a finished machine which is judged to be a great improvement, it is intended to encourage each stage of manufacture, and as soon as one stage is approved of to make a grant. Thus an inventor or manufacturer may have the necessary means to continue research and attempt success at the second stage. In this way the approval even of designs would merit a money allowance to permit a model to be made, and approval of the model would cause a grant of further funds for the next step in manufacture. And so nobody with brains but without capital need ever despair."

The General continued :—

"Besides the fixing of the 'cadre' from which all is to grow, we have conducted numerous technical experiments. We intend to connect Paris with the capitals of neighbouring States, and to build air routes between districts which have bad train services. The railway routes mainly run towards Paris ; we therefore intend to create air routes 'across country,' for example Bordeaux to Nice and Bordeaux to Nancy. This is to give airmen greater chances of commercial profits. Next year we expect to have built aerodromes between Boulogne, Paris, Lyons and Nice, thus covering part of the East Indian trade route.

"Our goal—a less formidable task for us than it would be for you—is to link up all parts of our Empire by air. For this we are now experimenting as far as Morocco. In time we shall have managed to connect this colony with Senegal, the Sahara, and the Congo. For this reason we have included in our scheme the formation of a 'colonial air service.'"

◆ ◆ ◆ ◆

SIDE-WINDS

The Sheffield municipal authorities certainly do not believe in hiding their light under a bushel. They publish a series of booklets setting forth the advantages of the Steel City as a business and commercial centre, and the newest one, just issued, deals with the transport facilities of the city. It deals not only with railways, waterways, highways, tramways and motor 'buses, but also "airways"—showing that Sheffield is right up to date in her ideas. Copies of the booklet—or any of the others which have been issued—can be had post free on application to the Development Department, Town Hall, Sheffield.

- - -

In connection with the aerial mail from Folkestone to Cologne which has recently continued, it may be noted that the service was carried out by two squadrons of the R.A.F., one of which was equipped with D.H. 9A aeroplanes fitted with 400 h.p. "Liberty" engines, while the other was provided with D.H. 9 aeroplanes fitted with 230 h.p. Siddeley "Puma" engines. The former type of machine performed the complete journey in an average of 3 hours 14 mins., while the other equipped with a much less powerful type of machine took only 8 mins. longer. The average weight of mail carried per journey was over 160 lbs.

- - -

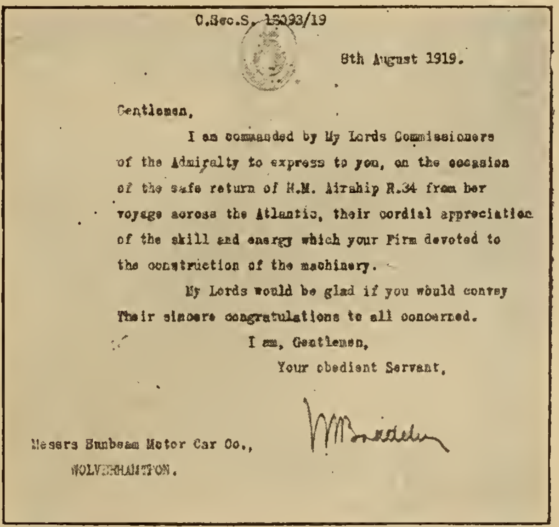
With the laudable idea of providing a further means of relaxation for the employees of the Sunbeam Motor Car Co., Ltd., a musical society has just been successfully started, and the results achieved are extremely encouraging. The society consists of three sections, orchestral, choral and a military band, and has a total membership at present of about 200. Much enthusiasm is being displayed, and it is confidently anticipated that the venture will prove a decided success.

- - -

The Leeds depôt of Palmer Tyres, hitherto situate at 54, New Briggate, has been transferred to more commodious premises at York Road, North Street Corner, Leeds. Unfortunately, owing to labour difficulties, the necessary construction work at the new depôt is not quite finished, and although for the time being the Leeds staff are working under difficulties, the manager of the depôt, Mr. Pepper, will use his best endeavours to give prompt attention to the requirements of all their friends in the trade.

- - -

A scrap of paper of which the Sunbeam Motor Car Co. Ltd., thinks quite a lot is the letter expressing the appreciation of the Lords Commissioners of the Admiralty of the work done by the Sunbeam Co. in connection with the machinery of the R 34. The letter is reproduced herewith.



C.Sec.S. 15393/19

8th August 1919.

Gentlemen,

I am commanded by My Lords Commissioners of the Admiralty to express to you, on the occasion of the safe return of H.M. Airship R.34 from her voyage across the Atlantic, their cordial appreciation of the skill and energy which your Firm devoted to the construction of the machinery.

My Lords would be glad if you would convey Their sincere congratulations to all concerned.

I am, Gentlemen,
Your obedient Servant,

Messrs Sunbeam Motor Car Co.,
WOLVERHAMPTON.

R80 to be Completed

As was anticipated the airship R80, now under construction by Messrs. Vickers (Ltd.) is to be completed. At the time when the Government stopped all work on rigid airships it was pointed out that as R80 was 95 per cent. completed, it would be cheaper to finish than to scrap, and this argument has apparently prevailed. Messrs. Vickers are bringing back to their construction shed many of the men who were temporarily diverted to other work, and it is hoped that R80 will be completed well before December.

Wireless on the London—Paris Route

THE Air Ministry makes the following announcement:—Wireless communication has now been established between the civilian aerodromes at Hounslow (London) and Le Bourget (Paris). Messages can be transmitted between 6.45 a.m. and 7 p.m., Greenwich time. Wireless communication on this route is only available for "Air Service Messages" (viz. messages regarding the arrival and departure of aircraft, weather reports and urgent messages asking for assistance, etc.)

Messages of a private or personal nature will not be transmitted.

Information as to the handing in and delivery of messages, etc., can be obtained from the Cival Aviation Traffic Officer at the aerodrome.

Demobilising the W.R.A.F.

ON September 1 there were in the W.R.A.F. 14,345 women, of whom 343 were on the Rhine, 657 in France and Flanders, and 13,345 in England. Up to September 24 the numbers in England had been reduced to 3,298. The W.R.A.F.'s who have been doing duty with the Army of Occupation on the Rhine have been ordered home, and, of those in France and Flanders, some are returning at once, and others will be relieved as soon as skilled men are ready to be sent out.

The Royal Air Force wishes it to be known that women wearing the well-known blue uniforms are not part of its establishment unless they are also wearing the badge marks. The demobilised W.R.A.F. is allowed to wear her unbadged uniform, and many of the girls are doing so.

Air Raid Compensation

THE Air Raid Compensation Committee is dissolved, and the office at 13, Abchurch Lane, King William Street, E.C., will be closed as from next Wednesday. All correspondence regarding the business of the committee should be addressed after that date to the War Risks Insurance Office, 53, Cornhill, E.C.

Gift for Sheffield University

AT the concluding meeting of the Institute of Metals at Sheffield University, Mr. W. H. Allen, a member of the Council of the Institute, presented to the University a complete nine-cylindered Le Rhone engine. In making the presentation, Mr. Allen said it was fitting that the city which had produced the steel used in the making of the engine—of which 3,000 had been made by his firm—should possess a specimen of the finished product. Mr. Allen predicted that engineers would ultimately achieve their ambition to produce an engine developing one horse-power per pound of weight.

Dr. Ripper, head of the Applied Science Department of the University, in accepting the gift, said that it would be to the students a striking example of inventive work and manipulative skill, as well as of the splendid work of the metallurgist.

A "Round the World" Race

AN ambitious competition is announced by the Aero Club of America in the shape of a race round the world. Competitors will be permitted to use as many machines as they like in the race, and may use dirigibles for all or any part of the course. In addition they will be allowed to use any other means of transport for making connections between aircraft to the extent of 10 per cent. of the total distance to be covered. Alternative routes will be given to competitors for crossing the Atlantic and Pacific. A committee of experts, headed by Commodore Louis Beaumont, president of the Flying Officers' Club, Paris, will start on a tour round the world shortly to arrange the routes and landing places. It is stated that the prizes offered will aggregate £200,000.

Fokker's Property Seized

FROM a statement issued by the Tax Office at Schwerin it appears that the property in Germany of the well-known aeroplane builder, M. Fokker, who is now staying in Germany, has been seized, owing to his failure to provide the 14,250,000 marks demanded by the taxation authorities as security against the exodus of capital from Germany.

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl.=cylinder; I.C.=internal combustion; m.=motors.

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published October 2, 1919

19,130. H. LEITNER. Screw propellers. (131,933.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published October 2, 1919

5,248. E. R. CALTHROP. Parachutes. (131,939.)
5,619. A. MOND. Doping aeroplane, etc., fabrics. (131,090.)
7,730. R. F. S. VALERI. Screw propeller. (131,951.)
10,663. G. H. THOMAS and B. C. HUCKS. Starting aeroplane engines. (131,962.)
11,149. D. J. MOONEY. Metal construction for aircraft. (131,969.)
11,979. A. V. ROE AND CO. and R. CHADWICK. Hinged aerofoils. (131,975.)
12,271. SPERRY GYROSCOPE CO. Gyroscopic stabilisers. (131,979.)
12,524. G. B. HARRISON and A. L. RAWLINGS. Gyroscopic stabilisers. (131,987.)
12,622. G. A. ROSSITER. Gyroscopic compasses. (131,990.)
13,667. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Flying boats. (132,002.)
14,129. J. L. TRAVERS. Flying-boats. (132,012.)
14,133. C. H. DAVIES. Aircraft framework. (132,013.)
14,136. A. G. HERRING and W. J. GOODING. Screw propellers. (132,014.)
14,266. H. N. WYLIE. Metal aircraft members. (132,025.)
14,267. H. N. WYLIE. Metal struts for aircraft. (132,026.)
14,472. A. J. T. IRELAND. Metal airscrews. (132,040.)
14,515. S. DIGGLE. Aerial propellers. (132,043.)
14,624. C. J. LAKE. Hulls for hydro-aeroplanes, etc. (132,050.)
15,341 and 15,342. A. ANZANI. I.C. engines. (132,070 and 132,071.)
16,120. G. H. E. WHITEWAY. Landing devices for aircraft. (132,092.)
16,369. H. N. WYLIE. Connecting metal aircraft members. (132,094.)
19,646. D. J. MOONEY. Metal spars, longerons, etc. (132,124.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published September 18, 1919

648. J. B. TUCKER. Devices for measuring speed of aircraft, etc. (131,536.)
7,495. A. G. POINTING. Facilitating movements of aeroplanes on the ground. (131,557.)

Published September 25, 1919

12,726. H. MIDDLETON. Mechanical wings. (121,862.)

Published October 2, 1919

720. D. J. MOONEY. Metal construction for aircraft. (132,153.)
1,182. SOC. DES MOTEURS SALMSON (CANTON-UNNE). I.C. engines. (132,154.)
6,635. G. CAPRONI. Multiplane flying-machines. (132,193.)
12,895. C. J. LAKE. Hulls for floats, etc. (132,215.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xliii, xliv, xlv, and xlvi).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates*:—

UNITED KINGDOM	s.	d.	ABROAD*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 563 (No. 41, Vol. XI.) OCTOBER 9, 1919 [**Weekly. Price 6d. Post Free, 7d.**

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY W.C. 2.
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**
These rates are subject to any alteration found necessary under abnormal conditions
**European subscriptions must be remitted in British currency.*

CONTENTS

Editorial Comment PAGE
The End of a Catastrophic Strike 1329
Aerial Mails in the Strike 1330
The Freedom of the Press 1330
A Useful Lead 1332
The Citizen Guard 1332
Flight—and the Men: Capt. P. D. Acland 1331
The Cato Sporting Monoplane 1334
Radiator Position 1338
The Cato 72 h.p. Aero Engine 1341
Prediction of Aeroplane Performance 1343
Beardmore Engines 1344
The Oertz Flying Boats 1346
Airisms 1350
The Royal Air Force 1353
Side-Winds 1355

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Nov. ...	Entrance Examination for R.A.F. College.
Nov. 7-15...	Olympia Motor Car Show.
Dec. 3 ...	" The Air Force." Lecture by Air-Commodore H. R. Brooke-Popham before R.U.S.I.
Dec. 19 to .. Jan. 4, 1920.	Paris Aero Show.

EDITORIAL COMMENT

The End of a Catastrophic Strike

THE week-end saw the railwaymen's strike settled, thanks to the mediation of the leaders of the transport unions and to the spirit of reasonableness displayed at the eleventh hour by the Executive of the National Union of Railwaymen, whose precipitate hot-headedness plunged the railway services of the country into a state of anarchy. The terms of the settlement were such as the Government had offered before the strike, with the single concession that wages adjustment shall not take effect downwards until September 30, 1920, instead of on March 31 next. Even then no such adjustment can take place until the cost of living has fallen to 110 per cent. above that of 1914. No sane person looks forward with very much optimism to any such fall in the cost of living, so what the railwaymen have gained by their action is precisely nothing at all. Under the terms of the original Government declaration, wages were not to be reduced until costs had fallen as stated, and if we agree that they are not likely to drop much within the next twelve months, we see that all the strife, all the dislocation of trade, with its consequent loss to the community, could have been avoided if the men's leaders had not been out to seek trouble. However, the thing is settled now, and there can be no use in bandying recriminations.

Among the lessons that have been taught by the strike and which we devoutly trust the nation will lay to heart is that of the power of road and aerial transport to bridge the gap caused by the total cessation of the railway services. The nation has been fed and supplied by motor transport running on the roads. The mails have been delivered and urgent passenger services conducted by aeroplane. Inconvenience and loss there has been undoubtedly, but the basic fact stands out that the nation has *not* been starved into submission. Instead, food has never been more plentiful since the Armistice, and eyes have been opened to the superiority of motor transport for many essential services. So much so is this the case that in many directions traffic which has hitherto been borne by the railways will in future be carried entirely by road.

All that has been achieved has been done, be it remarked, with an organisation got together almost at a moment's notice and with fleets of vehicles gathered from all corners of the country. Of permanent organisation there was nothing at all. Yet we have seen how well and smoothly everything has worked. All this will be lost, however, if the country is allowed to forget the debt it owes to the motor vehicle and the aeroplane. Beyond a doubt the real future of transport lies along the roads and in the air. We are not going to be so rash as to prophesy that the day of the railway is drawing to an end. Still, the railway has been our principal means of transport for a hundred years, and it would be strange if it were to remain so for all time—that would predicate a state of transport finality which we decline to believe has been reached. What we have to make sure of in the future is that the transport services of the country can never again be held up at the behest of a small group of extremists, with or without reason on their side. We are firmly convinced that our best safeguard against this evil is in the strong development of aerial and road transport services which do not depend on the same circumstances as the more trammelled railways. We must develop these services strongly and rapidly until they have reached a stage when the business of the country can be carried on without interruption even though the railways should close down altogether and their tracks become rusty and grass-grown.

◆ ◆ ◆

Aerial Mails in the Strike

In order to cope with the delay to the mails caused by the strike, the Royal Air Force and the Post Office combined to run aerial services between London and the chief provincial cities, and by the end of the week quite a number of them were working efficiently. The Post Office has been criticised for lack of initiative in the matter, and it has been pointed out that although the Air Ministry had months ago worked out plans for carrying on such services in case of emergency, the postal authorities were not over-anxious to avail themselves of the organisation. We do not think the criticism is altogether justified. It should be remembered that the strike was one of the "lightning" variety, and that it only lasted a couple of days over a week. The public, therefore, had not time to realise that aerial services were running, and moreover the cost of carriage, *viz.*, 2*s.* per ounce, was prohibitive except in the case of really urgent business correspondence. Therefore, the mail bags were in most instances very much on the light side. On one morning, for example, a machine left Hounslow for Bristol with 1 lb. 11 oz. of mail! On the other hand, the Brussels air mail went out with 1,400 lbs. and returned with 2,000 lbs. Obviously, then, the question of popularity is for the moment one of public knowledge that aerial mail services are running. It is largely a matter of use and custom.

Where it is known that services are in operation the public is not slow to take advantage of them, but in the matter of the strike services it was impossible to make the facts generally known in the time, and hence they were not very largely used. To blame the Post Office does not seem altogether logical. But after all excuses and explanations are made, it remains quite clear that when next, if ever, there is a stoppage of transport services the Post Office must be thoroughly prepared with plans for the carriage of mails by air. By that time, too, it should be possible to have ascertained with some certainty the cost of such services. Two shillings an ounce seems to be an inordinately high rate for letter postage, and we have no doubt at all that, given the necessary confidence and support by the business community, letters should be carried by air for no more at the utmost than a fourth of the strike figure.

One heartening aspect of these services is that although, roughly, 50 machines were employed in the service there was only a single serious accident to be recorded, and every bag of mail matter was duly delivered. That is a good record, and will undoubtedly assist in creating that public confidence in the dependability of aerial transport which we have always insisted is the first requirement of success in aerial development. The success of the services is the best sort of propaganda possible. Doubtless many business people were compelled to trust their urgent correspondence to aerial post somewhat in fear and trembling as to its fate—the movement is even yet too young to command universal trust. All these have seen that the aeroplane can and does deliver its freight safely, and in far less time than is taken by other means of transport. It is arguable that what these people have been compelled to do by necessity on this occasion they will do of freewill on the next. In other words, they have been converted to the reliability of the aerial service, which has thus made many friends in consequence of its demonstration during the strike. It is an ill wind that blows no one good, and at least the ill-conceived strike of the railwaymen has done aerial development no harm.

◆ ◆ ◆

The Freedom of the Press

One of the things that strikes us most in connection with the recent upheaval is the complete want of logic displayed by certain sections of Labour. They applaud to the echo the poisonous enunciations of such journals as the *Daily Herald*, and the more personally abusive its articles are of those who are striving to carry on the business of the nation the louder their applause. But let the "Capitalist Press" and the "reptile Press"—which seems to include every newspaper and journal but the *Herald* and a few more inconspicuous sheets—say a word against the chosen leaders of the workers, and they are up in arms in a moment. That would not matter much, if that were all. Everyone is entitled to the expression of his own opinion, so long as he does not try to prevent the other side in a controversy from having equal freedom of expression. Apparently, though, that is exactly what a section of Labour partisans do not intend to allow to those who happen to be on the other side of the fence. The letter addressed to Lord Northcliffe by the machine hands employed on the *Daily Mail* is a case in point. These men took exception to the tone of the leading articles on the strike, and expressed the intention of striking if the opinions were not modified. Lord Northcliffe took the only possible course in the circumstances by informing these men, through their leader, that sooner than have the policy of his paper dictated by anyone outside the editorial direction, he would close down altogether. That seems to have brought the men to their senses, since no action was taken, and the *Daily Mail* continues to be published as of yore. Not only the *Mail* encountered this trouble. Apparently there was something like an organised movement to stifle adverse comment on the strike, since in a number of other cases similar attempts were made to dictate policy, but these met with the fate that might have been expected if the men had stopped to think.

If there is one institution that must be more jealously guarded than another it is that of free speech and the untrammelled expression of opinion by responsible organs of public opinion. Once that freedom is lost, then good-bye to all the rest of the safeguards which make public life possible. If the men who last week tried to make trouble would stop to think, they would realise that the right of free speech is one which is subject to the greatest latitude —and quite rightly so. Indeed, strongly as we hold the latter view, we are sometimes inclined to wonder if speech is not too free in this England of ours. Some of the utterances to be heard in the parks

Flight—And the Men

Captain P. D. ACLAND, Manager, Aviation Department, Vickers, Ltd.

"Flight" Copyright

and on the commons are often so nearly verging on absolute sedition as to be indistinguishable from the real thing, and while such freedom is allowed it is surely illogical to endeavour to prevent the other side from being heard. However, there is no need to argue the point further. No attempt on the part of King, Government or proletariat can succeed in muzzling the Press, and for that the nation, including even those who made the ill-advised attempt to dictate to the papers what their strike policy should be, should be profoundly thankful.

* * *

A Useful Lead

In another part of this issue of FLIGHT we publish a communication from Messrs. Beardmore, outlining their policy in the matter of aero engines of their manufacture. Briefly, they seem to have recognised that the shortest way to assist in the development of aerial enterprise is for them, as an individual firm, to prevent the very large number of aero-motors of their manufacture existing at the end of the War from being distributed broadcast and without responsibility. Therefore, they arranged with the Government to re-purchase every one of their engines and all the spare parts the Government were prepared to sell. As Messrs. Beardmore say, this transaction was concluded after a careful review of the trend of aeroplane engine design, the present high productive cost of manufacture, and the impossibility of continuing to manufacture any type in sufficiently large series to enable their being sold at a reasonable price for some considerable time. They contend with perfect justice that the enormous number of aero engines and parts on hand at the end of the War cannot adequately be made use of unless collected and dealt with in a manner which will ensure to the aeroplane manufacturers a power unit of proved merit, and equally important that standing behind it is an organisation of experience, possessed of ample resources, both material and financial, upon whom he can rely to render the necessary assistance as and when required.

We like the idea very much indeed, and congratulate Messrs. Beardmore on their foresight and readiness to adopt a policy which we are convinced is the right one. It is one that we should like to see adopted by every one of the great aero engine-building concerns in the country. Messrs. Beardmore are perfectly right in their premise that it is impossible at the present stage of development to lay down engines for manufacture in large enough series to arrive at cheap production. Nor is there a great deal of necessity for starting engine manufacture on the grand scale, inasmuch as there are many thousands of engines, completed or nearly completed, awaiting disposal. Probably there are enough engines in the country to fill all our aerial needs for the next two years, or possibly even more. But, as again pointed out by Messrs. Beardmore, there is only the one way in which these almost numberless engines can be made of adequate service, and that is by their manufacturers standing behind them, as the Clydeside firm intends to do in the case of its own products. The example is one which we hope to see very widely followed. True, it entails the locking up of a considerable amount of money and the acceptance of a good deal of responsibility. That, however, only requires a little imagination and the same belief in the future of aviation as that shown by Messrs. Beardmore. Not only will such a policy prove to be for the general good of aviation, but it utilises resources which might otherwise be almost entirely wasted—and there is ultimately a substantial profit to be made. We commend the idea to other manufacturers.

* * *

The Citizen Guard

We greatly like the idea of the formation of the Citizen Guard, the purpose of which is to assist in the maintenance of order in times of emergency and to relieve troops and police of routine duty and free them for more important work. It is not only that it is the manifest duty of the good citizen to assist the forces of law and order, but it seems to us that in the Citizen Guard we have something more nearly approaching a real Middle Classes Union than anything we have had hitherto. Needless to say, the Guard will be recruited mainly from the middle classes, which are ever to the fore when there is work to be done or taxation to be paid. We can foresee that a spirit of comradeship and union will be fostered by the Guard, if only the authorities concerned will carry on strenuously with the idea, which will be of infinite use to the middle classes later on. There can be no blinking the fact that there is a real fight for bare existence before the middle clasess. They are being ground between the upper millstone of the profiteer and the taxgatherer and the nether stone of inordinate wages demands by Labour, which have the effect of increasing the cost of living to an intolerable extent where the unfortunate person with a fixed pre-War income is concerned. Many attempts have been made to band the middle classes together for their own protection, but for some reason or other they have not met with conspicuous success. It is quite possible that an organisation like the Citizen Guard, which aims at the protection of the State and the Constitution, may achieve what others have failed in.

* * *

Disbandment of the W.R.A.F.

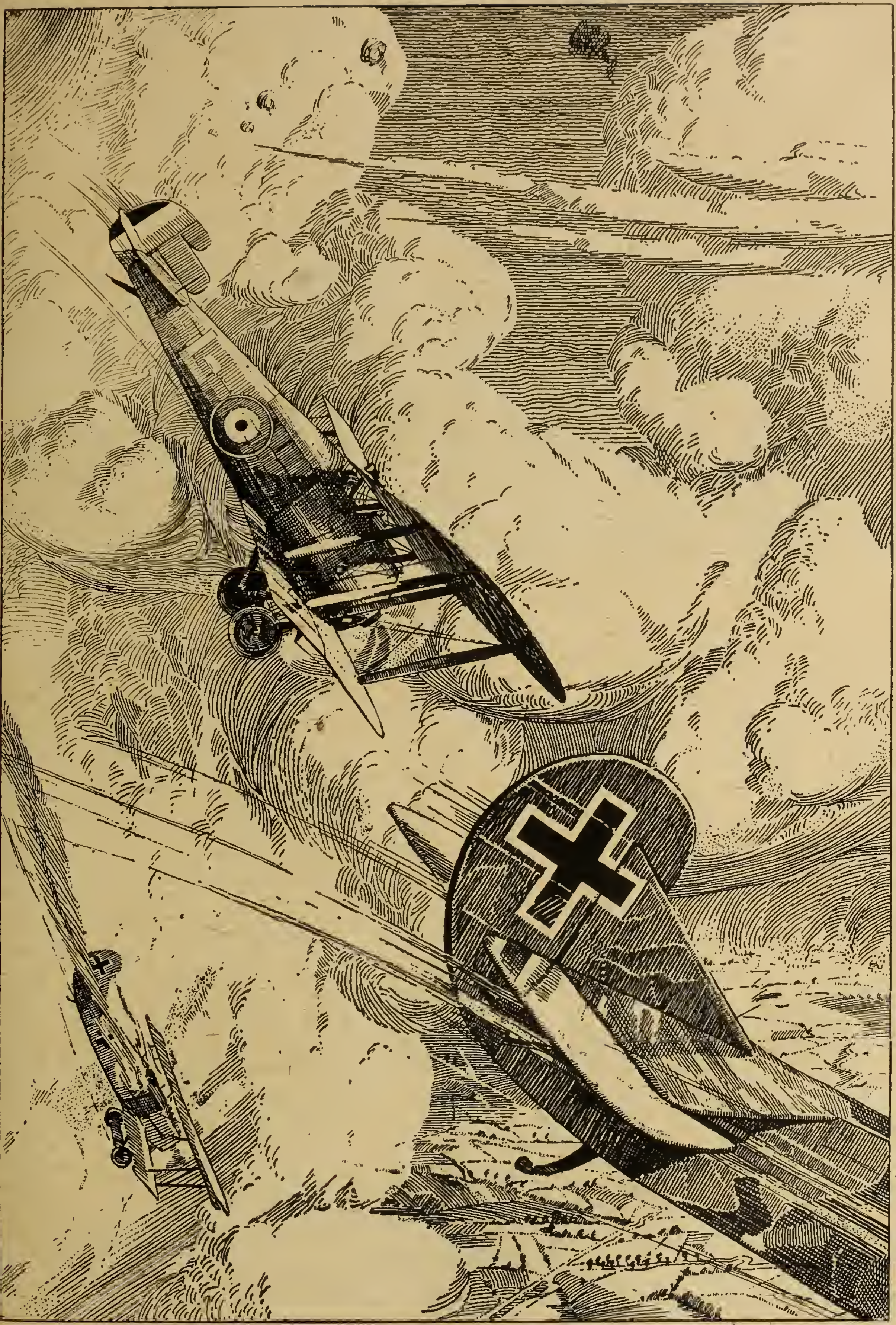
THE Air Ministry announces: An Order has been issued for the final disbandment of the Women's Royal Air Force, which has already been reduced to small proportions through rapid demobilisation during the past few months. The new Order, that demobilisation of the large majority of officers and other ranks, will be completed by November 8. A small number will be temporarily retained for the purpose of closing records, and winding up the affairs of the Force, and other special duties.

The Air Council has also issued the following special Order:—

"The Air Council desire to express their appreciation of the good work done by the Force both during and after the period of hostilities. In spite of much difficulty, and in face of hostile and unjust criticism, the W.R.A.F. has left a record of which they can feel well proud. During hostilities the good work they accomplished went far towards enabling the R.A.F. to reach the dominating position in the air, which had such a direct influence in the achievement of the final victory.

"Subsequent to the Armistice, when it was necessary to disperse a large portion of the airmen to civil life, it was the W.R.A.F. who made it possible for the R.A.F. to meet the demands made upon it, and maintained the service at the aerodromes until new male personnel could be enrolled.

"The necessity for the demobilisation of the W.R.A.F. is now imperative, but in returning to civil life, Commandant Dame Helen Gwynne-Vaughan, D.B.E., officers and members may feel assured that they carry with them the good wishes of the Air Council and a debt of gratitude from the nation."



By J. McGilchrist.

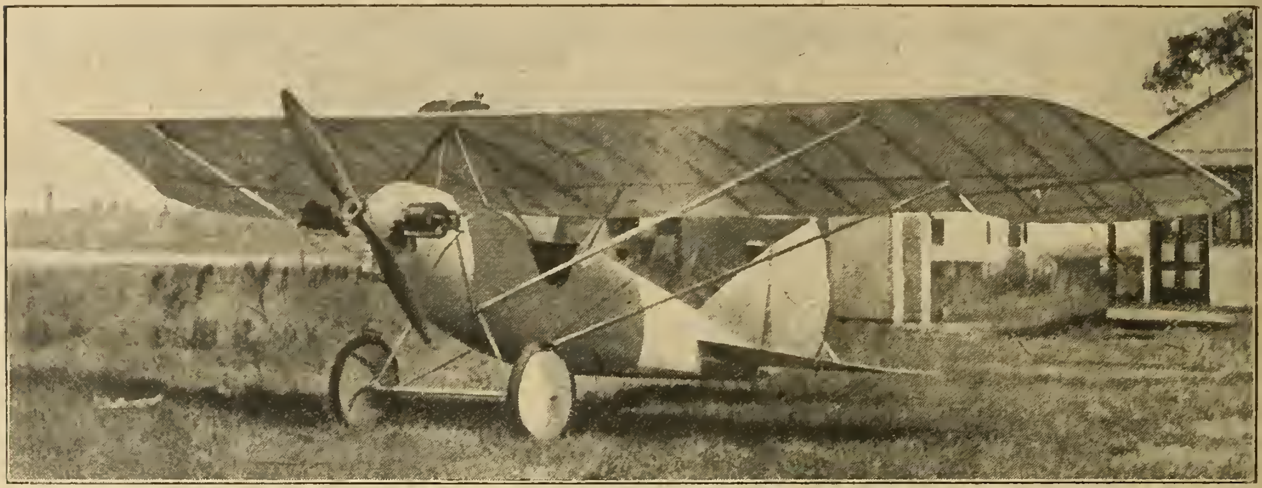
"AND NOW FOR THE OTHER ONE": A Sopwith Snipe gets home on the Fokkers.

THE CATO SPORTING MONOPLANE

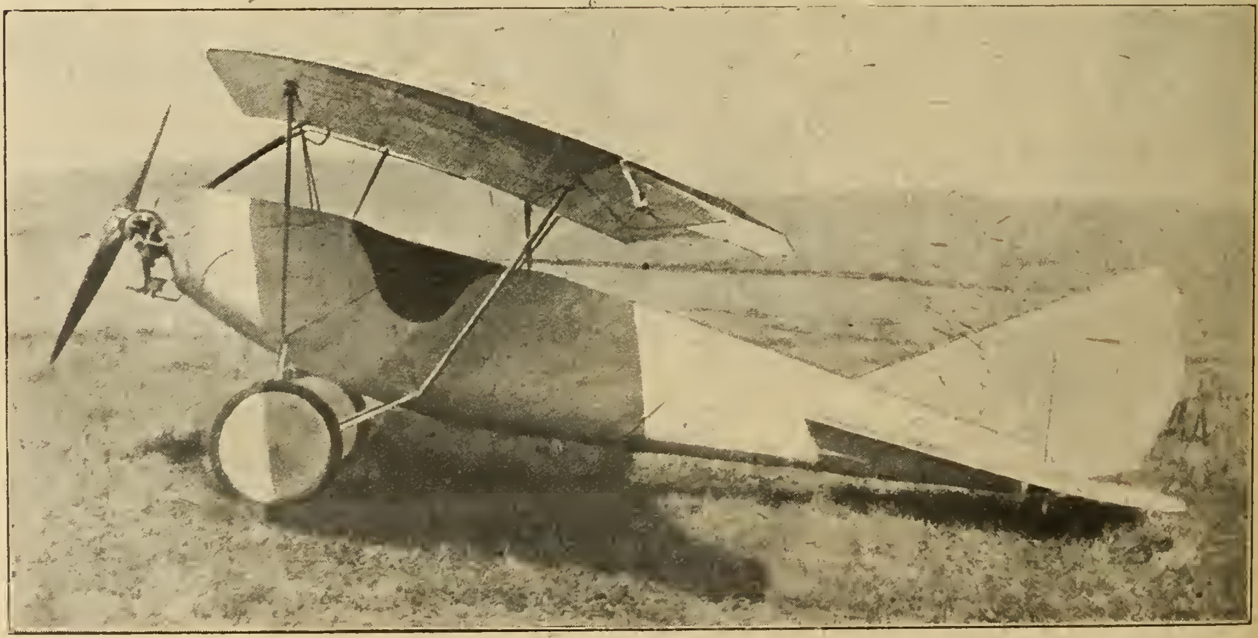
This single-seater machine was designed by Mr Joseph L. Cato, of New York, primarily as a sporting monoplane, the objects in view being a very slow landing speed, quick getaway, and ease of control, together with inherent stability and good manœuvrability both in the air and on the ground. With these objects in view, a wing of wide chord was adopted, and a special wing-section was laid out as existing sections were found to be unsuitable for the required performance.

This wing-section—known as Cato No. 4—which is shown with dimensions in one of the accompanying illustrations, was designed to give good climb and low landing speed rather than a very high speed, and recent tests have proved that it can accomplish all that was required of it. A climb of 4,600 ft. in 10 minutes was obtained with this section, whilst the speed range obtained was 22 to 70 m.p.h.

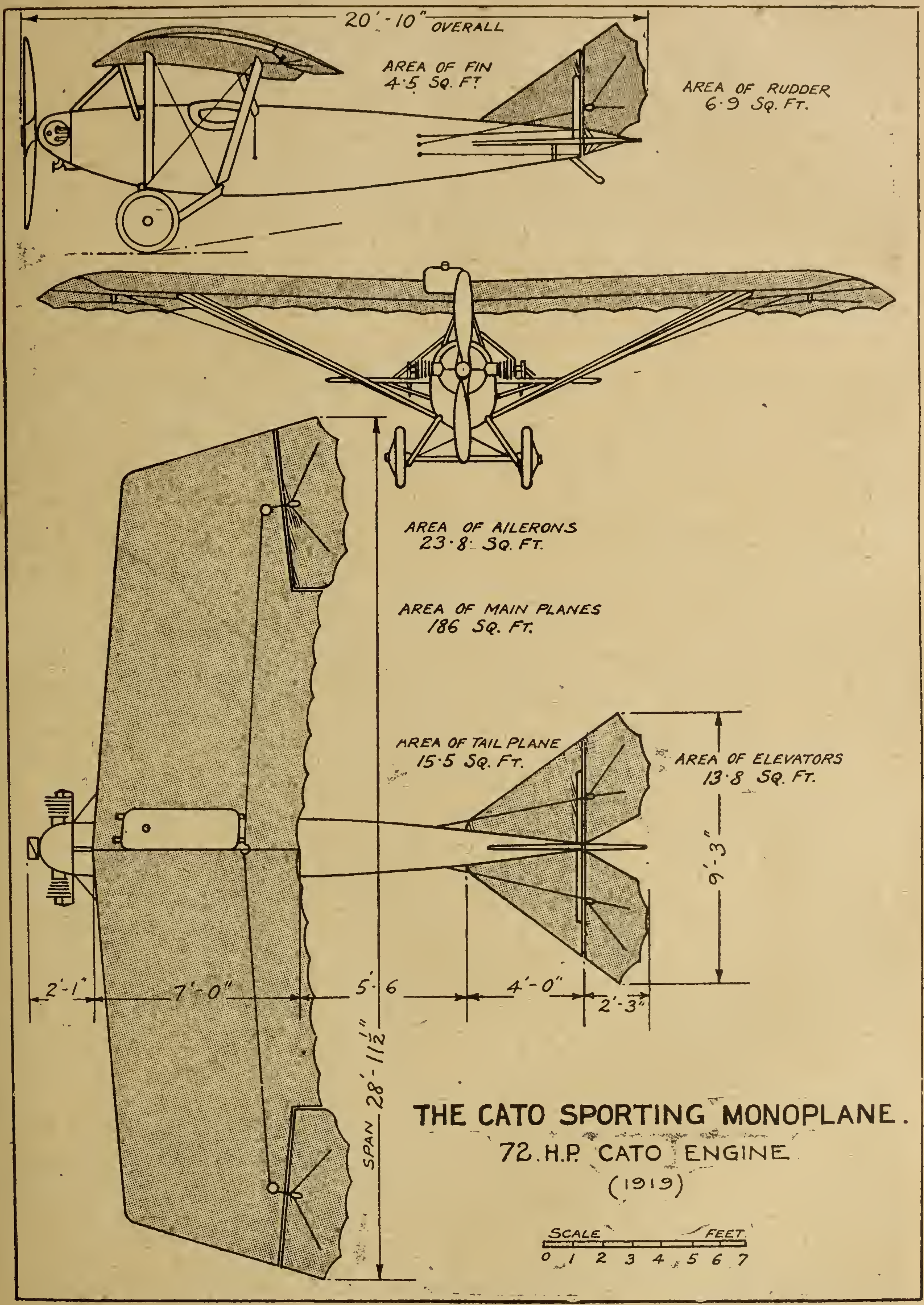
Constructionally the Cato monoplane has received much thought and consideration for detail, and throughout the general design is the keynote of simplicity—by far the best method of attaining light weight, which is so desirable in a small sporting machine of this kind. Simplicity also makes for low cost of manufacture, which in turn brings the selling price within the reach of the average sportsman. The controllability of the Cato monoplane at low flying speed is exceptionally good, and on landing the machine comes to a dead stop within 45 ft., whilst to get away a run of no more than 50 ft. is necessary. The longest run made at highest landing speed was 120 ft. to a dead stop.



Three-quarter front view of the Cato sporting monoplane



Side view of the Cato sporting monoplane


20'-10" OVERALL
AREA OF FIN 4·5 SQ. FT.
AREA OF RUDDER 6·9 SQ. FT.
AREA OF AILERONS 23·8 SQ. FT.
AREA OF MAIN PLANES 186 SQ. FT.
AREA OF TAIL PLANE 15·5 SQ. FT.
AREA OF ELEVATORS 13·8 SQ. FT.
9'-3"
2'-1"
7'-0"
5'-6
4'-0"
2'-3"
SPAN 28'-11½"
THE CATO SPORTING MONOPLANE.
72.H.P. CATO ENGINE
(1919)
SCALE FEET
0 1 2 3 4 5 6 7

The **CATO SPORTING MONOPLANE:** Plan, side and front elevations to scale.

As will be seen from our illustrations, this machine is a monoplane of the parasol type. The *fuselage* is of good streamline shape, comparatively deep in section. It is of monocoque construction, built up of three layers of cedar, and weighs, as it comes off the mould, 58 lbs. A portion of the *fuselage*, on the port side of the cockpit, is cut away to give access to the latter, thus avoiding the necessity of the pilot climbing over the top of the *fuselage*, a considerable improvement on the hitherto awkward method of "embarkation." The bottom of the *fuselage* being 22 ins. from the ground, it is possible for the pilot to step into the cockpit as easily as one would step into a car. The pilot's seat is mounted 16 ins. from the floor of the *fuselage*. A wind screen is rendered unnecessary owing to the shape of the top of the *fuselage* at the rear of the engine.

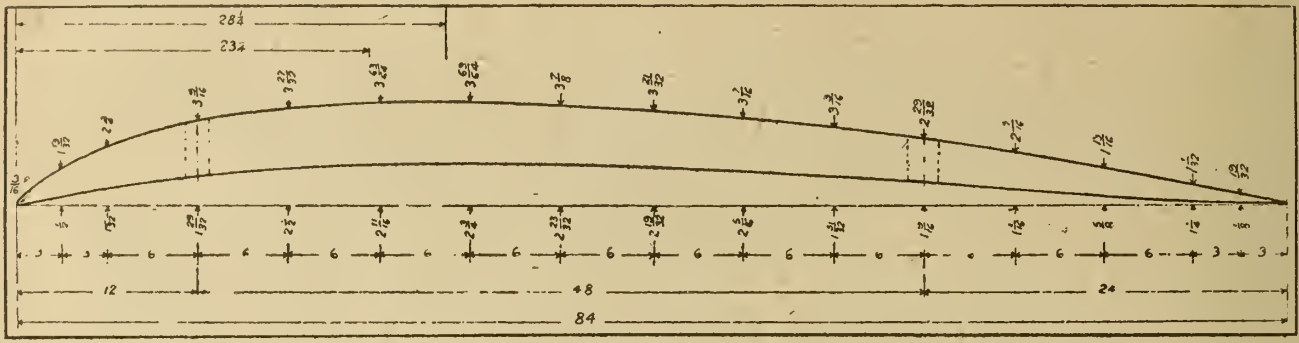
A neat stick control is installed, and the rudder bar has three adjustments—short, medium and long. The throttle control is located on the starboard side of the cockpit.

The construction of the wings follows more or less standard practice. The wing spars are of I-section, and the wing-bracing strut attachments are held on by four bolts clamping the spar through maple blocks. The wings are built in two halves, and are braced by four main struts anchored at their lower ends to the sides of the *fuselage*. These main struts are interchangeable from right to left and from front to rear. The wings are mounted some 14 ins. above the *fuselage* on central *cabanes*, and are given a backsweep of 5° and a dihedral angle of 2°; the angle of incidence is 4°. The inner ends of the *ailerons* are set back at an angle of 4° in order to render them more effective at very low speeds. These *ailerons* are interchangeable.

The tail plane is of the divided type, of symmetrical section, and is permanently mounted some 6 ins. below the line of thrust. Each half of the tail plane is interchangeable. The elevators are also interchangeable from right to left, and are further interchangeable with the rudder. The triangular fin is slightly offset to overcome the torque.

The landing chassis is of the V type, the Vs being of steel tube and interchangeable, whilst large-diameter wheels are fitted to provide easy rolling. The axle is sprung by means of the usual elastic cord. The tail skid consists of a three-leaf spring.

The power plant is a two-cylinder horizontally opposed air-cooled Cato aircraft engine, developing 72 h.p. at 1,825 r.p.m. It is mounted on a steel plate riveted to the front end of the *fuselage*. It is well protected by an aluminium hood, the only part exposed being the two air-cooled cylinder heads, and the carburettor intake. The engine drives direct a tractor screw of 7 ft. 2 ins. diameter by 4·38 ft. pitch.



Wing section of the Cato sporting monoplane

The petrol tank is located on the root of the right wing, and has a capacity of 12 gallons, which is sufficient fuel for about three hours' endurance. The oil tank is also situated in this position. Both petrol and oil are supplied to the engine by gravity.

The general specifications of the Cato sporting monoplane are as follows :—

Overall span	28 ft. 11½ ins.
Overall length	20 ft. 10 ins.
Chord	7 ft.
Sweepback	5°
Dihedral	2°
Angle of incidence	4°
Total area of main plane	186 sq. ft.
Area of *ailerons*	23·8 sq. ft.
Area of tail plane	15·5 sq. ft.
Area of fin	6·9 sq. ft.
Area of elevators	13·8 sq. ft.
Area of rudder	6·9 sq. ft.
Weight, empty	474·26 lbs.
Useful load	253 lbs.
Weight fully loaded	727·26 lbs.
Loading per sq. ft.	3·9
Loading per horse-power	10·1
Speed range	25-68 m.p.h.
Climb in 10 minutes	4,500 ft.
Ceiling	12,000 ft.
Endurance at high speed	3 hours.

* * *

Meteorology in the Empire

AT the conference held in London recently Lieut.-Col. D. C. Bates (New Zealand) proposed "that the conference of representative meteorologists of the British Empire assembled together for the first time should agree to continue as an association for the exchange of views from time to time upon scientific matters concerning the achievements, requirements and organisation of their services." This was carried unanimously. Sir Napier Shaw was elected the first president; members were invited to submit rules for the guidance and acceptance of the Association.

The conference was beneficial in bringing together the various meteorological organisations of the Empire, and it is confidently anticipated that as a result complete co-operation will be maintained between Dominions, Crown Colonies and the Mother Country. It is unnecessary to point out the need for this co-operation in view of the development of the great aerial routes of the Empire.

Air Services for China and Siam

LIEUT. E. C. RICON, who served in the French Army Air Service in China, is organising in America a scheme which aims at connecting up such points as Shanghai, Hong Kong, Hailfung, Canton, Tonkin and Macao by aerial services for the conveyance of passengers and light freight.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

SPECIAL COMMITTEE MEETING

A Special Meeting of The Committee was held on Wednesday, October 1, 1919, when there were present Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., in the Chair, Mr. Ernest C. Bucknall, Lieut.-Col. F. K. McClean, Air-Commodore E. M. Maitland, C.M.G., D.S.O., R.A.F., Lieut.-Col. Alec Ogilvie and the Secretary.

Election of Members.—The following New Members were elected :—

The Hon. Mrs. Bethell.
Ronald William Carmichael.
Leo Austin Walsh.
Vivian Claud Walsh.

Schneider Trophy.—Mr. Priest, of Messrs. A. V. Roe and Co., attended before the Committee in support of the protest lodged by his Company against the elimination of the Roe Seaplane from the Schneider Race.

Royal Aero Club Seaplane Competition.—The report of the Technical and Competitions Committee was presented by Lieut.-Col. F. K. McClean.

On the motion of Lieut.-Col. Alec Ogilvie, seconded by Mr. Ernest C. Bucknall, it was unanimously resolved :—

> "That on account of the Railway Strike, the Royal Aero Club Seaplane Competition proposed to be held at the end of October, 1919, be postponed."

HOUSE COMMITTEE

A Meeting of the House Committee was held on Monday, September 29, 1919, when there were present :—Mr. Ernest C. Bucknall, in the Chair, Mr. Herbert J. Corin, and the Secretary.

THE FLYING SERVICES FUND

A Meeting of the Flying Services Fund Committee was held on Friday, September 26, 1919, when there were present :—Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., in the Chair, Mr. Chester Fox, Squadron-Leader T. O'B. Hubbard, M.C., R.A.F., and the Secretary.

Grants and Allowances.—The following Grants and Allowances were made :—

(13) The School Fees of £3 15s. of the son of the father of a Lieutenant in the Royal Flying Corps killed on active service.

(105) An allowance of £2 a month for six months to the mother of a Cadet who died on active service.

(112) An allowance of £2 a month for six months to the widow of a 1st Class Air-Mechanic in the Royal Air Force killed on active service.

(129) An allowance of £4 a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Flying Corps killed on active service.

(141) An allowance of £4 a month for six months to the widow of a Private in the Royal Air Force who died on active service.

(145) An allowance of £4 a month for six months to the mother of a Private in the Royal Flying Corps killed on active service.

(148) An allowance of £1 a month for six months to the mother of a Private in the Royal Flying Corps who died on active service.

(153) An allowance of £2 a month for 12 months to the widow of a 2nd Class Air-Mechanic in the Royal Flying Corps killed on active service.

(161) An allowance of £2 a month for six months to the mother of a Private in the Royal Air Force who died on active service.

(164) An allowance of £4 a month for six months to the mother of a Private in the Royal Flying Corps who died on active service.

(172) An allowance of £2 a month for six months to the widow of a Private in the Royal Flying Corps killed on active service.

(178) A Grant of £10 to the widow of a Sergeant Mechanic in the Royal Flying Corps killed on active service.

(183) An allowance of £1 a month for six months to the mother of a 3rd Class Air-Mechanic in the Royal Flying Corps who died on active service.

(230) An allowance of £1 10s. a month for six months to the mother of a 3rd Class Air-Mechanic in the Royal Air Force killed on active service.

(231) An allowance of £2 a month for six months to the mother of a 2nd Class Air-Mechanic in the Royal Air Force killed on active service.

(251) The School Fees up to £50 per annum of the brother of an ex-Flight Sub-Lieutenant in the Royal Naval Air Service incapacitated on active service.

(253) An allowance of £4 a month for six months to the widow of a Private in the Royal Air Force who died on active service.

(258) An allowance of £3 a month for six months to the mother of a 1st Class Air-Mechanic in the Royal Air Force who died on active service.

(262) An allowance of £3 a month for six months to the mother of a Private in the Royal Air Force who died on active service.

(265) An allowance of £2 a month for three months to the mother of a 2nd Class Air-Mechanic in the Royal Flying Corps who died on active service.

(268) An allowance of £2 a month for three months to an ex-A.M.I. in the Royal Naval Air Service incapacitated on active service.

First Direct Non-Stop Transatlantic Flight

There has been a widespread expression of opinion that the first direct Transatlantic flight by Sir John Alcock and Sir Arthur Brown on a Vickers Vimy Rolls Biplane on June 14-15, 1919, should be permanently recorded in the Club House.

The idea has been fully considered by the Committee and they have decided to obtain portraits in oils, for hanging in the Club, of both Sir John Alcock and Sir Arthur Brown.

Sir John Lavery has very kindly consented to paint the portraits at a purely nominal figure, the canvases being 30 in. by 25 in.

A subscription list has been opened, and subscriptions limited to £1 1s. are invited towards the cost.

Offices : THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

London—Paris Air Express

The Airco express aeroplanes which fly daily between London and Paris completed on Saturday their sixth week of continuous operation. Since the service began, 86 flights have been scheduled, and of these, though on 28 days the weather was unfavourable, no fewer than 83 were accomplished. Only one flight had to be abandoned through weather, and on that day conditions were worse than they had been for years. The progress of another flight was interrupted by mist and exceptionally low clouds. Only once, during 20,750 miles flying, has a pilot alighted through mechanical trouble.

The Aerial Mail

Although the use of aeroplanes for aerial mails was only carried on for a few days, the authorities should have garnered some valuable data which it may be hoped will serve a useful purpose later on. A start was made on October 1, when machines left London carrying mails for Bristol, Birmingham, Manchester, Newcastle and Glasgow, and 315 letters and packages were dispatched. The next day, the return mails were received in London.

Forty-six aeroplanes were used for the distribution of mails throughout the country. Mails were also carried to Paris and to Brussels for Denmark and Belgium.

Owing to the improvement in train services it was announced on October 6 that it had been decided to discontinue the inland civil aerial mail services. The services to Paris and Brussels continued to run successfully.

Fifty R.A.F. aeroplanes were employed on the distribution of mails on October 5.

RADIATOR POSITION

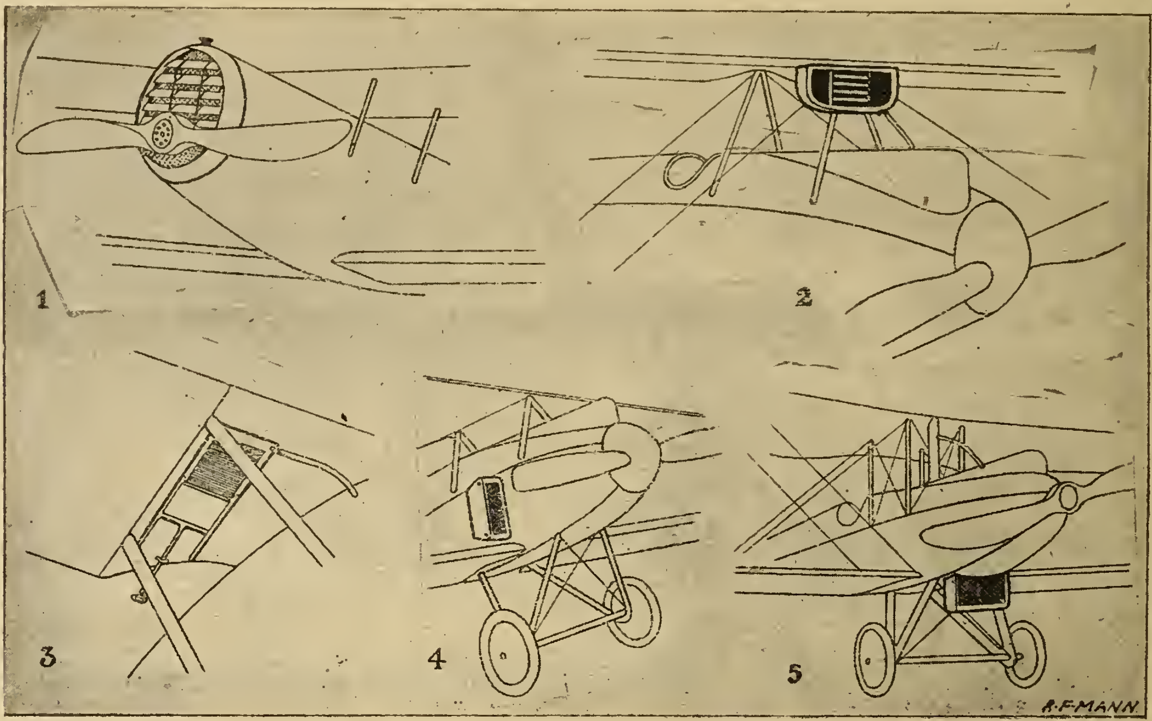
BY R. F. MANN

A careful consideration of the various methods employed by aeroplane designers in their efforts to solve any particular problem is not only of interest to the specialist, but also instructive to the uninitiated, for it enables the latter to realise how difficult it often is to arrive at a really satisfactory compromise. The problem of deciding upon the best all-round position for the radiator is one of particular interest, and as it has not received much attention in the pages of the technical press, the writer considers that no further introduction is necessary.

In the first place, the radiator, in addition to efficiently cooling the engine, must fulfil all, or most of, the following requirements, and as will be shown later, it is only possible to do this by choosing the position with great care. Requirement 1 is low weight; 2, small resistance; 3, its effective area must be capable of being varied by the pilot during flight; 4, be located as near the engine and the centres of gravity of the aeroplane as possible; 5, must not obstruct the view of the crew, or the range of fire of the guns; 6, must not interfere with the accessibility of the engine, magnetos, carburettors, etc.; and lastly, pilots naturally prefer radiators to be so placed that, in the event of one springing a bad leak, the boiling water does not stream down on to his face. Although the majority of such leaks during the past few years were attributable to hostile machine-gun bullets, it is not unknown for drain taps to shake loose, or pipe joints to unexpectedly spring a bad leak. for instance, during these days of Peace, so it is still necessary to remember this when designing purely commercial machines.

The first requirement can only be met—other things being equal—by keeping the radiator as small as possible, and to obtain the requisite cooling effect, it is essential for it to be exposed to the strongest current of air—which, in the case of tractor machines, is the slipstream from the airscrew. Unfortunately, this position is one of great resistance, and so does not comply with 2. If low resistance were the *only* requirement, the best arrangement would be to employ a very large area placed in a slow-moving current of air, such as, for instance, a radiator which formed the body covering from the nose to the pilot's cockpit. Quite apart from the objection of excessive weight, this construction makes the engine, tanks, etc., very inaccessible. Incidentally, the larger the radiator, the greater is the risk of its being hit during a "scrap." Another "low resistance position" is when the radiator is built-in flush with the centre section of the upper planes, but it will be shown later that this construction is not free from defects. Taking everything into consideration, it would appear that the best compromise is to employ a smaller radiator exposed to the strongest current of air, and modern practice is tending in this direction.

As regards 3, this provision is necessary because a radiator large enough to cool the engine efficiently on a warm day when flying slowly—at climbing speed, for instance—will overcool the engine when flying fast in a cold atmosphere, such as that experienced at 15,000 or 20,000 ft. By fitting a radiator large enough for the first set of conditions, it is possible to meet the second by one of three methods. The first method is to fit adjustable shutters, either in front of, or behind the radiator, which can be rotated by the pilot, and so cause the cooling surface to be screened the necessary amount. A modification of this method is to employ a blind mounted on a spring roller, which is controlled by a cable connected up with a hand wheel in the cockpit. It will be noticed that in neither of these two methods does a reduction of *cooling area* reduce the *air resistance*, in fact it probably increases it slightly, so it will be appreciated that a very distinct advantage is obtained by making use of the third method, which is to mount the radiator between guides in such a manner as to allow it to be partially drawn into the *fuselage*, so reducing air resistance as well as cooling area. This method has been employed on the Zeppelin airships, as well as on the Airco De H. 9 aeroplanes. Unfortunately, this method cannot be satisfactorily employed for all the possible radiator positions, as will be shown later.



4. It is desirable to keep the radiator as close to the engine as possible in order to reduce the length of water-piping, and, consequently, the risk of broken or leaky joints. The closer it is situated to the centre of gravity—both in the horizontal and vertical planes—the smaller will be the moments of inertia, and the quicker will the machine respond to the controls.

5. The necessity for an unobstructed range of view rather narrows down the number of positions in which it is desirable to employ the third method of area variation outlined above. Obviously it is quite out of the question to place a radiator on the top of the *fuselage*, level with the pilot's normal line

of vision; so there only remain the two sides, or underneath the body. In the former case, it will be necessary to keep the width down to a minimum, if the view forward and downward is not to be unduly restricted. Also two smaller radiators, and their connections, are liable to give more trouble, and be less reliable, than a single large one; so by a process of elimination, one is forced to the conclusion that a position below the body in the case of a single-engine machine is the most satisfactory, if it is decided to use the third method of area variation. As regards 6, it has already been shown how one "low resistance" position does *not* satisfy this requirement.

Having given the reasons for the more important requirements, it will now be possible to examine the various positions in which radiators are placed on modern aeroplanes, and see how nearly these requirements are met in practice.

There are approximately half-a-dozen alternative positions, and they are:—(*a*) On the front of the *fuselage*—or engine *nacelle* in the case of multi-engine machines—between the engine and airscrew (see Fig. 1). (*b*) In the *fuselage* immediately behind the engine. (*c*) Mounted under the top plane to the front centre section struts (see Fig. 2). (*d*) Let in flush with the top plane; either directly over the body, or on either side (Fig. 3). (*e*) At the sides of the body (Fig. 4). (*f*) Underneath the body between the front chassis struts (Fig. 5). There are other positions, such as—on a "pusher"—in the *nacelle* in front of the engine, and in this case the flow of air is controlled by adjustable air scoops; but this example has not been included in the above for the reason that this type of aeroplane is now seldom designed.

The position shown in Fig. 1 is very popular with British designers, and a few typical examples are the Bristol F 2B, Airco D.H. 4, Martinsyde F 3 and 4, as well as the French Spad, and Italian S.I.A. and S.V.A. This position satisfies most of the requirements, and may be considered one of medium resistance, for although it is behind the airscrew, the slipstream is not as strong near the boss as it is nearer the tips. Being at the extreme nose of the *fuselage*, its weight increases somewhat the longitudinal moment of inertia, but this defect is probably of less moment than the fact that the large flat surface placed immediately behind the airscrew has an adverse effect on the efficiency of the latter; as was explained by the writer in a previous article. The fitting of adjustable shutters, or a blind, presents no difficulties, and the operating-gear need be quite short, and can be kept inside the *fuselage*. Although the radiator is quite close to the engine, its position does not seriously lessen the latter's accessibility. Water-piping can be kept short, with a reduction of the work imposed on the circulating pump, and chances of failure. Bearing in mind the fact that motor car radiators have, of recent years, been almost invariably placed directly in front of the engine, it is not surprising that this position should have been chosen by the early aeroplane designers when installing water-cooled engines in tractor machines. An alternative position is to place the radiator in the *fuselage*, immediately behind the engine, and as this has the advantage of massing a by no means unimportant weight nearer the centre of gravity, it was considered, a few years ago, to be a distinct improvement. Unfortunately it suffers from a great defect, which is that during a steep, prolonged dive there is a considerable risk of the engine cowling being forced away from its fastenings by the pressure of air inside the open front of the *fuselage*. This position is not now employed on any aeroplane with which the writer is acquainted, and as other positions offer as many advantages, and are free from serious defects, it is doubtful whether the type will be employed in the future. In the case of the "pusher" previously cited the pressure cannot become excessive, because the air has a convenient exit *via* the pilot's cockpit.

Fig. 2 illustrates a position which has, in the past, been very popular with German designers, and notable examples are found in the Rumpler and Aviatik biplanes. It is placed where the slipstream is strongest, and being above the water outlet of the engine cylinders, there is no need to incorporate a header tank in the circulating system. Although situated nearly over the centre of gravity, it is considerably above the line of thrust, and in this respect the position is not as good as it might be. The view of the pilot forward and upward is somewhat restricted, and can only be improved by mounting the radiator above the plane, which will increase the length of piping, and also its position above the centre of thrust. Also, in the event of damage causing a bad leak, there is every probability of the pilot being seriously inconvenienced by the scalding water. Although not an ideal position when used on single-engined tractor biplanes, it would appear to possess distinct advantages in the case of multi-engined machines. Mounted, in this case, over the engines, on the struts leading to the upper plane, its position would neither restrict the view, nor would a serious leak inconvenience the crew. The water-piping would be quite short, and it would be easy to arrange for one radiator to serve both engines in the *nacelle*—in the case of four-engined machines. The radiator being quite clear of the *nacelle*, it would be possible to make the latter of a really good streamline form; and only the shape of the engine would prevent perfection being attained in this direction.

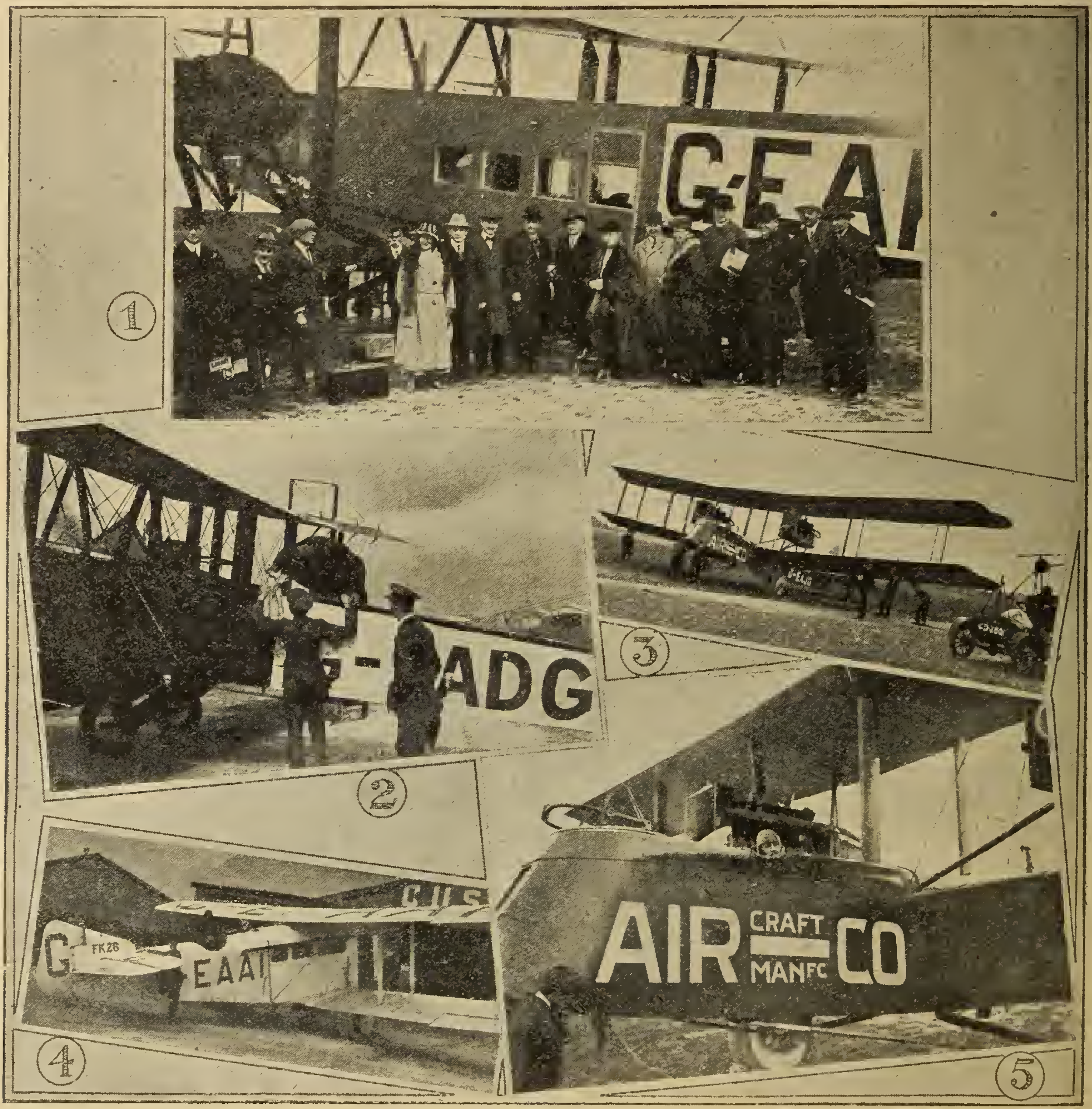
The examples given so far have been of medium or high resistance, but the position illustrated in Fig. 3 is one which offers the least possible resistance. This position has during the last year or two slowly, but surely, superseded C (see Fig. 2), and is now so extensively employed by German aeroplane designers, for single and two-seater machines, that it may be regarded as a typical feature of their design. The following are some noteworthy examples:—Albatross and Pfalz single-seaters, Hannoveraner, Halberstadt, and L.V.G. Type C VI in the two-seater class. This position is undoubtedly one of merit, for in addition to the prominent feature of low resistance, it will be seen that it is directly above the centre of gravity, although rather far above it in a vertical plane. Also the range of view and fire are not restricted in the slightest degree. This position of the radiator places it within such easy reach of the pilot, that very simple methods of area variation are quite practicable. One such system is to mount a sheet of aluminium between guides on the lower side of the radiator, and a small handle attached to the end of this shutter enables the pilot to slide it forward the necessary amount when wishing to decrease the cooling area. If the upper plane is quite close to the top of the body, and also staggered well forward, the radiator is brought quite close to the engine, and the length of water-piping is, consequently, not excessive. The foregoing are the chief points in favour of this position, so we will now turn our attention to the defects; and the foremost among these is that increase in size increases weight and the risk of damage during a "scrap." When this position is employed, the radiator is usually placed on the extreme right or left of the centre section, in order to minimise as much as possible the risk of scalding the crew in the event of a serious leak. Balance is maintained by placing a petrol service tank in the corresponding position the other side. It would appear that this position is suitable for really fast machines, where the slight increase of weight is amply justified by the reduction of resistance.

The position shown in Fig. 4 has sufficient merit to justify its being used in special cases, but it has never become as popular as positions A and D, for instance. The chief objection is that by using two radiators—one on either side of the *fuselage*—the installation is unnecessarily complicated; and, moreover, a header tank is essential, because the tops of the radiators are below the level of the outlets of the cylinders' water-jackets. This latter objection can be overcome by continuing the radiators up to the top plane, but as this somewhat restricts the range of view, the best compromise is to make use of the header tank. If the pilot is placed well back towards the rear, his view forwards and downwards is almost unaffected by the projections on either side. One advantage of this position is that the radiators are quite close to the centre of gravity and centre of thrust. Also, the slipstream is much greater than it is in the case of position A. Area variation, by means of shutters or blinds, presents no difficulties. Whilst on this subject it may be of interest to refer to a little-known experimental British machine in which the leading edge of a long radiator on either side was hinged to the sides of the body, and by moving the rear edge further away from the body sides, the cooling area could be increased to almost any extent; the maximum effect being reached when the radiators were placed at right angles to the body. If it should ever have been necessary to fly the machine with them in this position, the range of view would have been reduced to a serious extent.

The position illustrated in Fig. 5 possesses a greater number of advantages than it would appear, on first thoughts, to offer. The view is not restricted in the least; the slipstream here is almost at its maximum; the radiator is close to the engine, centre of gravity and centre of thrust; also, all the water can leak away without the crew running the slightest risk of being scalded. This is the only position, in the case of single-engine tractor machines, where it is convenient to make use of the third method of area variation, and it would seem that the excellence of this system more than justifies the slight complication involved. It might be argued that with the radiator in this position it is liable to be seriously damaged in the event of an undercarriage failure, and on first thoughts this certainly appears to be the case, but it must be remembered that there are machines in existence in which the *fuselage* is mounted between the two planes, so with the radiator placed between the *fuselage* and the lower plane, the latter would bear the brunt of the shock. The position below the *fuselage*—and, consequently, the engine cylinders—necessitates a header tank being incorporated in the circulation system, but, as it has already been shown, this addition is unnecessary if the top of the radiator is sufficiently above the level of the outlets of the cylinders' water-jackets. This can only be obtained by mounting the radiator above the body, and unfortunately this position is not feasible in the case of single-engine tractor machines, because of the limits it would impose in the range of view, but when mounted above the engine *nacelles* of multi-engined machines and used in conjunction with the third method of area variation, it would constitute an almost ideal system for this type of aeroplane. It would possess all the advantages of position C when used on multi-engined machines, together with that of being able to obtain both a reduction of resistance and cooling area by partially withdrawing the radiator into the *nacelle.*

In this, as in so many other matters, it is impossible to state definitely which is the all-round *best*, for that which may be very satisfactory with one set of conditions, is often quite unsuitable with another, so it is only possible to carefully explain the why and wherefore in the hope that some of the problems which confront aeroplane designers may be more generally appreciated.

◆ ◆ ◆ ◆



"Flight" Copyright

THE RAILWAY HOLD-UP AND MAILS BY AEROPLANE : Post Office officials and the despatch and receipt of mails at Hounslow. 1. The Handley Page had a busy time. Two, fully loaded with passengers, set out for Paris. Our snap shows various members of the American Express Co. about to go aboard. Later a mail 'plane, loaded with 2,185 lbs. of mail, 250 lbs. of baggage, pilot and the mechanic, left for Brussels. 2. The above Kangaroo from Grahame-White brought in mails from Leeds. Another Kangaroo of the North Sea Aviation Co. carried mails to Leeds. 3. The D.H. 10 (Capt. Gathergood) flew with mails to Glasgow as its destination. 4. A "B.A.T." arrived from Manchester in 1½ hours, piloted by Turner. Another carried mails to Newcastle, piloted by Duke. 5. Capt. Gathergood, on a D.H. 10, sets out for Glasgow.

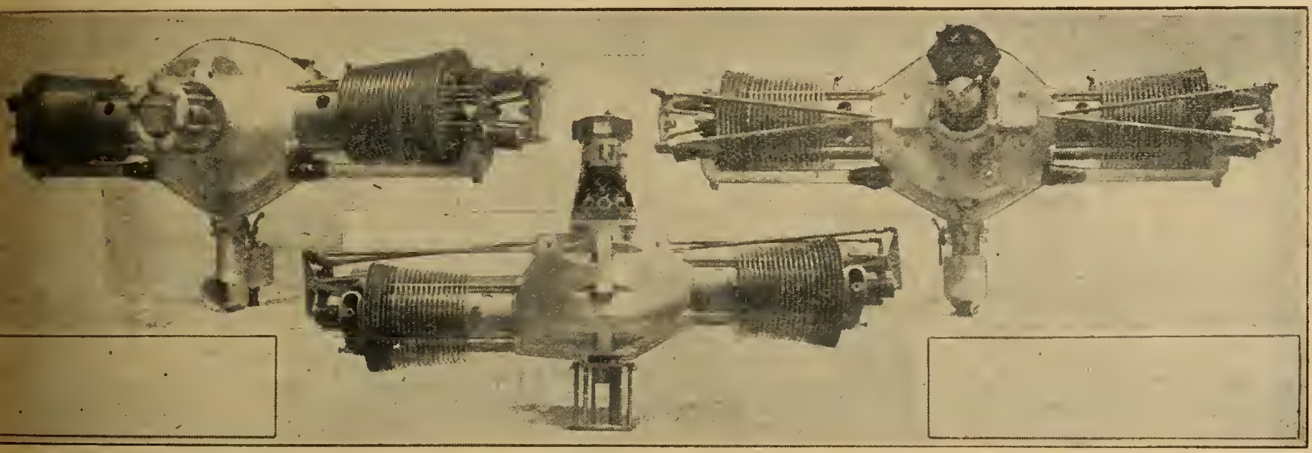
THE CATO 72 H.P. AERO ENGINE

This engine was designed by Mr. Joseph L. Cato, of New York, especially for the Cato sporting monoplane described in FLIGHT this week. In the design laid down, all experimental and untried features were eliminated, and only features which had been proven out by the designer's long experience were used, and the extreme importance of interchangeability was kept in mind. Light weight was secured by simplifying design rather than building light parts, and the very best material and workmanship employed with a view to extreme reliability and durability.

This engine is a two cylinder, horizontally opposed, four-cycle air-cooled valve-in-head type. Bore, 5 ins.; stroke, 6 ins.; piston displacement, 235·63 cub. ins.; compression ratio, 433 to 1; weight complete ready to run, 134 lbs., corresponding to a specific weight of about 1·86 lbs. per h.p. The rated horse-power is 72 at 1,825 r.p.m.

The crank-case is a two-piece aluminium alloy casting, split vertically and securely bolted together by standard S.A.E. ⅜-in. bolts. The engine is bolted to the *fuselage* by eight ⅜-in. bolts set at a large pitch diameter at the rear of the crank-case. The interior of the crank-case is well flanged to allow cooling, and as well gives an extremely rigid construction combined with light weight. The rear of the crank-case forms the gear-case housing. The gear-case cover, magneto bracket and oil pump plunger barrels are cast integrally.

The actuating mechanism consists of one camshaft with two cams, one inlet cam and one exhaust cam, operating four tappets each connected to its valve push rod. The tappet rollers are ball-bearing. The camshaft is mounted on the outside race of a ball-bearing; the inside race is mounted on the crankshaft, and the camshaft is free to rotate on this ball-bearing. The camshaft or cam hub and gear are in one piece cut from a solid steel forging. The cam hub is driven at half crankshaft speed by internal gearing. Three idlers or planet pinions are used mounted on ball-bearings. The driving pinion on the crankshaft drives the planet pinions as well as the pump reduction gears. The valve push rods are of the tubular type with adjustment on one end. The valve rocker levers are mounted on ball-bearings with the outside race cut in the rocker lever and the inside race cut in the rocker lever-pin.



Three views of the Cato 72 h.p. aero engine

The cylinders are machined from solid steel forgings weighing 186 lbs. before, and 11¾ lbs. after machining. Fifteen cooling-fins are machined on the outside of the barrel. A little below the lower cooling fin, eight holes are drilled, equally spaced, to allow air circulation to piston head.

The cylinder-head is a grey iron casting with six cooling fins cast around, and nine across the head. These cooling fins allow ample cooling surface over the entire head, and hot valve, so common in air-cooled engines, is, therefore, entirely eliminated. Two spark plug bosses are provided, one on each side of the cylinder head between the valves. The cylinder head and cylinder are bolted to crank-case by means of long studs running the length of the cylinder and cylinder head. This brings the parts under compression, which is much more to be preferred than tension.

The crankshaft is machined from a solid steel forging. It is of the double-throw type with crank-pins set at 180° and mounted on two ball-bearings. The inside race of the front bearing and the two crank-pin or connecting-rod roller bearing races are machined on the crankshaft. The front flange for the propeller is machined integrally with the crankshaft. This shaft is of liberal size—2 9/32 ins. in diameter—bored hollow throughout to insure minimum weight with maximum strength.

The connecting-rods are of one-piece construction, machined from a solid steel forging, and are of the "H" section. No bronze bushing is provided for the piston-pin end, but these are fitted roller bearings. The outside race is formed by the connecting-rod, while the inside race is the piston-pin. The big end or crank-pin end is solid with the outside roller race machined in the rod. This construction makes a short "H" section, which is unusually light, and consequently strong.

The pistons are cast of aluminium alloy fitted with one inland ring above the piston-pin. The piston-pin is free to oscillate directly in the piston-pin bosses and has bronze buttons at each end to prevent wear on cylinder-wall. The crown head is strengthened by eight webs radiating from a central boss in the piston crown. The formation of these webs is such that they act as cooling fins for the air circulating through piston at every stroke to carry heat off from the piston crown. Between these cooling fins, and equally spaced, air circulating ports are drilled. The piston-pin, on which the rollers of the small end of connecting-rod run directly, is bored hollow, hardened and ground. These pistons are of very light weight, which is of great importance to minimise vibration.

Two poppet valves are located in each cylinder head, and all valves are interchangeable. The valves are 2¾ ins. in diameter. Excepting that the valve stem is somewhat shorter, the valve assembly is interchangeable with that of the Liberty engine.

The oiling system is of the dry sump, non-circulating type. Oil pressure is provided by a dual plunger-pump drawing oil from a supply tank in the *fuselage*, and delivering a small quantity to each of the cylinders every seven and a half revolutions of the crankshaft. On the down stroke of the plungers a small quantity of oil is delivered into the gear-case lubricating the oil pump reduction gears and the valve operating mechanism. The main bearings, crank-pin and piston-pin bearings are lubricated from oil spray in the crank-case.

The ignition is accomplished by a Bosch magneto mounted directly opposite the rear end of the crankshaft, and is driven from the end of the crankshaft at the same speed.

Carburation is secured through one special Zenith carburettor, and is bolted directly to the crank-case, in which the intake manifold is cast. The manifold from crank-case to the cylinder-head is located quite close to the cylinder, which is kept warm by the cylinder heat. The carburettor being bolted to the crank-case, not only makes a very rigid mounting, but adds materially to the cooling of the crank-case as well as warming the gas.

The overall dimensions are: Width, 46⅛ ins.; length, 23 1/16 ins.; height, 20¼ ins. The petrol consumption at 1,650 r.p.m. is 86 lbs., and the oil consumption 2 lbs. per hour.

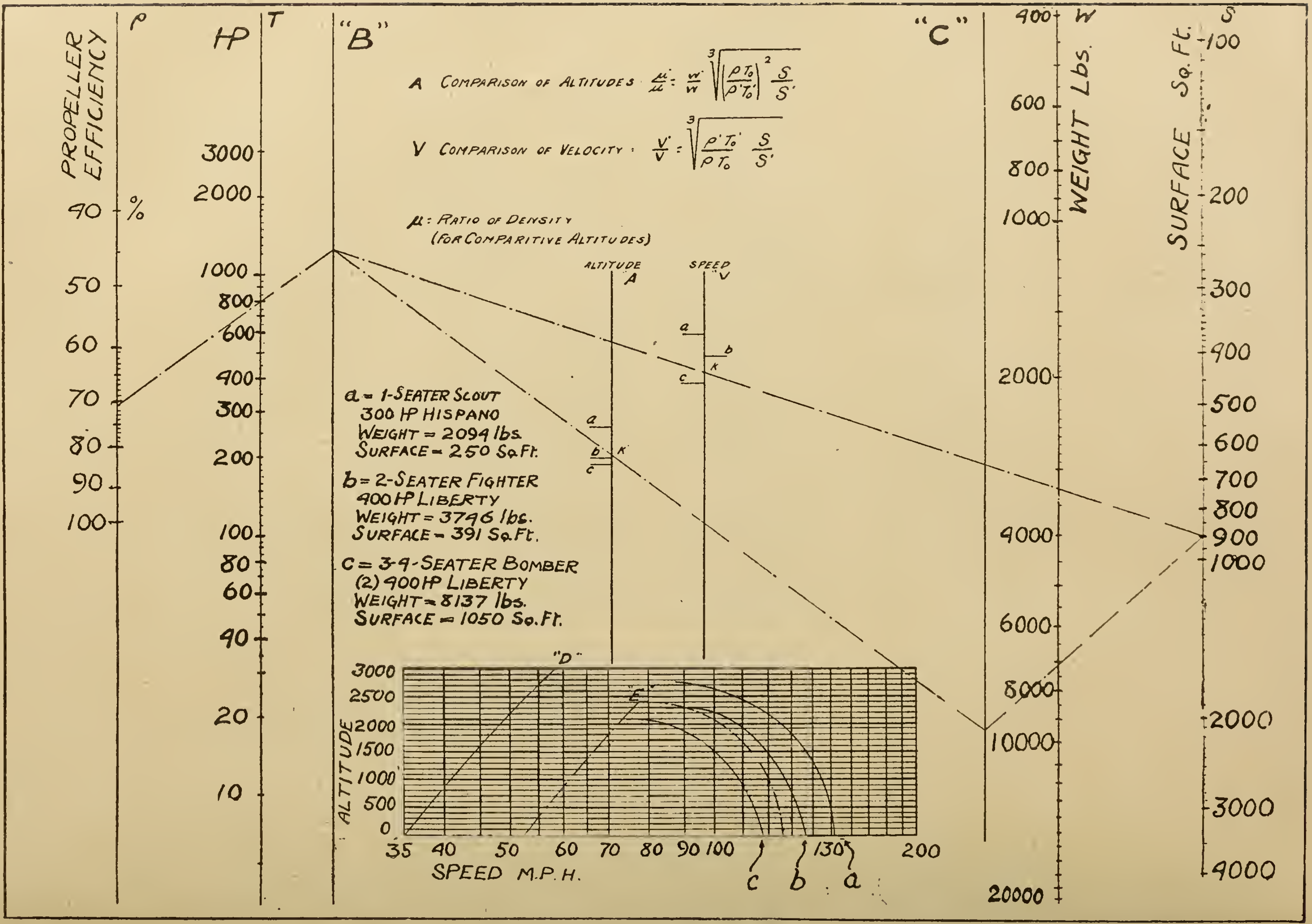


Chart for estimating aeroplane performances. (See page 1343.)

PREDICTION OF AEROPLANE PERFORMANCE*

By I. M. LADDON, Aeronautical Engineer, U.S. Air Service

The following method of estimating aeroplane performance was outlined to the author by Lieut. Alkan of the French Aviation Mission. It consists in comparing the aeroplane whose performance is to be found with the actual performance of an aeroplane of similar type on a power and a surface loading basis.

The actual performances of three different types of aeroplanes are given on the chart on p. 1342. These aeroplanes are all good, clean designs; therefore, when comparing an aeroplane that is poor aerodynamically with any one of the above, an allowance should be made in the high speed obtained. In extreme cases this allowance may run as high as 10 m.p.h., but for all ordinary designs no allowance need be made. The ceiling is not correspondingly affected. Curves of factual performance shown include the three common types: (*a*) Single-place scout. (*b*) Two-place fighter or reconnaissance aeroplane. (*c*) Three or four-place, twin-engined bomber. By selecting the proper type for comparison one can make an accurate prediction.

It has been the author's experience that the results obtained through this simple method are much more reliable than those given by the old laborious method of computing the parasite resistance, horsepower required, available, etc. It should prove quite useful to the designer, since it affords a rapid and accurate means of estimating how changes in weight, surface or horsepower affect the performance of the plane in question.

Example—Twin-engined aeroplane: weight, 7,200 lb.; horse-power, 800; surface, 900 sq. ft.

The obvious plane to use for comparison is the twin-engined bomber.

1. Find the intersection on reference line B of a straight line through the propeller efficiency and horse-power.

2. Join this point to the surface and note the intersection on line V.

3. Find the intersection on reference line C of a straight line through weight and surface.

4. Join point on reference line C to point on reference line B, and note intersection on line A.

The linear difference between the points found on lines A and V and the corresponding points given for the plane which it is being compared with are the measures of the relative ceiling and speed.

5. Construct a curve similar to curve C, using ordinates increased (or decreased) by the difference in altitude (C-K) and abscissæ increased (or decreased) by the difference in speed (C-K).

6. From the point of absolute ceiling (E) draw curve parallel to curve D.

This curve gives the minimum speed for horizontal flight at given altitudes, while the curve first constructed gives the high speed. The enclosed area is the speed range.

---

* From *Aviation*, U.S.A.

◆ ◆ ◆ ◆

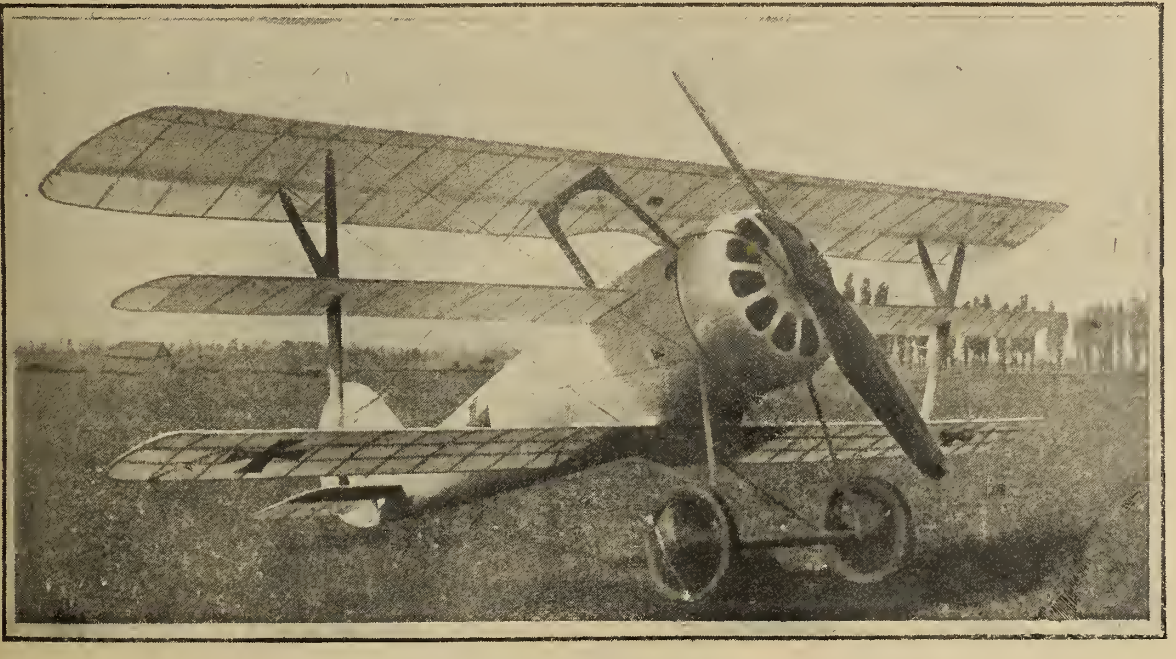
Searchlights for Aerodromes

The Air Ministry announces that as a temporary and emergency measure to assist belated aircraft to locate their aerodromes after dusk, the Air Ministry has arranged for vertical searchlight beams to be projected from the following aerodromes about dusk till all overdue machines have arrived:—

Hounslow ..	1 vertical beam.
Kenley ..	2 vertical beams.
Lympne ..	3 beams, arranged in a triangle.

U.S. Warships to Carry Seaplanes

Announcement was made by the U.S. Navy Department on September 13 that every American warship of the second class is to have a seaplane included in its equipment. It is stated that the U.S. naval authorities are convinced that the time has passed when a direct attack on sea coast cities may be made by a battleship fleet however powerful; the attack will be by seaplanes launched from a moving base of dreadnoughts at sea.



The Pfalz triplane, fitted with rotary engine.

THE BEARDMORE AERO ENGINES AND COMMERCIAL AVIATION

PROBABLY no other single item will play such an important part in deciding the future of aviation as a commercial proposition as will the aviation engine. Aeroplane constructors are to a large extent dependent on the engine manufacturer, not only as regards the type of his machine, but also in the matter of the price at which this machine can be sold to the public. It is obvious to anyone acquainted with the aviation industry that for several years to come commercial aviation will not be on a scale which will allow production in anything like the quantities which were demanded during the War. This will mean that the saving in labour and cost which attends production in large quantities will not be available, and consequently the cost of production—and, therefore, the sale price—will be comparatively high. The problem is one which has to be faced, and as the question of cost will play an important part in the immediate future of commercial aviation, anything which tends to bring the price of aircraft down is to be welconed as assisting in making the immediate prospects of commercial aviation more encouraging A step in the right direction in this respect is, we think, the purchase from the Government, by Messrs. The Beardmore Aero Engine, Ltd., of all the Beardmore aero engines which the Government were willing to sell. By this transaction it is hoped that it will be possible to sell the Beardmore engines at a reasonable figure, while at the same time providing an adequate supply of spare parts in order to ensure prompt and correct replacements of parts damaged as the result of accidents or worn out by ordinary wear and tear. The purchase referred to includes the whole of the Beardmore engines and spares, new and second-hand, partly or completely manufactured. Regarding the purchase of the Beardmore engines, and the plans for their future disposal, we have received from Messrs. The Beardmore Aero Engine, Ltd., the following communication :—

"A man's or firm's faith in an industry, or any section of same, is perhaps best demonstrated by the degree to which they are prepared to stake their money on it. Ours can be judged by the fact that immediately we learned that Beardmore aero engines were going to be disposed of through the Government we stepped in and purchased every engine and part they would agree to sell, and as this was a six-figure transaction, it may be safely assumed that we have faith both in our engine and the future of aviation.

"The above transaction was concluded after a careful review of the trend of aeroplane engine design deve oped during the War, the present high productive cost of manufacturing and the impossibility of continuing to manufacture any type in sufficiently large series to enable their being sold at a reasonable figure for some considerable time.

"The Beardmore engine was conceived and first constructed in 1908, and its present state has been one of gradual evolution. At that time the question of cost in relation to service had to be considered, and, in fact, was considered far more seriously than has been the case during the past four years. We were convinced that this must be quickly realised by all practical men who had an opportunity of observing the amount of service obtained from engines designed exclusively for War purposes in relation to their cost, and this, coupled with the influence that the War would have upon future production cost, decided us in embarking upon the policy mentioned.

"The number of Beardmore engines and parts of engines on hand represented an enormous volume, both in cash and potential value to commercial aviation, but this value could not be adequately made use of unless it was collected and dealt with in a manner that would ensure to the aeroplane manufacturer a power unit of proved merit, and equally important that standing behind it was an organisation of experience, resources, material and financial, upon whom they could rely to render the necessary assistance as and when required. We claim that our policy will go far to meet such needs, but as it is only intended to appeal to the actual aeroplane manufacturer and manufacturer's agent, we propose shortly to place it before them direct for their consideration.

"In addition, we have organised and equipped with the most modern appliances of all kinds an entirely independent factory to deal with the motors in the following manner :—

"Each engine, upon receipt, will be carefully examined by experts, and graded according to its condition and the classified record of its history. Any motor that has seen service in an aeroplane, no matter for how short a period, will be entirely dismantled, cleaned, and examined by a specially qualified and experienced staff of experts. Any parts found to show signs of wear, exceeding the tolerances allowed on new engines built to Government specification and subjected to A.I.D. inspection, will be replaced by new ones. The motor will then be rebuilt and subjected to the standard endurance, power and consumption tests.

"A certificate of performance will be issued with each engine upon leaving the factory, and, in addition, will be guaranteed by us as to material and workmanship for a period of six months.

"An adequate supply of spare parts will be always and immediately available for despatch on request, and local stocks will be provided in the various colonies and countries abroad where circumstances warrant."

◆ ◆ ◆ ◆

The Airship Old Comrades' Association

THE office of the Airship Old Comrades' Association has been transferred to 147, Oxford Street, W.

Royal Aero Club Seaplane Competition

ON account of the railway strike the Committee of the Royal Aero Club, at its meeting on October 1, 1919, decided to postpone the Seaplane Competition proposed to be held at the end of this month.

Roll of Honour

THE War Office announces that the following officers who were previously reported missing are now reported killed : Lieut. A. J. C. E. Phillippo, R.A.S.C., attached R.F.C. ; Sec. Lieut. R. G. Ottey, R.F.C. ; Sec. Lieut. G. B. Samuels, Durham L.I., attached R.F.C. ; Capt. A. H. Smith, M.C., R.F.C.

A R.N.A.S.-R.N.V.R. Reunion

A REUNION is to be held in London on November 8 of R.N.V.R. and R.N.A.S. men who passed through the Crystal Palace during the War. Those interested are asked to send a postcard to Mr. E. B. Holmes, Hon. Secretary, C.O.I., Reunion Committee, 60, Fountayne Road, N. 16.

Petrol and Profiteering

THE Board of Trade have issued an Order declaring motor spirit "used or capable of being used for supplying motor power to motor vehicles" to be an "article in common use" under the terms of the Profiteering Act ; and by another Order they have used the powers given them by that Act to fix maximum prices for such spirit. The maximum retail prices are : Aviation, 3s. 2½d. ; No. 1, 3s. 0½d. ; No. 3, 2s. 10½d. per gallon in cans. In Ireland and Scotland 1d. per gallon more may be charged.

Testing the Lawson "Aerial Transport"

A CROSS country trip of 313 miles was made on September 13 by the Lawson "Aerial Transport," of which a description was given in FLIGHT of September 11. Leaving Syracuse at 8 a.m. the machine, piloted by Mr. A. W. Lawson and Mr. C. Cox, flew to New York and landed in the Mitchel Field at Mineola. Altogether there were nine persons on board including the two pilots, an engineer, two mechanics and four passengers.

French Ace Killed at Football

LIEUT.-PILOT NOGUES, who has just been demobilised after serving for the last five years in a chasing squadron at the front, and escaped from Germany after being made a prisoner of war, was killed on Sunday when playing Rugby football. In the course of a friendly match between the Racing Club and the Paris University Fifteen, Nogues, who was playing for the former, sustained injuries to his neck, and died during the evening. Lieut. Nogues had brought down 13 Germans, and wore the Croix de Guerre with 10 palms.

Italian Flying Boat at Stockholm

THE Savoia flying boat, piloted by Lieut. Count di Robilant, arrived at Stockholm on Saturday evening from Copenhagen. The journey from Texel (West Frisian Islands) to the Danish capital was made on September 30 in just under four hours.

THE OERTZ FLYING BOATS

[There is little doubt that the development of commercial aviation will be closely allied with the progress made in the production of seaplanes, especially as far as the British Empire is concerned. It is, therefore, of interest to know what has been done until now by others as well as by ourselves, and we think that the following notes, translated from *Flugsport*, dealing with an interesting series of flying boats designed and built by the Oertz Works at Hamburg, may be of interest. This factory was, before the War, chiefly concerned with the building of yachts and motor boats, corresponding, in a way, to our Saunders Works at Cowes.—Ed.]

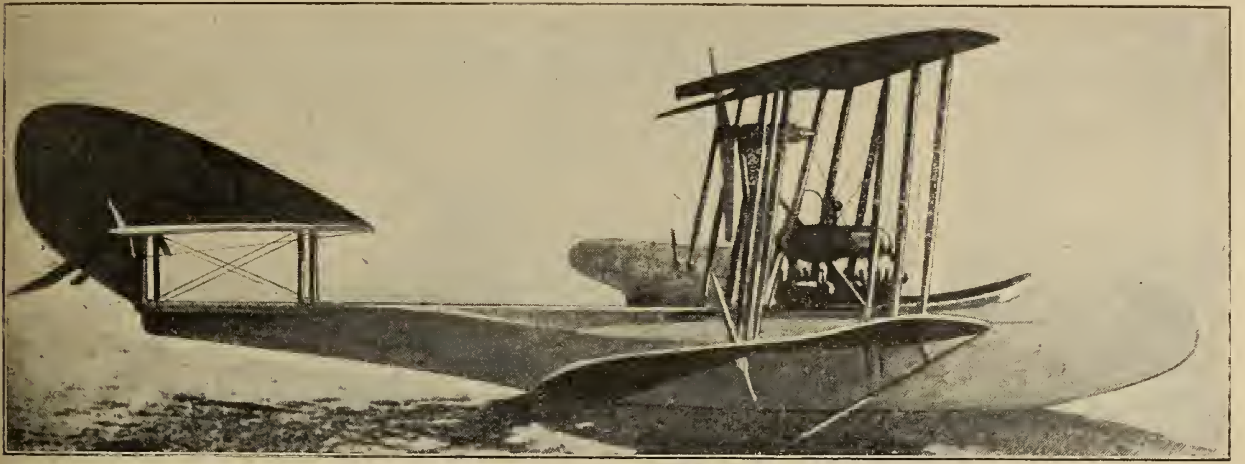


Fig. 1.—The first Oertz flying-boat of 1913. The engine was a 100 h.p. Argus

"The fight for existence between the flying boat and the float seaplane commenced in the very earliest days of seaplanes. Even now the final decision as to whether the flying boat or the float seaplane offers the best solution for aerial transport over the sea has not been made. The experience gained during the War cannot straightaway be applied to peace conditions. At the moment the flying-boat people naturally have the last word, since a flying boat was the first to cross the Atlantic safely. After the questions of weight and air-resistance, the most important point in the evaluation of the advantages and disadvantages of the two types is that of seaworthiness. By this is meant the possibility of getting off and alighting with a certain amount of sea running, and also to be able to 'live' when on the surface in rough weather. The performance required is in direct opposition to the qualities of seaworthiness, since a seaplane, to be seaworthy, must necessarily be of very substantial construction, which can only be provided at the cost of a fairly heavy weight of the hull and machine.

"Next, it would appear that the float seaplane would be superior to the boat seaplane in the matter of seaworthiness, since the boat has a very low freeboard, and, therefore, will be more likely to be swamped while taxying than will the float seaplane. Moreover, the lower plane of a boat seaplane is much nearer to the water than is that of a float seaplane, so that there is more likelihood of it coming in contact with the sea. It will, therefore, be seen that the difficulties that beset flying-boat constructors are by no means small.

"With regard to the questions of weight and air resistance, it must be said that the flying boat is more favourably placed in both respects. Although for powers of 150 to 240 h.p. the weight of the two types does not differ greatly, the advantages of the boat seaplane increase with size. Thus, a float sea-

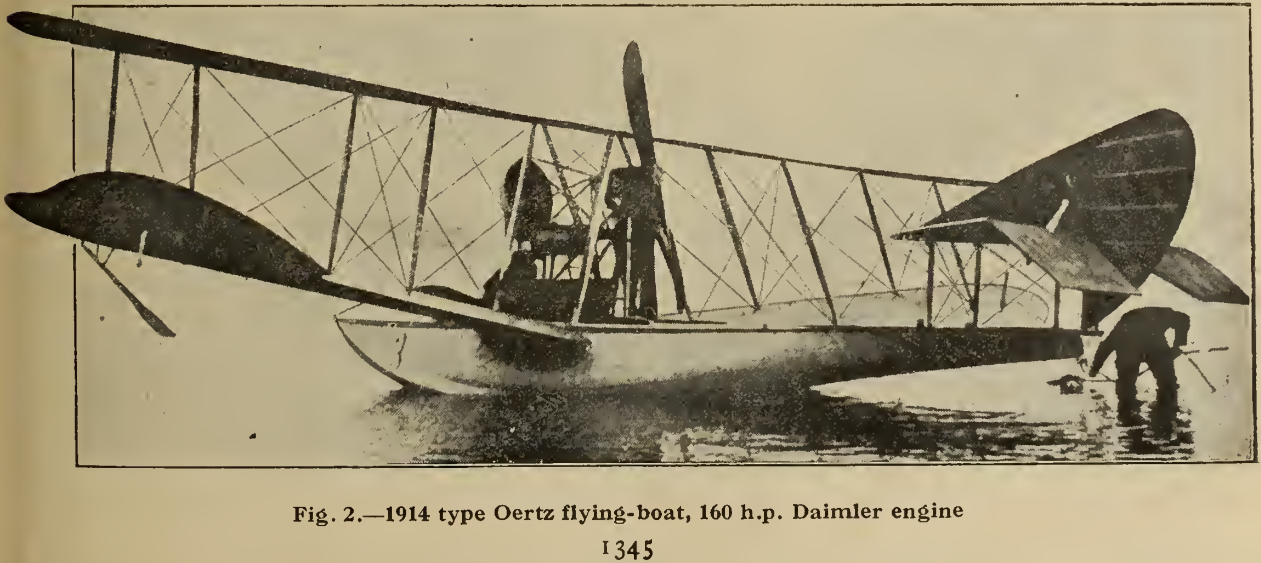


Fig. 2.—1914 type Oertz flying-boat, 160 h.p. Daimler engine

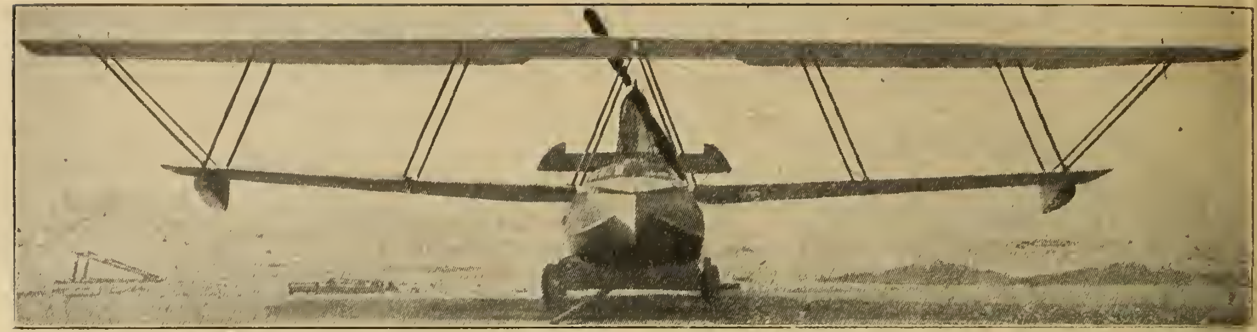


Fig. 3.—The 160 h.p. Oertz flying-boat of 1915

plane of 1,000 h.p. will be about 4,400 lbs. heavier than a boat seaplane of the same power.

"From the point of view of air resistance, the fact that a float seaplane has a fairly extensive strutting arrangement for the floats, while the boat seaplane can be made of fairly good stream-line shape, gives the boat type a smaller resistance than that of the float type, even when, as is sometimes the case, the engine of the boat seaplane is placed on a structure above the boat proper.

"After balancing up the pros and cons. of the case, taking into consideration the practical experience of the Navy, one arrives at the conclusion that the flying-boat type, as regards medium and large-size machines, is superior, also as regards seaworthiness. For types of up to about 300 h.p., possibly the float seaplane will be found the most suitable, while for types of from 300 h.p. to 700 h.p., there would seem to be little to choose. For larger types, however, the flying boat type appears to be the most promising. The chain of experience of both types is not, however, sufficiently long to make it advisable to decide finally for one type or the other.

"Among the most successful, and, therefore, most noteworthy, flying boats, are those designed by D. Ing. Max Oertz, which were built at the Oertz Works at Hamburg. Dr. Oertz, the famous yacht and motor-boat builder, was one of the first in Germany to realise the possibilities of flying and the suitability of his works, with their special facilities and trained workmen specialists, for the requirements of aircraft construction. Above all, the Oertz Works were not laid out as quantity production works, but were used to meet the special requirements of yacht construction by scientific investigation into the smallest mechanical details, and to devote an absolutely loving care to workmanship and finish.

"These fundamental facts, which were reflected in all new productions of this scientifically working factory, whether boats or flying machines, could already be noticed in the very first machine built in 1910. This was a land machine, a monoplane with monocoque body, which weighed only 770 lbs., and, fitted with a 70 h.p. Gnome engine, reached a speed of 80 m.p.h. This first success encouraged Oertz to return to his proper element, the sea, and to apply the same principles to the construction of a flying boat; this was ordered by the Navy in the spring of 1913. Already in the autumn of the same year this flying boat could show its usefulness by

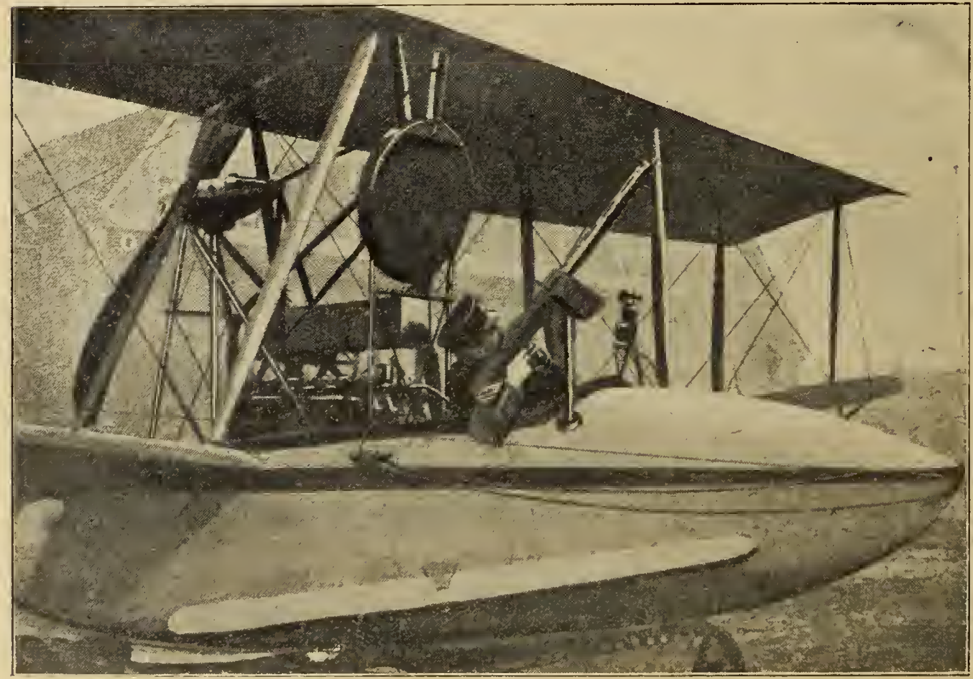


Fig. 4.—1915 type Oertz flying-boat, 160 h.p. engine

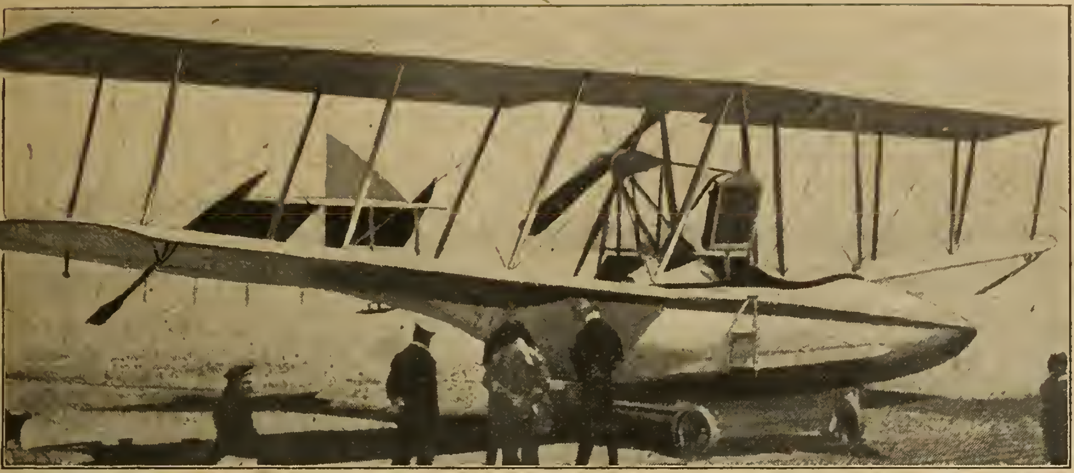


Fig. 5.—Oertz flying-boat of 1915, fitted with 240 h.p. Maybach engine. The machine was designed for a 260 h.p. Argus, but this could not be obtained

ccessful test flights at Breitling, near Warnemünde. his machine, which is shown in Fig. 2, was fitted ith a 100 h.p. Argus engine placed down in the at, and driving the airscrew through shafts and vel gearing. This arrangement, the constructional tails of which had been worked out by Dr. Oertz mself, was something quite new for those times, d this first boat already showed the characteristics all later Oertz flying boats. Among these is, chiefly, e division of the planes into two halves and the nting struts, with means for quickly dismantling e complete plane *cellule*. In looking at this flying at, the thing which at once attracts notice is the ry large chord of the lower plane, compared with at of the top wing. The object of this arrangement s to raise the centre of pressure of the biplane, d thus reduce the undesirable pendulum effect used by having the engine in the hull. The objections to this effect have, however, later proved to be small importance.

" One of the greatest difficulties of that time was design a boat hull which should have the greatest ssible amount of lateral stability when on the sea. The French flying boats of that date had very narrow hulls, which necessitated fitting auxiliary floats to the lower wings. In anything of a sea, these wing floats were a constant danger to the plane, owing to the shocks and stresses set up. It was in this respect that the art of the experienced yacht builder came to the rescue. Oertz provided a boat hull, which not only had a very good stream-line form, but which also possessed a very great amount of lateral stability on the sea; so much so that it was possible for a man to walk half-way out on the lower plane without the machine heeling over enough for the plane to touch the sea. This great lateral stability on the sea has remained one of the features of all Oertz flying boats to this day. The credit of being the first to provide this lateral stability is not in the least reduced by the fact that the American Curtiss flying boat, which was used in the Transatlantic flight, shows the same feature. In order to reduce the danger of the lower wing tips cutting under when the machine is rolling in a sea or taking off, the lower wing tips were provided with flat spring boards which prevented, by their dynamic action, the tips from cutting under.

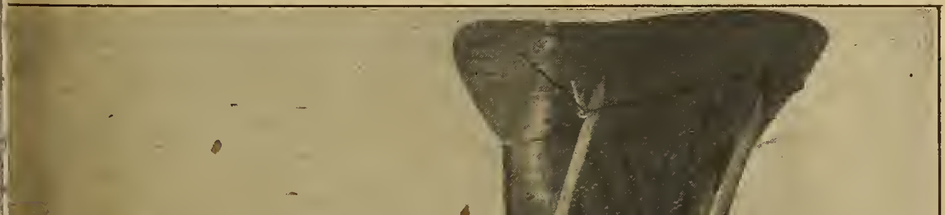


Fig. 6.—Oertz flying-boat (1917), with 240 h.p. Maybach engine

These spring boards are shown in illustrations 1 and 2.

"Already at the first attempt the boat flew well, and proved the soundness of its design. Especially was the transmission found to work well, although, on account of trouble with the engine itself, no flights of very long duration were attempted. The first boat was perfectly smooth, that is to say, it had no step. In order to improve the getting off, experiments were then commenced on hulls provided with step. The first boat of the stepped type appeared in the spring of 1914, and is shown in Fig. 2. The machine was fitted with the first 160 h.p. Daimler engine. The photograph shows the general graceful lines of the hull and the large lower plane, which has upturned *ailerons*, after the manner of the old Tauben. The illustration also gives a good idea of the slanting inter-plane struts which, like those of the Hansa machines, gives equal distances between supports in upper and lower planes. On account of the late arrival of the engine, the boat was not ready for its first trial flight until two days before the great Warnemünde race planned for August of that year. All those who took part in the preparations for that race, which was postponed owing to the outbreak of War, will still remember the splendid and startling performance of this boat, which was piloted by the late pilot Stagge, who, by the way, had never flown a seaplane before. This, however, did not prevent him from doing a series of stunts on this machine.

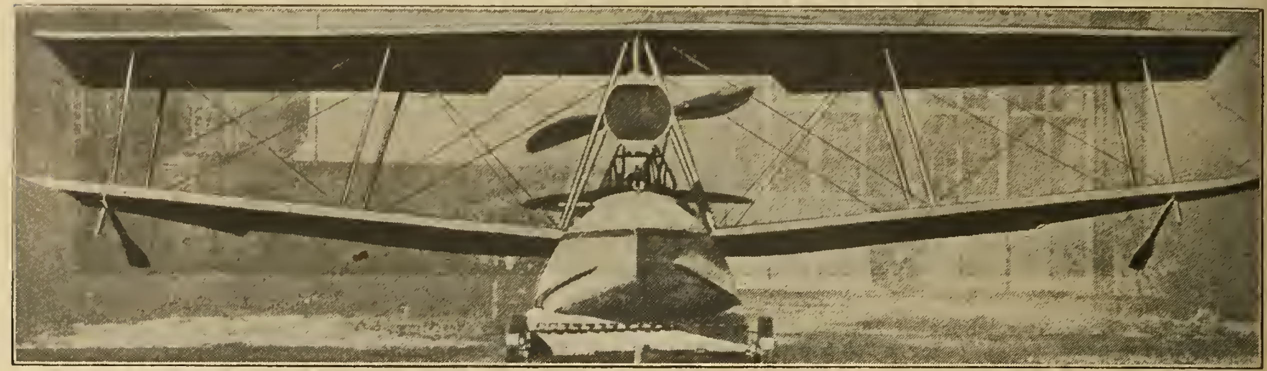


Fig. 7.—Front view of Oertz flying-boat, 1917

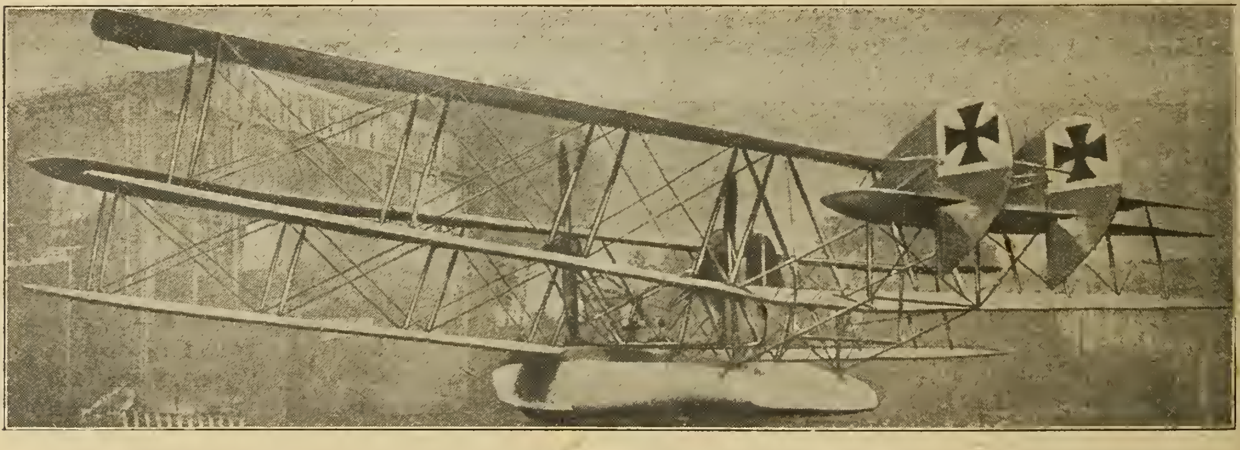


Fig. 8.—Three-quarter rear view of 1916 Oertz tandem biplane, known as the "Flying Schooner."

So absolutely 'right' was this boat, that it could be taken over by the Navy without any alterations whatever, and not long afterwards, piloted by Stagge, it was flying over Dover. Later boats of similar type are shown in Figs. 3 and 4.

"It was not long before a demand arose for larger and more powerful boats, and the Oertz Works received an order for a series of flying boats, which were to be fitted with 260 h.p. Argus engines. Delivery of these engines was much delayed, and when they were available they proved to have exceeded the estimated weight to such an extent that it was quite out of the question to fit them in the Oertz boats. It was, therefore, decided to fit, instead, the 240 h.p. Maybach airship motors, which were at that time quite new. This was done, and in the autumn of 1915 the first of these boats could be delivered. In spite of the fact that the boats were really too large for the engines' power, which was lower than that for which they were designed, and that the engines were heavier than had been the estimated weight of the Argus engines, the boats were able to pass their acceptance tests. One of these boats is shown in Fig. 5.

"Figs. 6 and 7 show an Oertz flying boat specially designed for the 240 h.p. Maybach engine. This machine was presented to the Navy by Messrs. Krupp von Bohlen and Halbach. All previous experience was taken advantage of in the design of this boat, and especially was the step question solved successfully.

The wing-tip spring boards were replaced with small, low-resistance wing-tip floats. [So they had to come back to them after all, in spite of the previous remarks as to the danger caused by them.—Ed., Flight.] The actual performance of this boat exceeded the estimated figures, the speed being 87 m.p.h., as against the estimated speed of 80 m.p.h. This made the Oertz flying boat the fastest in the Navy.

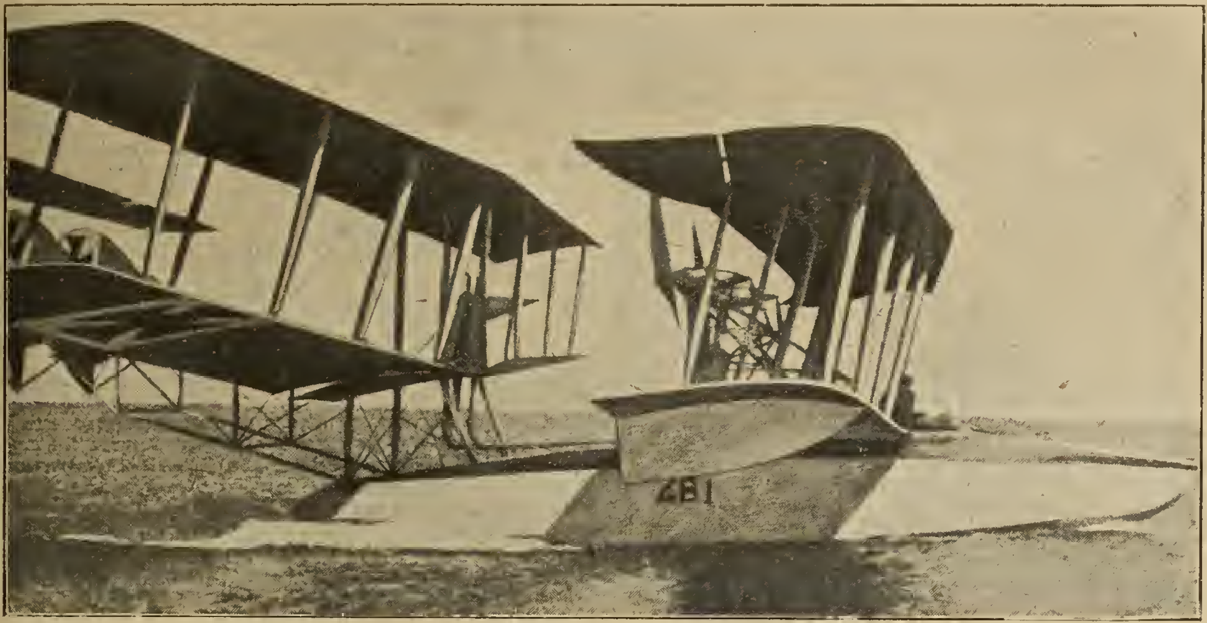


Fig. 9.—The Oertz "Flying Schooner" taxying

"Already at the outbreak of war, Mr. Oertz was considering the design of large flying boats. In order to reduce the overall span of large machines, which may, under certain conditions, be a great disadvantage at sea, he evolved the, in itself, quite novel idea of constructing a tandem machine. [This is incorrect. The tandem machine had already been considered, and, in fact, several had been built, although they could hardly be said to be very successful.—Ed., Flight.] After model tests by Professor Prandel at the Göttingen Laboratory, the construction shown in Figs. 7 to 10 was decided upon, and the boat was finished in 1916. It was given the official, and more seamanlike, title of 'The Flying Schooner.' The 'Flying Schooner' had two 240 h.p. Maybach engines, placed side by side, and attained a speed of about 71 m.p.h., which was better than the speed predicted by Göttingen. The 'Flying Schooner'. was especially good for starting and alighting. In order to enable it to make shorter turns, inter-plane *ailerons* were fitted between the rear planes. These have not yet been fitted in the photograph, Fig. 8, but may be seen in Figs. 9 and 10.

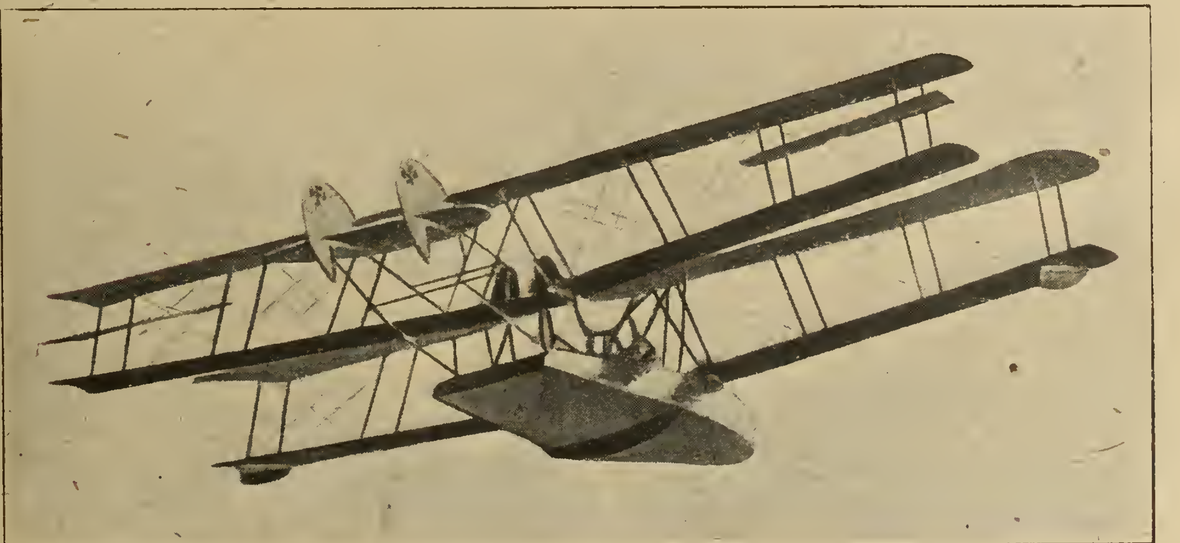


Fig. 10.—The Oertz "Flying Schooner" in the air

"The appearance of the large fast American Curtiss flying boats in the War gave the impetus for us also to start construction of large boats to a considerable extent. In connection with the Brandenburg Aircraft Works, the construction of two large flying boats with two 300 h.p. engines was commenced. The hulls of these boats were already finished when the Armistice came, but the work on the complete boats was then stopped. May it be resumed again for the benefit of peaceful development."

AIRISMS FROM THE FOUR WINDS

ON Monday last the Bishop of Versailles dedicated a chapel, for navigators of the air, to Our Lady of the Skies.

- - -

ITALY has presented two seaplanes to Brazil. We wonder why.

- - -

SPECIAL certificates, it was announced by Mr. Winston Churchill last July, would be later issued to all officers, non-commissioned officers and men who had been "Mentioned in Dispatches" for services in the field during the War. As there are so many in the R.A.F. who had this distinction, now that these "bits of paper" are being issued, the form which they take is of interest. The certificate, which is on thin white cardboard, measures 8½ ins. in length by 7¼ ins. in depth. The inscription, which is printed in black in script lettering, is headed by the Royal Arms, and the following is the form in which the record is issued :—

> The War of 1914-1918.
> (Unit.)
> (Number, rank, and name.)
> was mentioned in a Dispatch from
> Field-Marshal Sir Douglas Haig, K.T., G.C.B., G.C.V.O., K.C.I.E.,
> dated the 8th November, 1918,
> for gallant and distinguished services in the Field.
> I have it in command from the King to record
> His Majesty's
> high appreciation of the services rendered.
> WINSTON S. CHURCHILL,
> Secretary of State for War.
> War Office,
> Whitehall, S.W.,
> 1st March, 1919.

Some R.A.F. Impressions

Captain Lalley, M.C. and bar, O.C. 25th Squadron, Germany, who can do wonderful things with a Fokker

A notice accompanying the certificate states that certificates are not being prepared in the order of date of award, and that any further certificate to which the recipient may be entitled will be forwarded in due course, no further application being necessary.

- -

THE actual disposal of the air-fleet of Germany appears to be still in the balance. The *Intransigeant*, a usually well-informed Paris contemporary, when dealing with the recent adoption by the Supreme Council of the report of the Inter-Allied Commission of Aeronautics, writes :—"According to the programme which was decided upon for the sharing out of the Zeppelins, France will have the first choice, then Great Britain, and then the United States. After this choice has been made, the remaining Zeppelins will be destroyed. The different Powers will also have the right to choose various makes of German aeroplanes, Belgium, Greece, Roumania, and Serbia also taking part in this partition.

"No official confirmation of the destruction of Zeppelins by the Germans has been received, but it is known to the French authorities that German officers attached to the airship service are destroying all vessels, the existence of which was not formerly known to the Allies. According to the terms of the Peace Treaty, the manufacture of German machines must cease six months after the ratification of the Treaty by three Powers. A factory at Dusseldorf is at present engaged in constructing a giant type of Zeppelin. The work is being hurried forward in order that it may be finished before the ratification of the Treaty."

- - -

LABRADOR is reported to be of great promise for the supply of wood-pulp. This fact emerges after a survey in aeroplanes, spread over a month, by members of an expedition to investigate the subject. Great lands, they report, exist from which millions of cords of pulp wood could be cut and rolled to streams for direct shipment.

- - -

"AMONG the goods sent to Paris by the Airco express aeroplane which left Hounslow at 12.30 was a tiny pedigree Persian kitten." And very interesting too, but we've looked in vain for the usual "interview" as to what Kittie thought about it all.

- - -

LAST Saturday a very heavy mist came over the land, and cross-country flights practically reached the impossible. So the Avros turned their attention to salvage operations. Before dawn the drone of twin engines was heard through the murk. The noise wandered uneasily to and fro, and it became evident that some large aeroplane was completely lost. Signals were made from the aerodrome without result ; so at last an Avro was asked to perform the function of an aerial life-boat. It went up and groped about in the dark in the direction of the noise, and presently made out a large machine with 10 passengers aboard roaming unhappily round with a "four a.m. and I can't find the keyhole" air. The Avro pilot had to go cautiously, for when he began to fly towards the liner he lost sight of the aerodrome. However, he fired Verey lights and presently attracted the attention of the liner and directed it safely to earth. It had taken an hour and a half to get to Hounslow from another London aerodrome, and, for once, the passengers were not sorry to be back on *terra firma*.

Again after dark that night an Avro had to go up to show the way to a second large machine which had lost its bearings.

- -

R.N.L.I., please note.

- -

"AN egg having on it clear impressions arranged in a circle like the figures on the dial of a clock has been laid at Walberton."—*Daily Paper.*

Some Monoplane feat, *that!* By encouragement there may be hope in this direction for the natural evolution of a really reliable drift-meter, direction finder, or other helpful air-instruments.

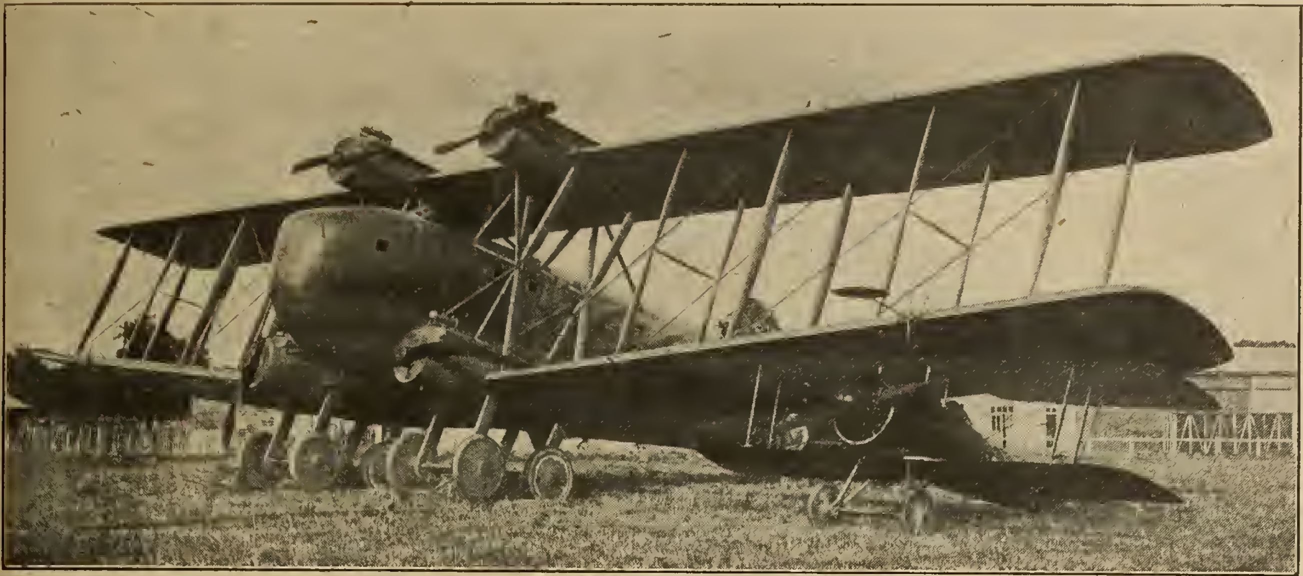
- -

Apropos of eggs, why not utilise the homely sand egg-boiler as an intimation to pilots in a fog that their machine is upside down. (*Patented.*)

- -

HE was an Air Force man, and he had patriotically undertaken to drive a train for a distance of some 36 miles as part of the journey.

He did it successfully in 25 minutes.



THE LATEST PRODUCTION FROM THE PIONEER HOUSE OF BLÉRIOT: The four-engined 28-passenger "Aerobus," which has recently passed its first tests. It has a total horse-power of 1,000, and a speed of 90 m.p.h.

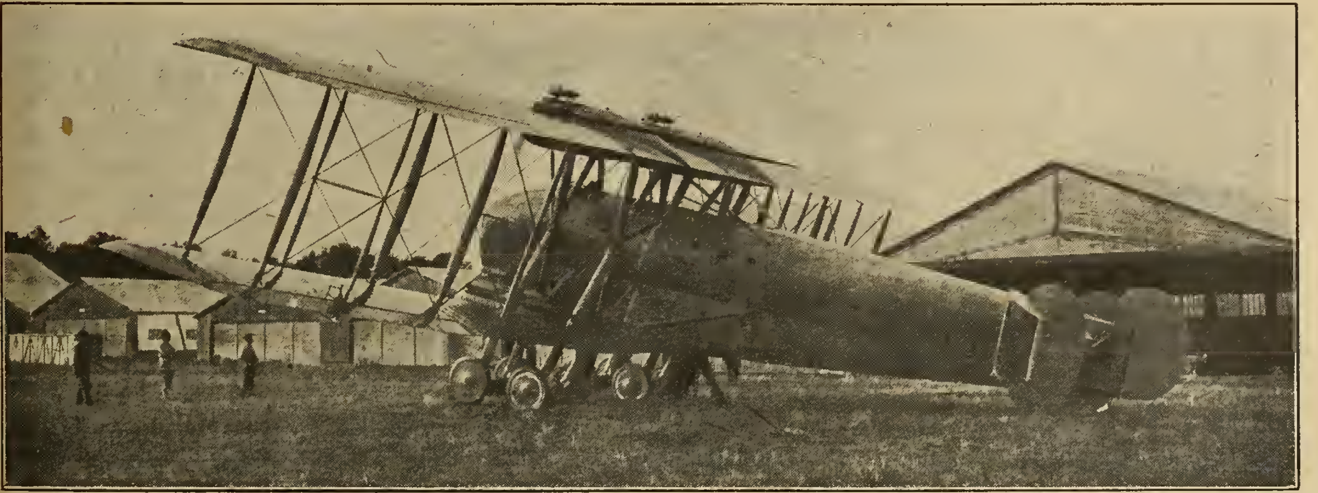
Then all the passengers got out, and there was no comment.—(*Globetrotter.*)

- - -

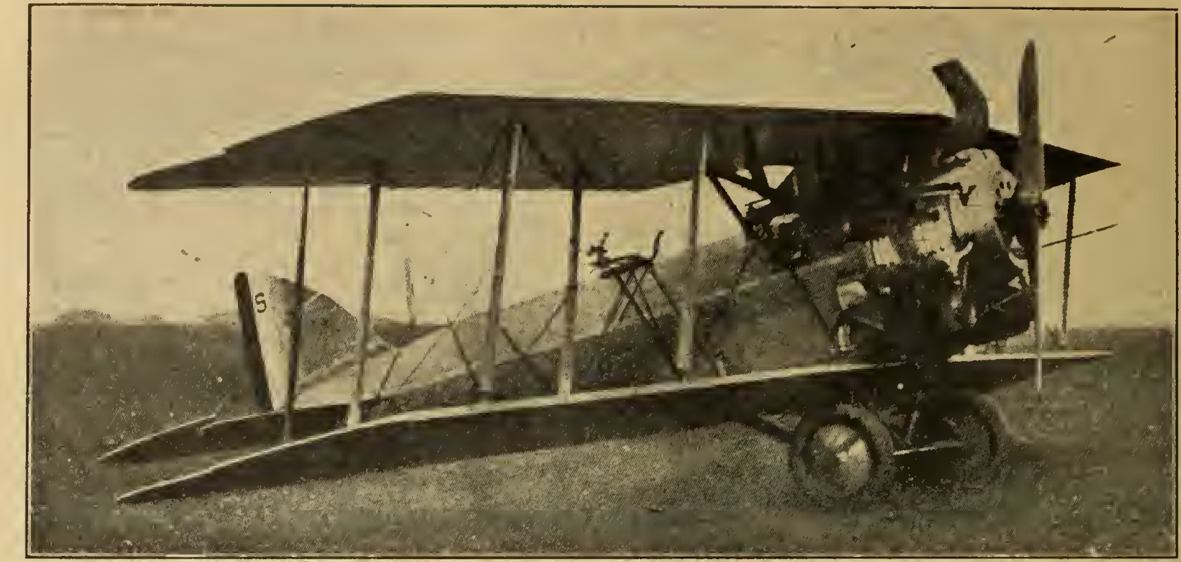
PROFITEERING this side the Channel is quite pronounced enough for most after-War citizens. But compared with France it would appear as if *our* commodities are actually being given away. Pretty steep measures are in preparation by the Senate for stamping-out some of the more flagrant abuses, but the *Temps* seems to have doubts as to their efficacy. In fact, they suggest that the very punishment proposed to be inflicted will probably lead to an intensification of the evil, as the guilty will just add their fines to the prices of their goods. What the figures to the public in France will mount up to under this eventuality is a bit puzzling when one finds the following items foreshadowed in the new measure, as an antidote to the profiteering virus which appears to have permeated the system of every man's son (and daughter) since the Hun first set his hordes roaming: Fines will be increased to £2,000, and in cases where the guilty persons are not *bona-fide* traders, but speculators pure and simple, to £8,000, while the maximum period of imprisonment has been increased to five years. This augmentation of the terms of imprisonment is welcomed for the reason that the sentences passed upon profiteers have not up till now proved a deterrent. The profiteers paid the fines and went to prison, but resumed their illegal operations as soon as they regained their liberty. If light sentences were imposed, it was not because the magistrates were inclined to be lenient; it was because the law did not permit them to inflict heavier terms of imprisonment.

- - -

AT least during the terms of imprisonment the rapacity of the individual will be temporarily checked; it should be only a question of laying the whole tribe to heel as quickly as possible. And there should be little chance of respite for the rapacious crowd, as never a voice was raised in the Senate to stay the increased fines and sentences embodied in the bill. Looks as if this were another little stunt which is done better in France, and might be well worth giving a trial trip over here.



Three-quarter rear view of the new Blériot four-engined 28-passenger "Aerobus," showing the biplane tail with its triple rudders.



THE MORANE FIGHTING BIPLANE, FITTED WITH A BUGATTI ENGINE : Note the "lobster-pot" radiators mounted below the engine, and the back-swept wings.

The King's Certificate to Invalided R.A.F. Officers

The Air Ministry announces that His Majesty the King has been pleased to approve of the issue of a certificate to officers who have relinquished their commissions during the War under the following circumstances :—

(*a*) Having served in a sea-going ship of war at sea, or abroad in a theatre of operations, since August 4, 1914, and who have been invalided on account of ill-health or wounds, not due to misconduct, and where such is or are certified under the authority of the Air Council to be caused or aggravated by service.

(*b*) Having been invalided on account of ill-health or wounds certified under the authority of the Air Council to have been caused or aggravated by service while engaged on flying duty at home in connection with operations against the enemy, or aerial coast patrol work, since August 4, 1914.

(*c*) Having been invalided on account of disablement certified under the authority of the Air Council to be directly attributable to the action of the enemy, *e.g.*, air raids or naval raids.

The certificates for officers of the R.F.C. who relinquished their commissions prior to April 1, 1918, will be issued under the regulations laid down in Army Order 138 of 1918. The certificates for officers of the R.N.A.S. who relinquished their commissions prior to April 1, 1918, will be issued by the Admiralty.

His Majesty the King has further approved of the award of a special distinctive certificate to be entitled the King's Second Certificate, to officers who, after having become eligible for the award of the King's Certificate, voluntarily served again, and again relinquished their commissions during the War, under the circumstances detailed in paragraph 1 of this Order.

Applications from officers who have already left the Service, and who are entitled to these certificates should be addressed to The Secretary, Air Ministry (P.4 E.), Kingsway, London, W.C.2.

Applicants must state : (*a*) Full name and rank ; (*b*) The grounds upon which the certificate is claimed ; (*c*) Details of service for which it is claimed, including the branch or arm of H.M. Service in which the applicant was serving at the time ; (*d*) Date of relinquishment of commission ; (*e*) Whether a certificate has already been applied for or been granted, in respect of service in the ranks, etc.

Mr. R. Kenworthy at the "E.L.T.A." (Amsterdam) on the Blackburn Kangaroo, where he was busy carrying passengers continuously for six weeks or more. This machine was last week commandeered for Midlands and the North aerial-post work

THE ROYAL AIR FORCE

London Gazette, September 26, 1919.

Permanent Commissions.—The following are granted Permanent Commissions in the ranks stated, with effect from August 1, 1919 :—

Group Captain.—E. M. Maitland, C.M.G., D.S.O., A.F.C.

Wing Commanders.—J. N. Fletcher, A.F.C. ; T. R. Cave-Brown-Cave, C.B.E. ; W. C. Hicks, A.F.C. ; A. D. Cunningham, O.B.E. ; J. W. O. Dalgleish, O.B.E.

Squadron Leaders.—E. H. Sparling ; D. Harries, A.F.C.

Flight Lieutenants.—G. G. H. Cooke, D.S.C., A.F.C. ; R. A. Cochrane, A.F.C. ; R. S. Booth, A.F.C. ; G. M. Thomas, D.F.C. ; J. B. Cole Hamilton ; T. P. Y. Moore ; P. E. M. Maitland, A.F.C. ; P. G. N. Ommanney ; W. Underhill, D.S.C. ; A. H. Wann ; T. W. Elmhirst, A.F.C. ; I. C. Little, A.F.C. ; J. A. Barron ; H. L. Rutty ; F. L. C. Butcher ; H. S. Scroggs ; E. F. Turner, A.F.C. ; R. S. Sugden, A.F.C. ; R. S. Montagu, D.S.C. ; H. V. Drew, A.F.C. ; R. V. Goddard ; J. H. Hagon ; A. W. Mylne ; C. W. C. Browne.

Flying Officer.—S. B. Harris, A.F.C.

The undermentioned temporary appointments are made :—

Staff Officer, 3rd Class.—(Air)—Flight-Lieut. F. N. Halsted, D.S.C. ; Sept. 15, 1919. (Substituted for the notification in the *Gazette* of Sept. 23, 1919.) (P.)—Lieut. F. W. Memory, Nov. 11, 1918, and to be actg. Capt, whilst so empld. (Substituted for the notification in the *Gazette* of Nov. 26, 1918.)

The undermentioned temporary appointments are made :—

Staff Officers, 2nd Class.—(P.)—Capt. R. B. Waite, M.B.E. ; May 1, 1919. (T.)—Sqdn. Ldr. R. K. Pillers, O.B.E., from S.O. 1. ; Sept. 15, 1919.

Staff Officer, 2nd Class (*2nd Grade*).—Lieut. (actg. Capt.) A. D. Carey, June 10, 1919, and to be actg. Maj. whilst so empld. The rank of Capt. G. S. Lardner is as now described, and not "Lieut." as stated in the *Gazette* of Sept. 9, 1919.

Flying Branch.

Maj. G. P. Wallace, D.S.O., to be actg. Lieut.-Col. whilst empld. as Lieut.-Col. (A.), from Feb. 27, 1919, to April 30, 1919. Maj. N. M. Martin to be Maj. (A.), from (S.O.), from Nov. 20, 1918, to Dec. 29, 1918.

The undermentioned Squadron Leaders (S.O.) to be Squadron Leaders (A.) :—A. G. R. Garrod, M.C., D.F.C. ; Sept. 6, 1919. P. C. Malthy, D.S.O., A.F.C. ; Sept. 15, 1919.

Squadron Leader R. M. Field to be Squadron Leader (S.), from (S.O.) ; Sept. 15, 1919.

Capt. L. D. McKean is graded for purposes of pay and allowances as Maj. whilst empld. as Maj. (A.), from May 1, 1919, to June 4, 1919. Capt. I. C. Little, A.F.C., is graded for purposes of pay and allowances as Maj. whilst empld. as Maj. (A'ship) ; May 1, 1919. Capt. G. E. Livock is graded for purposes of pay and allowances as Maj. whilst empld. as Maj. (S.) from May 1, 1919, to June 29, 1919.

The undermentioned Flight Lieuts. to be Flight Lieuts., from (S.O.) :—Sept. 15, 1919—C. H. Keith (A.) ; F. W. Walker, D.S.C., A.F.C. (A. and S.) ; P. J. Sumner (K.B.) ; Sept. 10, 1919.

Capt. E. M. Pizey is graded for purposes of pay and allowances as Capt. whilst empld. as Capt. (A.) ; Nov. 25, 1918.

The undermentioned Lieuts to be actg. Capts. whilst empld. as Capts. (A.) :—(Hon. Capt.) Alan Storey, D.F.C., from Nov. 21, 1918, to April 30, 1919 ; C. E. Maitland, D.F.C. ; July 14, 1919. Lieut. O. R. Gayford, D.F.C., to be actg. Capt. whilst empld. as Capt. (O.) ; May 1, 1919. (Substituted for the notification in the *Gazette* of July 22, 1919.) Lieut. (Hon. Capt.) Alan Storey, D.F.C., is graded for purposes of pay and allowances as Capt. whilst empld. as Capt. (A.), from May 1, 1919, to June 15, 1919. Lieut. E. M. Henderson relinquishes the grading for pay and allowances as Capt. on ceasing to be empld. as Capt. (A.) ; July 25, 1919.

Flying Officer F. C. Deane to be Flying Officer (O.), from (Ad.) ; Aug. 30, 1919. Flying Officer A. F. Lang to be Flying Officer (O.) to (T.) ; Aug. 1, 1919.

The undermentioned 2nd Lieuts. to be Lieuts. :—(Hon. Lieut.) W. Bagnall ; April 2, 1918. G. B. Emery ; April 25, 1918. Fred Wood ; Oct. 26, 1918. W. R. N. Cheetham ; Jan. 5, 1919. L. Walsh ; Jan. 16, 1919. F. W. Dunnett ; Feb. 16, 1919. E. P. C. Godsil ; April 2, 1919. O. V. Lee ; April 25, 1919. R. D. Rogers ; April 25, 1919. A. N. Abbott ; May 8, 1919. J. G. Walton ; June 6, 1919. V. G. Record ; June 13, 1919. L. T. Wilson ; July 5, 1919. W. Urwin ; July 10, 1919.

2nd Lieut. S. W. Tinham (late Gen. List., R.F.C., on prob.) is confirmed in rank as 2nd Lieut. (A.) ; July 29, 1918.

177058 Cadet J. H. R. Hopkins is granted a temp. commn. as 2nd Lieut. (O.) ; Nov. 10, 1918.

The undermentioned relinquish their commns. on ceasing to be empld. :—Lieut. J. M. M. Hume (Lieut., Black Watch) ; Feb. 24, 1919. Lieut. R. Whyte ; May 20, 1919. Aug. 26, 1919—Lieut. A. H. A. Alban, D.F.C. (Lieut., R.A.) ; Lieut. A. M. Diamant (Lieut., R.A.) ; Lieut. (Hon. Capt.) E. J. Long (Capt., Gordon Highrs.) ; Aug. 27, 1919. 2nd Lieut. (Hon. Lieut.) P. N. Melitus (Lieut., R. War. R.) ; Aug. 30, 1919. 2nd Lieut. (Hon. Lieut.) N. MacLeod (Lieut., Seaforth Highrs.) ; Sept. 1, 1919. 2nd Lieut. (Hon. Lieut.) D. Neil (Lieut., Cam. Forestry Corps) ; Sept. 3, 1919. 2nd Lieut. T. W. Woodrow (Lieut., R.A.) ; Sept. 6, 1919. Lieut. W. E. Davis, M.C. (Lieut., Gloster R.) ; Sept. 11, 1919. Lieut. W. D. Robertson (Lieut., R.E.) ; Sept. 18, 1919.

Then follow the names of 81 officers who are transferred to the unempld. list under various dates.

Capt. A. H. Dalton (Lieut., Hussars) resigns his commn. ; Sept. 27, 1919.

The undermentioned Lieuts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank :—

A. Hartley ; May 6, 1919. (Substituted for the notification in the *Gazette* of May 16, 1919.) H. H. House ; Sept. 9, 1919.

Lieut. S. A. Harper, M.C. (Lieut., Cheshire R.), resigns his commn. ; Sept. 27, 1919.

The undermentioned 2nd Lieuts. relinquish their commns. on acccount of ill-health, and are permitted to retain their rank :—W. P. Wemple ; July 12, 1919. T. V. J. Nicholas, July 18, 1919. (Substituted for the notification in the *Gazette* of July 29, 1919, wherein this officer was described as 2nd Lieut. T. U. J. Nicholas.)

Capt. Kenneth Gordon Macdonald to take rank and precedence as if his appointment as Capt. bore date July 1, 1918.

The initials of 2nd Lieut. E. W. Cowdery are as now described, and not "E. D.," as stated in the *Gazette* of July 1, 1919. The initials of Lieut. N. P. Edwards are as now described, and not "J. P.," as stated in the *Gazette* of Aug. 22, 1919. The Christian names of 2nd Lieut. Gerald Marcus Jackson Morton are as now described, and not as stated in the *Gazette* of Aug. 30, 1918. The notifications in the *Gazette* of March 28, 1919, concerning 2nd Lieut. E. C. Heyes and Lieut. C. A. Jordan are cancelled. The notification in the *Gazette* of June 20, 1919, concerning Lieut. J. W. S. Mellish is cancelled. The notification in the *Gazette* of July 11, 1919, concerning 2nd Lieut. Thomas Clifford Stranger is cancelled. The notification in the *Gazette* of Aug. 12, 1919, stands. The notifications in the *Gazette* of July 25, 1919, concerning 2nd Lieut. T. K. Ludgate and 2nd Lieut. W. P. Wemple are cancelled.

Administrative Branch.

Wing-Com. R. E. M. Russell, C.B.E., D.S.O., to be Wing-Com., from (S.O.) ; Aug. 30, 1919. Squadron Leader A. J. Currie to be Squadron Leader, from (S.O.) ; Sept. 3, 1919. Capt. A. W. Crombie to be Capt., from (T.) ; July 19, 1919. (Substituted for notification in the *Gazette* of Aug. 1, 1919.)

The undermentioned Flight-Lieuts. to be Flight-Lieuts., from (S.O.) :—E. O'D. Crean ; Aug. 29, 1919. F. F. Lloyd ; Sept. 1, 1919. A. M. Waistell : Sept. 14, 1919. H. G. Hutchinson ; Sept. 15, 1919.

Flight.-Lieut J. W. Havers to be Flight-Lieut., from (A'Shp.) ; Sept. 9, 1919.

Lieut. G. Roberts to be actg. Capt. whilst empld. as Capt. ; June 3, 1919.

The undermentioned Lieuts. are graded for purposes of pay and allowances as Capts. whilst empld. as Capts. :—May 1, 1919—P. E. D. Addis ; W. Halliwell F. J. Logan ; T. Mack ; V. G. Davis (to July 14, 1919).

(Hon. Capt.) J. R. Gould ; May 16, 1919.

Flying Officer (actg. Flight-Lieut.) J. C. Cantrill relinquishes the actg. rank of Flight-Lieut. on ceasing to be empld. as Flight-Lieut. ; Sept. 3, 1919. Flying Officer F. Pratt relinquishes the grading for pay and allowances as S.O. 3 on ceasing to be specially empld. ; Sept. 2, 1919

The undermentioned Flying Officers (A.) to be Flying Officers : O. D. Freeman ; Aug. 1, 1919. G. N. Prout ; Aug. 21, 1919.

Lieut. I. MacL. Moffats to be Lieut., from (O.) ; Jan. 20, 1919. (Substituted for notification in the *Gazette* of March 4, 1919, wherein this officer's rank was shown as 2nd Lieut.)

The undermentioned Flying Officers to be Flying Officers, from (S.O.) :—John Duncan ; Sept. 1, 1919. W. F. Duff ; Sept. 4, 1919. Sept. 15, 1919—G. D. Ashby ; P. A. Simmonds.

Flying Officer (Hon. F./Lieut.) E. J. Langridge, M.B.E., to be Flying Officer, from (T.) ; Sept. 1, 1919.

The undermentioned Lieuts. and Qr.-Mrs., Gen. List, are granted temp. commns. as Lieuts. :—May 27, 1918—J. Hicks ; G. Roberts ; J. Sims.

The undermentioned 2nd Lieuts. to be actg. Lieuts. whilst empld. as Lieuts. : W. Fell, from Oct. 1, 1918, to April 30, 1919. (Substituted for notification in the *Gazette* of Nov. 26, 1919). John Mellor, from Nov. 15, 1918, to April 30, 1919.

The undermentioned 2nd Lieuts. to be Lieuts. :—F. H. M. Francis-Hawkins ; Dec. 15, 1918. G. E. Shipp ; April 11, 1919. 2nd Lieut. John Harold Grey to be 2nd Lieut., from (O.) ; Jan. 3, 1919. (Substituted for notification in the *Gazette* of Mar. 25, 1919.

The undermentioned relinquish their commns on ceasing to be empld. :—Lieut. J. B. Edgar (Capt., R. Scots. Fus.) ; Oct. 11, 1918. Lieut. C. B. Millett ; Feb. 28, 1919. Lieut. C. P. Sisley (Lieut., R.G.A.) ; June 17, 1919. Lieut. J. D. G. MacRae (Lieut., Sea. Highrs.) ; June 30, 1919. Capt. S. C. Renny (Capt., K.O S.B.) ; July 1, 1919. Sec. Lieut. J. G. Berry ; Aug. 24, 1919. Capt. C. W. Bright (Lieut , R.N.R.) ; Aug. 26, 1919. Capt. P. F. J. Kent (Lieut., Dragoon Guards) , Sept. 6, 1919.

Then follow the names of 12 officers who are transferred to unempld. list under various dates.

Capt. W. S. Cole C.G.M., D.S.M., relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank ; Sept. 17, 1919. Lieut. (Hon. Capt.) Frederick John Smith relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain the rank of Capt. ; Sept. 9, 1919.

2nd Lieut. W. K. Holms relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; Sept. 19, 1919. The notification in the *Gazette* of Feb. 28, 1919, concerning Lieut. J. Handley is cancelled. The notification in the *Gazette* of April 4, 1919, concerning Lieut. C. B. Millett is cancelled. The notification in the *Gazette* of May 27, 1919, concerning Lieut. N. M. Hoskins is cancelled. The notification in the *Gazette* of June 3, 1919, concerning Sec. Lieut. J. Macarthy is cancelled.

Technical Branch.

Maj. G. P. Grenfell, D.S.O., is graded for purposes of pay and allowances as Lieut.-Col. whilst empld. as Lieut.-Col., Grade (A.), from May 1, 1919, to July 31, 1919. (Substituted for notification in the *Gazette* of Sept 9, 1919.) Maj. T. H. Vitty to be Maj., Grade (A.) from Grade (B.) ; July 24, 1919. Capt. F. H Songhurst, M.B.E , is graded for purposes of pay and allowances as Maj. whilst empld. as Maj., Grade (A.), from May 1, 1919, to July 31 1919.

Lieut. A. H. Hughes to be actg. Capt. whilst empld. as Capt., Grade (A.) ; June 20, 1919. Lieut. H. F. Wilkinson is graded for pay and allowances as Capt. whilst empld. as Capt., Grade (A.) ; May 1, 1919. Lieut. (Hon. Capt.) Cyril Chapman, D.S.C., is graded for purposes of pay and allowances as Capt. whilst empld. as Capt., Grade (A.), from (O.), from June 4, 1919, to July 31, 1919. Flight-Lieut. O. S. Stiles to be Flight-Lieut., Grade (B.), from (K.B.) ; Sept. 15, 1919.

The undermentioned Sec. Lieuts. to be actg. Capts. whilst empld. as Capts., Grade (B.) :—H. C. Hull, from Jan. 12, 1919, to April 30, 1919. (Hon. Lieut.) W. A. Winter ; May 1, 1919.

The undermentioned Flying Officers to be Flying Officers, Grade (A.) :—H. Norrington, from (S.O.) ; Sept. 2, 1919. H. W. Armstrong, from (K.B.) ; Sept. 9, 1919. 2nd Lieut. (actg. Lieut.) J. A. Joyce to be actg. Lieut. whilst empld. as Lieut., Grade (A.), from Grade (B.), from Nov. 8, 1918, to April 30, 1919. Flying Officer J. M. McEntegart to be Flying Officer, Grade (B.), from (S.O.) ; Sept. 15, 1919.

The undermentioned relinquish their commns. on ceasing to be empld. :—Capt. G. H. J. Mercer (Lieut., D. of Corn. L.I.) ; Sept. 1, 1919. Col. the Hon. A. Stopford, C.M.G. (Capt., R.N.) ; Sept. 13, 1919.

Then follow the names of 17 officers who are transferred to the unempld. list under various dates.

Lieut. A. L. C. Fuller (Lieut., Dragoon Guards) resigns his commn. ; Sept. 22, 1919.

The undermentioned Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—T. A. Russell ; Sept. 6, 1919. G. Spurgen (contracted on active service) ; Sept. 10, 1919.

The surname of Capt. G. L. Godden is as now described, and not "Gooden," as stated in the *Gazette* of Aug. 19, 1919.

Medical Branch.

Capt. T. E. Mulvany relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; Aug. 13, 1919. (Substituted for the notification in the *Gazette* of Sept. 2, 1919.)

Memoranda.

Sec. Lieut. (Hon. Capt.) F. C. Marsh is granted the hon. rank of Maj.; July 4, 1919.

The undermentioned Overseas Cadets are granted temp. commns. as Sec. Lieuts. with effect from Feb. 15, 1919, and relinquish such commns., with permission to retain the rank, from the day following termination of the standardised voyage in the case of those claiming immediate repatriation, and from the day following demobilisation in England in all cases:—

316105 C. D. Hooper.

184852 Herbert Stanley Morris. (Since killed.)

Pilot Officer (Hon. Flying Officer) W. E. Cowie is transferred to unempld. list, from (S.O.); Sept. 3, 1919.

The surname of George Henry Piercy is as now described, and not "Piercey," as stated in the *Gazette* of June 24, 1919.

London Gazette, September 30, 1919.

Permanent Commissions.

The following are granted Permanent Commissions in the ranks stated, with effect from Aug. 1, 1919:—Squadron Leader E. J. C. Roberts; Flight-Lieut. R. G. Parry.

The notifications which appeared in the *Gazette* of Aug. 1, 1919, appointing the undermentioned officers to Permanent Commissions, are cancelled:—Maj. F. R. Stapleton-Cotton (T.); Capt. Gerald Allen (A.); Capt. E. P. Hardman, D.F.C. (A.); Capt. A. L. McFarlane (A.); Capt. L. H. T. Sloan (A.); Capt. R. B. Tomlinson (T.); Lieut.. D. G. McGregor, A.F.C. (O.); Lieut. G. S. Peffers, D.F.C. (A.).

The surname of Maj. W. A. McClaughry, D.S.O., M.C., D.F.C. (A.), is as now described, and not "McLaughry," as in the *Gazette* of Aug. 22, 1919. The rank of Squadron Leader W. C. Hicks, A.F.C., is as now described, and not "Wing-Com." as stated in the *Gazette* of Sept. 26, 1919.

The undermentioned temporary appointment is made:—

Staff Officer, 3rd Class.—(Air)—Flight-Lieut. C. F. Gordou, O.B.E., M.C., Sept. 18, 1919.

Group Captain (*Staff*).—Group Capt. A. M. Bent, C.M.G., C.B.E., relinquishes the grading for purposes of pay and allowances as Air Commodore; Sept. 15, 1919.

Flying Branch.

The undermentioned Sec. Lieuts. to be Lieuts.:—F. de M. Hyde; April 13, 1919. D. O. Onslow-Carleton; May 8, 1919.

H. V. N. Bankes (Lieut., R.E.) is granted a temp. commn. as Sec. Lieut. (O); April 24, 1918, and to be Hon. Lieut.

The undermentioned relinquish their commns. on ceasing to be empld.:—Sec. Lieut. J. C. Bowstead, D.C.M., M.M. (Lieut., Norf. R.); April 9, 1919. Lieut. H. B. Mason (Lieut., R.A.); April 30, 1919. Lieut. D. P. F. Uniacke (Lieut., R. Irish Rifles); May 12, 1919. Sec. Lieut. P. J. A. Fleming; June 3, 1919. (Substituted for the notification in the *Gazette* of June 13, 1919.) Lieut. T. M. Draper; June 12, 1919. Lieut. A. W. Davison (Lieut., Wiltshire R.); June 13, 1919. (Substituted for the notification in the *Gazette* of Aug. 5, 1919.) Sec. Lieut. (Hon. Lieut.) H. W. Blakeney, M.C. (Lieut., R.E.); Sept. 5, 1919. Lieut.-Col. E. T. R. Chambers, A.F.C. (Lieut.-Com., R.N.); Sept. 8, 1919. Capt. J. G. Selby, M.C. (Capt., R.H. and R.F.A.); Sept. 15, 1919. Lieut. G. D. Gillie (Lieut., E. Ont. R.); Sept. 21, 1919. (Substituted for the notification in the *Gazette* of May 27, 1919.) Lieut. E. J. H. Dough (Lieut., R.G.A.); Sept. 22, 1919. Lieut. A. W. Frazer (Sec. Lieut., S. Wales Borderers); Sept. 23, 1919.

Then follow the names of 127 officers who are transferred to the unempld. list under various dates.

Lieut. R. Coop relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; Aug. 9, 1919. (Substituted for the notification in the *Gazette* of Aug. 8, 1919.)

The undermentioned Sec. Lieuts. relinquished their commns. on account of ill-health, and are permitted to retain their rank:—H. P. Brumell (caused by wounds); July 7, 1919. Alex. Boyce McDonald (caused by wounds); Aug. 13, 1919. Oct. 1, 1919—W. M. Hall; John Rhodes (W. Yorks. R.).

The surname of Sec. Lieut. Arthur Fred Belyea is as now described and not "Beyles" as stated in the *Gazette* of July 2, 1918.

The notification in the *Gazette* of Sept. 3, 1918, concerning Harry Thomas Daniel is cancelled. The notification in the *Gazette* of Nov. 29, 1918, concerning Joseph Wilfred Lavoie is cancelled. The notification in the *Gazette* of Dec. 31, 1918, concerning 2nd Lieut. H. Clarke is cancelled. The notification in the *Gazette* of Jan. 28, 1919, concerning Sec. Lieut. J. S. Ford is cancelled. The notification in the *Gazette* of March 11, 1919, concerning Sec. Lieut. D. A. Jones is cancelled. The notification in the *Gazette* of April 1, 1919, concerning Sec. Lieut. (Hon. Lieut.) A. Mills, D.F.C., is cancelled. The notification in the Gazette of May 9, 1919, concerning 2nd Lieut. J. E. H. Chadwick is cancelled. The notification in the *Gazette* of May 27, 1919, concerning Sec. Lieut. Wm. Anderson is cancelled. The notification in the *Gazette* of June 13, 1919, concerning Sec. Lieut. P. J. A. Fleming is cancelled. The notification in the *Gazette* of July 1, 1919, concerning Lieut. C. C. Miller is cancelled. The notification in the *Gazette* of July 29, 1919, concerning Sec. Lieut. H. A. Thompson is cancelled. The notification in the *Gazette* of Aug. 5, 1919, concerning Lieut. A. W. Davison is cancelled.

Administrative Branch.

Sec. Lieut. Harold Clarke to be Lieut.; June 19, 1918.

The undermentioned relinquished their commns. on ceasing to be empld.:—Lieut. O. Dunkerley (Paymaster Sub-Lieut., R.N.); Sept. 29, 1918. Lieut. J. A. V. Duff (Lieut., Rifle Bde.); May 20, 1919. Lieut.-Col. J. W. L. Hunt (Lieut.-Com., R.N.); Sept. 5, 1919.

Then follow the names of 19 officers who are transferred to unempld. list under various dates.

The undermentioned Lieuts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank:—H. C. R. Milward; Sept. 17, 1919. A. H. Lancaster, Sept. 19, 1919. Sec. Lieut. G. M. M. Clune relinquishes his commn. on account of ill-health, and is granted the rank of Lieut.; Aug. 7, 1919. Lieut. M. J.. J. G. Mare-Montembault, M.C. (N. Somerset Yeo.), relinquishes his commn. on account of ill-health contracted on active service; April 10, 1919. Lieut. J. B. Tait (Lieut., Dur. L.I.) resigns his commn.; Oct. 1, 1919. Sec. Lieut. W. J. Washer relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Aug. 7, 1919.

Technical Branch.

Lieut. R. S. Haward to be Lieut., Grade (B.), from (A.); April 4, 1918.

The undermentioned Sec. Lieuts. to be Lieuts.:—April 2, 1918—(Hon. Lieut.) (Actg. Capt.) L. W. Allen, and to retain the actg. rank of Capt. until April 30, 1919. (Hon. Lieut.) C. Bishop (without pay and allowances prior to Feb. 15, 1919.)

The undermentioned Sec. Lieuts. to be Lieuts., without pay and allowances of that rank:—W. Hallet-Carpenter; April 2, 1918. A. S. G. Smith; June 12, 1918. A. H. Varian; Nov. 22, 1919. (Substituted for the notification in the *Gazette* of July 29, 1919.) J. E. McCrea; July 28, 1919.

Sec. Lieut. (Hon. Lieut.) W. J. G. Barnes (Lieut., R. Socts Fus.) relinquishes his commn. on ceasing to be empld.; Sept. 11, 1919.

Then follows the names of 16 officers who are transferred to unempld. list under various dates.

Sec. Lieut. J. S. Forder relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Jan. 29, 1919.

The notification in the *Gazette* of May 24, 1918, concerning Lieut. R. S. Haward, is cancelled.

Memoranda.

Lieut. W. J. E. Owen is granted the Hon. rank of Capt.; Aug. 31, 1918.

Then follow the names of 2 Overseas Cadets who are granted temp. commns. as Sec. Lieuts., and 24 Cadets who are granted hon. commns. as Sec. Lieuts.

Lieut.-Col. R. G. Cherry, M.C. (Maj., R. Regt. Art.), relinquishes his commn. on ceasing to be empld.; Sept. 15, 1919.

The undermentioned temp. Hon. Lieuts. relinquished their commns. on ceasing to be empld.:—F. W. Hedgecock; Aug. 20, 1919; H. Bedson; Sept. 16, 1919.

The undermentioned are transferred to unempld. list:—Flying Officer S T. Smith, from (S.O.); Sept. 13, 1919. Flight-Lieut. L. Henshall, M.B.E from (S.O.); Sept. 15, 1919. Sept. 16, 1919—Flying Officer C. T. Inman from (S.O.); Flying Officer T. T. Pickup, from (S.O.).

The undermentioned Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—Oct. 1, 1919—Ernest Earl; P. E. B. Holliwell.

The notifications in the *Gazette* of Sept. 23, 1919, concerning Lieut. F. W. Hedgecock, are cancelled. The notifications in the *Gazette* of Sept. 23, 1919 concerning Lieut. H. Bedson are cancelled.

Personals.

Married

CYRIL DAVENPORT SIDDELEY, eldest son of John Davenport Siddeley, C.B.E., and Mrs. Siddeley, of Crackley Hall, Kenilworth, was married on September 30 at St. Martin's Church, Scarborough, to MARJORIE TENNANT, eldest daughter of HARRY TENNANT FIRTH and Mrs. Firth, of Woodleigh, Dewsbury.

To be Married

The engagement is announced between Lieut. HARRY FLETCHER ATTWATER, Northumberland Fusiliers (attached R.A.F.), eldest son of the late Rev. H. S. Attwater and Mrs. Attwater, of Lytham, and WINSOME WINGATE WHEATLEY, elder daughter of Lieut.-Col. J. P. D. Wheatley, R.F.A., and Mrs. Wheatley, Carlisle.

The engagement is announced between Lieut. REGINALD LONGMAN, R.A.F., youngest son of Mrs. C. Longman, Wryde, Raymead Avenue, Thornton Heath, and OLIVE, eldest daughter of Mr. and Mrs. PERCY EDSALL, Hughenden, Dunheved Road North, West Croydon.

The engagement is announced between KENNETH ARTHUR SETH-SMITH, 5th Fusiliers, attached R.A.F., youngest son of Mr. and Mrs. Martin Seth-Smith, Colwood, Bolney, Sussex, and DORIS ROBERTA, only daughter of Lieut.-Col. R. W. McKERGOW, O.B.E., M.F.H., and Mrs. McKergow, Twineham Grange, Sussex.

Item

Mr. BENNETT MELVILLE JONES, of Emmanuel College, Cambridge, who has been elected to the Francis Mond Professorship of Aeronautical Engineering at Cambridge University, entered Emmanuel College as an exhibitioner, became a scholar, and obtained first-class honours in the Mechanical Sciences Tripos in 1909. For some years he was employed on aeronautical research at the N.P.L., leaving in May, 1913, to take up the designing of rigid airships for Armstrong, Whitworth and Co., and in September, 1914, he joined the Royal Aircraft Establishment, remaining there until May, 1916. From there he went to the Orfordness Armament Experimental Station, with the rank of Capt., R.F.C., and eventually he became Assistant-Controller of Experiment and Research with the rank of Lieut.-Col., R.A.F. His chief activities were directed towards aerial gunnery and bombing, and in order to gain experience of fighting conditions, he qualified as a pilot and served with No. 48 Squadron, R.F.C., in France during the early months of 1918. On being demobilised Mr. Jones was elected Junior Fellow of Emmanuel College, Cambridge, with the post of Director of Engineering Studies at the college.

SIDE-WINDS

From an announcement which appears elsewhere in this issue it will be observed that Messrs. W. A. and R. J. Jacobs, Ltd., will shortly be installed in their new factory at Electary Works, Colin-Deep, Hendon. This move will provide an opportunity for those who wish to add to their plant, of acquiring a few useful items of this kind, as Messrs. Jacobs, Ltd., find that some of the machinery in their works at Leonard Street, Finsbury, will be surplus to their requirements. They will be pleased to send particulars to anyone interested.

– – –

We understand from Messrs. Burton, Griffiths and Co., Ltd., of 1, 2, and 3, Ludgate Square, London, E.C. 4, who have been associated with the Birmingham Small Arms Co., Ltd., for many years past as their sole representatives and agents for the sale of their high-speed steel twist drills, milling cutters, etc., that in view of further developments, the directors of this company, in conjunction with the directors of the Birmingham Small Arms Co., have considered that a closer connection would be mutually advantageous. In consequence, an exchange of shares has taken place, by which the interests of the two firms become synonymous. This will in no way affect the name, conduct, or the management of the business, which will be carried on as heretofore, but the closer association of this old and very powerful organisation will enable the firm to extend their business in other spheres.

– – –

One hopeful feature at the moment to those of us who are engaged in British engineering business, is the anxiety shown by the residents in Overseas countries to avail themselves of the technical assistance of British business men. Perhaps this has nowhere been more apparent than in London. Within the last four months Barimar, Ltd., have been asked to co-operate in the establishment of 15 branch scientific welding businesses in various parts of the world, from Scandinavia at one end to Australia at the other, from France in the west, to Greece and India in the east, and in South and East Africa. These new Overseas establishments will furnish excellent openings for young British engineers at good rates of pay, and quite a number of Barimar-trained men are shortly proceeding to positions abroad. All the new branches will be completely equipped with British machinery, and run by British men, and it seems to us that the establishments must inevitably lead to healthy extensions of British trade and British influence.

– – –

Recently attention was drawn to the improvements effected by the Dissolved Acetylene Co. in the containers, and it may further be pointed out that the gas before being compressed into the cylinders is produced in generators operating on the carbide-to-water principle and in the presence of a considerable excess of water. This prevents overheating and polymerisation in the generator. Generators of any other type invariably overheat the gas in course of manufacture, and thus lose the heat of dissociation which represents approximately 16½ per cent. of the total heating value of the gas. The gas manufactured by this firm is, after generation, treated by six processes of purification, so as to extract all moisture and impurities.

– – –

A simple method of testing acetylene gas for purity is to expose to a jet of the gas a piece of white absorbent paper moistened with a 10 per cent. solution of silver nitrate, for a period of 15 seconds. If the paper is discoloured it indicates the presence of sulphur and phosphorous impurities. A pure gas leaves the prepared paper quite white.

– – –

The Dissolved Acetylene Co. supply their gas under a guarantee of purity. In addition to the quality, the quantity is also guaranteed, as the cylinders are filled and the gas is sold by weight; 1.1 ozs. of acetylene being equal to 1 cub. ft. A purchaser can, therefore, always ascertain whether he is receiving the quantity of gas for which he is charged. For the manufacture of their cylinders and gas, the company employ an efficient staff of engineers and chemists, who are constantly engaged in maintaining and improving the quality of the firm's products. We may add that the latest improvement is the method of compressing acetylene at low temperatures by a patent process of which the Dissolved Acetylene Co. are the sole proprietors. By this method a cylinder which has hitherto required to remain on the compressing racks before being completely filled for a period of from three to five days, can now receive its full complement of gas in a similar number of hours.

– – –

One example of Palmer enterprise during the recent strike troubles deserves to be recorded. Two sets of aeroplane landing-wheels and tyres to suit the special conditions of the Dutch landing-grounds were required in a hurry for the B.A.T. machine which was to take the mails to Amsterdam. The Palmer Tyre, Ltd., (whose landing-wheels and tyres were fitted to every bombing and fighting aeroplane that left these shores during the Great War) did not happen to have this particular type in stock in London at the moment, but they immediately got into touch with their Paris representative who handed the tyres over to Aerial Transport and Travel, Ltd., for despatch by the next Airco machine. Within five hours these landing-wheels and tyres were over here and ready for fitting to the British Aerial Transport Co.'s machine.

– – –

A Triplex safety glass wind-screen is now included as standard in the specification of the 11·9 h.p. "H.E." light car, a new production manufactured by the Herbert Engineering Co., of Reading. The approximate cost of a car is £400 for a two-seater, and £425 for a five-seater. The owner of an "H.E." light car who takes out a "Triplex Policy" will thus make a saving of about £2 per annum on his premium.

– – –

About thirty little brothers and sisters of the famous Avro Baby are soon to make their appearance in the world. Flying men do not need to be reminded of the original Baby's triumphs in the sealed handicap of the Aerial Derby, of other wins at Hendon, and of the sensation it created at Amsterdam. But 25 miles on the gallon of petrol at 70 m.p.h. are figures to give food for thought to business men who have mastered the art of flying, especially in view of the recent transport upheaval. It would be interesting to have a peep at Sir Philip Sassoon's diary during the past ten days.

– – –

The first instance of an aeroplane being used for transporting dope has occurred this week. Messrs. Pasche and Co., of Vickers House, the Hague, the Dutch representatives of the British Emaillite Company, on Monday afternoon wired over for a supply of Emaillite, Scheme "X," khaki pigment, for Dutch Government machines. The wire arrived on Monday at 5 p.m. and at 11.30 a.m. on Tuesday the consignment left Hounslow on the B.A.T. 3-seater machine for Utrecht, where it was placed on rail for the Hague. Such expedition would be hard to beat.

– – –

Quite informal was a dinner given by Messrs. Robert Ingham Clark and Co., Ltd., on September 26th, to all their employees who served in the Great War, and it was therefore a most cheerful affair, enabling, as it did, the executive and the operative staffs to get into closer personal touch than is possible in the ordinary way. A novel programme was drawn up, and both this as well as the peace souvenir, containing portraits of those members of the firm who joined up, will be treasured as permanent reminders of a pleasant gathering. During the evening a number of musical items and recitations were given.

– – –

It is officially announced that Mr. Frank Shearman, chairman and managing director of the Mount Stuart Dry Docks, Ltd., Cardiff, has been appointed to a seat on the board of Messrs. J. Samuel White and Co., Ltd., the well-known shipbuilders and engineers of Cowes, Isle of Wight. Mr. Shearman is connected with several engineering and ship-repairing establishments in South Wales, and is also chairman of the Times Shipping Co., Ltd., of Cardiff.

▣ ▣ ▣ ▣

Admiral Koltchak thanks French Flyers

Admiral Koltchak has published an order of the day thanking the French flying detachment which is taking part in the operations on the Siberian front.

Above the Fjords

Friedrich Christiansen, the German pilot, is credited with having made a successful flight from Bergen to the North Cape and back, but details are lacking.

AN AVRO CIRCUS IN HOLLAND

After the close of the E.L.T.A. Exhibition (is it a redundancy to add the word Exhibition ?) on September 14, three Avro three-seaters and one five-seater flew to Ockenberg, near The Hague. The pilots were Messrs, W. G. R. Hinchliffe, D.F.C., A.F.C., D. Shanks, F. P. Adams and Smith. There they again found a bad aerodrome, and did not enjoy the best of weather. They stayed there, however, for September 26, 27 and 28, took up passengers, and did quite well. The Avro is already accepted in Holland as *par excellence* the machine for pleasure flying.

They next proceeded to Middelharnis, and operated there on October 3 and 4. This town is a charmingly picturesque capital of an old-world Dutch island, and, as someone remarked, it seemed sacrilege for such a blatantly modern invention as an aeroplane to break in on its mediæval calm. Passengers in wooden clogs and flying helmets typified the paradoxical situation. However, the rustic Hollander took to the air as readily as Van Tromp and de Reuter took to the water. The short meeting was a great success, and the enthusiasm of the people was unbounded. All the pilots were garlanded *more Indico* with really beautiful wreaths of roses and other flowers. The Hollanders throughout were charming hosts, but in the Netherlands, as elsewhere, the grumpy farmer provides occasional comic relief. Once Shanks had a forced landing in a meadow, put things right himself, and flew away. Later, a letter was received from the farmer, backed by the local burgomaster, complaining that in the field there had been a horse which was so frightened by the engine that it had since *nearly* had an accident. Likewise two cows had given less milk since the occurrence, and the farmer felt morally convinced that there would be other consequences. He thought that 200 guelders (about £20) would no more than meet the moral and material damage.

The three three-seaters flew back to England on October 5. They carried extra supplies of petrol, landed on the beach at Calais and filled up their own tanks. The mist hung low over the Channel and over Kent, and the last stage of the journey was an anxious time for the pilots, but they felt their way round the hills and arrived safely.

The actual flying time for these three machines on their journey home from Amsterdam was 3 hours 30 mins.

The pilots are returning by boat to Holland to use the other Avros which are over there to give the Hollanders a little more enjoyment—and, incidentally, to revel themselves in unrestricted butter and sugar.

* * * *

FLYING AT CAMBRIDGE AND SKEGNESS

During the week the Cambridge School of Flying have carried numerous passengers at Skegness and Cambridge, and have, in addition, had the honour of carrying the first air mail to Cambridge and London from Skegness.

One flight was made to an aerodrome near Wickford, Essex, and several to Friestone.

Preparations are being made for the arrival of undergraduates in Cambridge, many of whom it is hoped will try their hand at flying while up this term. Ex-pilots have the the opportunity to get solo flying by means of a flying club formed by the above company. The flying at Skegness has been a great success, and Lieut. Fresson became quite a popular hero.

* * * *

Extra Leave for Officers and Men of the R.A.F.

The Air Ministry announces that officers and other ranks of the R.A.F. who were on leave in the United Kingdom on September 27 will be considered to have their leave cancelled with effect from that date and will be entitled as from October 8 (inclusive) to the remaining portion of their leave *plus* seven extra days.

Those officers and airmen who volunteered their services and were employed on duty in connection with the railway strike, but who were not on leave on September 27, will, on completion of this duty : (1) If on the home establishment, return to their units and then receive seven days' pay. (2) If from France, Flanders, or the Rhine, report to the O.C. R.A.F., Manston, near Ramsgate, who will then grant them seven days' leave pending their return to their units. Vouchers will be given for these leave journeys.

* * * *

PUBLICATIONS RECEIVED

Special Missions of the Air. By Jacques Mortane. London: Aeroplane and General Publishing Co., Ltd., 61, Carey Street, Chancery Lane.

Lord Fisher on the Navy. London : Hodder and Stoughton.

Electric Spark Ignition. By J. D. Morgan. London : Crosby Lockwood and Son.

NEW COMPANIES REGISTERED

COLWICK MOTORS AND GENERAL ENGINEERING CO., LTD., Colwick Works, Old Colwick, Notts.—Capital £10,000, in £1 shares. Aeronautical and automobile engineers and manufacturers of motor chassis, etc. First directors : C. P. Pullinger, D. M. Shaw, W. Allan, H. Beech, F. B. Miller, H. E. Town, F. Clarke and R. Stevenson.

GILBERT CAMPLING, LTD.—Capital £200,000, in £1 shares. Under agreements with Gilbert Campling, Ltd. (incorporated in 1919) and its liquidator, and the Selsdon Aero Engineering Co., Ltd., and its liquidator, manufacturers of and dealers in motor vehicles, aeroplanes, etc.

W. D. ODDY AND CO., LTD., Propeller Works, Globe Road, Leeds.—Capital £25,000, in £1 shares. Manufacturers of aircraft propellers and accessories, etc., appertaining to aircraft. First directors : W. D. Oddy and R. Blackburn.

OGILVIE AND PARTNERS, LTD.—Capital £10,000 in £1 shares. Acquiring business of a consulting aeronautical engineer carried on by A. Ogilvie, C.B.E., F.R.A.E.S., at Gwydir Chambers, 104, High Holborn, London, as "Ogilvie and Partners." Subscribers : A. Ogilvie, 3, Hans Crescent, S.W., consulting aeronautical engineer, and F. P. Walsh, 23, Cheyne Court, S.W. 3, civil engineer. Permanent governing director and chairman : A. Ogilvie.

SMITHBROOK ENGINEERING CO., LTD., Smithbrook Engineering Works, Market Street, Chapel-en-le-Frith, Derby.—Capital £1,000, in £5 shares. Aeronautical, agricultural and general engineers, etc. First directors : G. Ibbetson, M. Ibbetson, O. H. Harris and K. N. Harris.

VICTORY DISC-WHEEL CO., LTD., 40, High Street, Watford, Herts.—Capital £5,000, in £1 shares. Acquiring patents for inventions relating to (1) improvements in wheels suitable for road vehicles, aeroplanes, etc., and (2) an adjustable air pump indicator for pneumatic tyres. First directors , E. A. Whitfield, H. Everitt, W. Beedle and E. C. Strawbridge.

* * * *

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations :—cyl.=cylinder; I.C.=internal combustion; m.=motors.

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published October 9, 1919.

4,766. A. Anzani. I.C. engines. (132,282.)

9,415. S. Hashimoto. Apparatus for measuring thrust of screw propeller. (132,288.)

9,815. Nieuport an General Aircraft Co. and H. P. Folland. Aeroplane joints for. (132,295.)

9,926. F. H. Page. Landing gear. (132,296.)

10,404. T. L. Davies and E. W. Bowen. Aerial propellers. (132,300.)

12,730. J. J. B. Arter and James Cycle Co. Laying guns for engaging aircraft. (132,308.)

14,471. H. C. Watts. Air screws. (132,321.)

14,631. H. N. Wylie. Metal aeroplane parts. (132,332.)

14,632. H. C. Watts and E. Neal. Laminated wood air-screws. (132,333.)

14,635. United States Airplane and Engine Co. Revolving-cylinder I.C. engines. (119,460.)

15,062. E. R. Calthrop. Parachutes. (132,361.)

15,202. Birmingham Guild and C. A. L. Roberts. Aeroplane struts, etc. (132,367.)

16,259. B. A. Duncan. Girder-like parts of aircraft. (132,376.)

19,564. Soc. Anon. des Ateliers d'Aviation, L. Breguet. Aeroplanes. (128,537.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published October 9, 1919.

6,224. R. Frassinetti. Propulsion of aeroplanes. (132,448.)

6,636. G. Caproni. Multiplane flying-machines. (132,450.)

13,470. F. H. Page. End connections for aircraft struts. (132,478.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xli, xlii, xliii, and xliv).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegraphic address : Truditur, Westcent, London.

Telephone : Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates* :—

United Kingdom	s.	d.	Abroad*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 564 (No. 42, Vol. XI.) OCTOBER 16, 1919 [**Weekly. Price 6d. Post Free, 7d.**

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY W.C. 2.
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**
These rates are subject to any alteration found necessary under abnormal conditions
European subscriptions must be remitted in British currency.

CONTENTS

Editorial Comment PAGE
In the Matter of Aerial Mails .. 1357
Why Make a Profit at All? .. 1358
A Landmark in Aviation .. 1358
The R.A.F and Economy .. 1358
The R.A.F. as a Profession .. 1360
Flight—and the Men: Lieut.-Col. T. O'F. Hubbard .. 1359
Lord Fisher and Aircraft .. 1361
The Sopwith (Australia) Transport Machine .. 1362
Royal Aero Club: Official Notices .. 1368
The R.A.F. Cadet College .. 1368
Honours .. 1369
Personals .. 1370
Some Friedrichshafen "Milestones" .. 1371
The Shipping Exhibition .. 1374
Airisms .. 1375
Civilian Flying .. 1377
An Altitude Laboratory .. 1378
The Royal Air Force .. 1381
Correspondence .. 1382
Side-Winds .. 1383
Publications Received, etc. .. 1384

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Nov. ..	**Entrance Examination for R.A.F. College.**
Nov. 7-15 ..	**Olympia Motor Car Show.**
Dec. 3 ..	**"The Air Force." Lecture by Air-Commodore H. R. Brooke-Popham before R.U.S.I.**
Dec. 19 to Jan. 4, 1920. ..	**Paris Aero Show.**

EDITORIAL COMMENT

In the Matter of Aerial Mails

DURING the railway strike the Post Office made a somewhat half-hearted attempt at an inland aerial mail service. It is true that the strike very fortunately lasted only a little more than a week, and that there was thus none too much time at the disposal of the postal authorities for proper organisation, and to that extent they are entitled to the benefit of the doubt. We said as much at the time, but it is impossible to regard what happened then and the position as it is now with anything approaching satisfaction. We can pass over the apparent lack of enterprise shown by the Post Office as being due to the causes we have stated, viz., the lightning character of the strike and the shortness of its duration, but there is nothing in this to account for the general lack of interest, to use no harder term, in the development of the carriage of mails by the air.

It seems to be fairly clear that the Post Office cannot have given anything like close study to the question of aerial mail-carrying. The absurd charge demanded during the strike—two shillings per ounce for letters—is sufficient proof that it has not gone closely into the costs of aerial carriage, else it would have known that mails can be conveyed by aeroplane to anywhere in the British Isles for sixpence per ounce and still show an all-round margin of profit. To demand such extraordinary rates as the first is simply to kill the traffic before it has begun. Major C. C. Turner, writing in last Sunday's *Observer*, gives some very interesting figures relative to costs which he has obtained from a number of experts. The figures all relate to multi-engined machines, which are costly to run, but have been selected because of their real or supposed greater reliability than the single-engined type. It is possible, by the way, that the success of the London-Paris service, which is being conducted by single-engined machines, may lead to a modification of the theory. The estimates range from £1 to £2 per ton per mile, so that it is safe to take a mean figure, which is what the writer does for the sake of pointing his argument. One of these mean estimates gives the figure of £1 11*s.* 8*d.* per ton per mile, allowing for all overhead and establishment charges and providing for a profit of 30 per cent. A 300 miles' journey, then, would cost £470, but the machine would carry a sufficient weight of mail to bring in a revenue of £1,250 at 6*d.* per ounce! Another estimate puts the cost, inclusive of all charges whatsoever, at £1 9*s.* 4*d.* per ton per mile. On this basis it would cost 1*s.* 3*d.* to carry one pound 100 miles, 13*s.* 1*d.* to carry one pound for 1,000 miles and £65 10*s.* to carry 100 pounds for 1,000 miles. On this basis, assuming 20 letters to weigh 1 lb., the postage per letter for 1,000 miles would be about 7*d*. And yet for journeys of not more than 350 miles the Post Office asks for 2*s*. per ounce. Obviously, it is not a commercial proposition at all, and until the Post Office is prepared to talk commercial sense, instead of simply making a shot at its charges and placing the latter on a profiteering basis, it is obvious that there will be no development in the aerial carriage of inland mails.

◆ ◆ ◆

Why Make a Profit At All?

Being convinced that the aerial carriage of mails can be worked on a sound commercial basis, showing an advantage in speed of delivery to the community and enabling the Post Office to recoup itself, we are not advocating the subsidising of aircraft for the purpose. The figures quoted by the *Observer* contributor are on all fours with other estimates to which we have had access, and we accept them as being quite sufficiently near the mark to answer for all practical purposes. That being so, there is not the slightest doubt the Post Office could run its mail services on the basis of 6*d*. per ounce and show a considerable margin of profit. But even if there were a slight loss on such services—in the early days during the working up to paying load there would naturally be a loss—we should still say that it is the business of the Post Office to accept the loss and inaugurate a comprehensive series of mail services. We need not argue the case from our own point of view or that of the aircraft industry. We have had it from almost every member of the Government that it is essential, even vital, that aviation should be encouraged by every possible means, and that the Government intends so to encourage it. We have been told, time and again, that it is absolutely necessary that we should be always in a state of aerial preparedness for any eventuality that may befall. Therefore, the matter is better argued from the point of view of national preparedness at all times and in every season. Having been told all these things, we naturally look towards the Government to see exactly what measure of support and encouragement is likely to be forthcoming. All sorts of schemes have been in the air, from a frank subsidisation of the industry to the inauguration of State-owned mail and passenger services, but they all remain very much in the air, if the expression may be allowed to pass. There has been a great deal of talk, but precious little real encouragement.

Why should the Post Office, being a department of the Government which has urged that aviation must be encouraged, look initially to the making of inflated profits on any aerial mail services it may run? Does it want a new and prolific source of revenue to balance the alleged loss on the telephones? Seriously, we think that even though it were faced with a certain loss on the first few months' trading, until such time as the commercial community had got used to the idea of aerial mails, it is the bounden duty of the Post Office to set about the organisation of aerial mail services to supplement other methods of transport, which, as we have seen recently, are liable to sudden and complete stoppages, and to give to the commercial community the added facilities for the transmission of urgent correspondence which aircraft have placed at our disposal. The argument is all the stronger because there is every reason for believing that there need be no loss—under competent management—but a substantial profit—and not at 2*s*. per ounce—after the services had been well established and the confidence of the public gained. In any case, there must be a certain amount of risk about all new enterprises, and while we do not expect a Government department to accept, as a general rule, the same risks as a commercial undertaking, the case of aviation is an exceptional one in which not only is the taking of the risk justifiable but essential in the best interests of the nation.

◆ ◆ ◆

A Landmark in Aviation

Last week saw the completion of the first six weeks of the London–Paris aerial passenger service. The figures are more than a little interesting, especially having regard to the discussion now taking place on account of the apparent unwillingness of the postal authorities to commit themselves to the use of the aeroplane as a mail carrier. These statistics show that of 86 scheduled flights, 83 were successfully accomplished. Of the three which were not completed, one was prevented altogether by weather, one was interrupted by weather conditions, and the remaining one was interrupted by a mechanical defect. The number of miles flown was 20,750, at an average speed of 106 miles an hour, the 250 miles journey between the two capitals having been accomplished in an average time of 2¼ hours.

There is very little need to elaborate the figures, which speak far more eloquently for themselves than we could. They must appeal to the man in the street most powerfully, as demonstrating that the aeroplane has indeed arrived at a stage of reliability at which it can be trusted to carry out its work with very nearly the same practical certainty as any other form of transport. Moreover, it is a safe form of transport on the showing of the London–Paris service, since there has not been a single accident to machine or passengers with the exception of one forced landing through a slight mechanical defect, and that only involved delay. It is not as though the opening of the service had been blessed with fine weather and calm atmospheres. On the contrary, the weather conditions generally have been unstable, and there has been at least one storm of exceptional severity when, in spite of a wind velocity of over a hundred miles an hour, the Paris to London service was duly carried out, though the flight in the other direction had to be abandoned. Against this may be noted that at times the service has had to be duplicated. On the whole, therefore, we think we are justified in calling attention to the success of the service as a veritable landmark in the history of aviation. That success augurs very well indeed for that of future enterprises of a like nature, and, incidentally, it may be hoped that the Postmaster-General will take due note of the facts.

◆ ◆ ◆

The R.A.F. and Economy

Sir William Joynson-Hicks, in a letter to *The Times*, urges the need for immediate and drastic cutting down of national expenditure, and pleads for a civilian head to determine policy and consequent expenditure in each of the great spending departments of State. He takes the R.A.F. as his text, and seems to be on good ground when he says:—

"No one will accuse me of belittling this force or of denying the need of an adequate and highly trained force in the future, but are the military heads to get to work on a basis of a £60,000,000 expenditure, or a £25,000,000 expenditure, or a £10,000,000 expenditure? Do not forget that Gen. Trenchard is a soldier; his immediate superior, Gen. Seely, is a soldier; and his superior, Gen. Churchill, is—well, a super-soldier. All three are imbued with the principle,

Flight—And the Men

"Flight" Copyright.

Lieut.-Col. T. O'B. HUBBARD, who was in charge of the Martlesham Heath Experimental Station of the Air Ministry, Technical Department good in war but fatal in peace, 'Get the thing done and never mind the cost.' May I again press upon the Government the appointment of a Parliamentary Committee to examine, in consultation with the General Staff, the needs of the Air Service and the possibilities of the Exchequer, with power to fix—subject, of course, to the Cabinet—first the nature of the new Air Force, and, secondly, the total amount that can be allotted to it ?"

On general principles we agree with the views thus expressed, but we fear this is a thorny and a controversial subject. In the past, especially during the War, the cry has been always for experts to run the fighting Services. The man in the street has wanted to know why a politician and not a sailor has been at the head of the Board of Admiralty, and why we should be content with a political War Minister when there were available distinguished and able soldiers capable of running the business of preparing for and making war. Equally the argument extends to the R.A.F., and on grounds of efficiency it might be asked whether the three distinguished names quoted by Sir William are not those of men better qualified to run the R.A.F. than the best politician of them all. In any case, as we understand the position, General Trenchard has been told most categorically that the maximum amount to be spent annually on the services of the Air Ministry is £25,000,000, and that he must cut his coat accordingly. Of course, it might be reassuring to the public that such a Parliamentary Committee as that suggested should be appointed to make sure that the £25,000,000 is the minimum required, and that it is being spent wisely. We are not, however, particularly enamoured of Parliamentary Committees of the kind. They usually spend a lot of time, not only their own, which does not matter particularly, but that of a number of officers and officials who are taken from their proper tasks to compile masses of information and to give evidence before the Committee—time which could be far more usefully employed. In the end, they make a report to Parliament, which is read and promptly forgotten.

What we should like to know about the allocation of the £25,000,000 is exactly what proportion is to be devoted to civil aviation, and we shall look anxiously forward next year to the detailed estimates for the information. It is fairly generally agreed that for the present we shall do better to cut down on the active list of the R.A.F. and go in for a policy of encouragement of civil aviation in such a way as to build up an adequate and efficient flying reserve which would be at the disposal of the Air Ministry in case of national emergency. The arguments *pro* and *con.* for this policy have been set forth in the columns of FLIGHT on several previous occasions, so we do not propose to traverse them again now. It appears to us to be the best line of policy to be adopted in the circumstances, but the Air Ministry seems to be chary of taking the public into its confidence, and if Sir William will press for a statement on policy in the course of the debate on economy which is sure to take place when Parliament meets next week, we had rather see that than any controversy about the appointment of a purely civilian head of the R.A.F.

◆ ◆ ◆

The R.A.F. as a Profession

The Air Ministry has recently issued a booklet containing the regulations for the R.A.F. Cadet College. In the main, they closely follow those governing Sandhurst and the R.M.A., the objects of the college being precisely similar in their scope. The limits of age for admission to the college are from 17½ to 19, with the exception of those who are actually serving, or have served, in the forces and are recommended by their C.O. for a permanent commission in the R.A.F., in which case the age limit is twenty-one.

The subjects for the entrance examination which are obligatory are English, English history and geography, elementary mathematics and one modern language. Optional subjects are Latin, Greek, another modern language, mathematics (elementary, intermediate and higher), science, and elementary engineering. All the obligatory subjects must be taken, but not more than three of the optional. Incidentally, we had begun to think that the fetish of the dead languages had almost departed, but it does not seem to be so. How much better a flying officer the candidate is likely to make if he passes high in Greek than as though he were unable to differentiate between ϕ and θ is one of those things which are possibly only known to those who drafted the syllabus.

Candidates will be expected to qualify by obtaining not less than 33 per cent. of marks in the four obligatory subjects. They will receive extra marks if they hold Certificate A from an O.T.C., or if they have served in the senior division of the O.T.C., or if they have completed four months' continuous service as officers, warrant or non-commissioned officers or in the ranks in the Services. A certain number of prize cadetships will be awarded to successful competitors in order of merit, carrying certain emoluments and financial benefits. These are designed to give assistance to those who stand in need of the emoluments attached to them. There will also be King's cadets appointed by the Secretary of State, and honorary King's cadets nominated by the Secretary of State, and a limited number of cadetships will occasionally be filled by suitable candidates specially nominated by the Air Council, such recommendations being submitted by the candidates' head masters.

The course of study at the College during the first year will include :

English literature and language, the British Empire, practical mathematics (including mechanics and draughtsmanship), general elementary science, history of the R.A.F., outline of Army and Navy organisation and characteristics of the various arms and types of ships, map-reading, R.A.F. law and administration, drill (with rifles) and physical training, hygiene and sanitation, practical work in the workshops, the Morse code, passenger flying, with instruction in map-reading and use of compass and machine-gun.

During the second year the course will be :

Theoretical and practical instruction in engines, including magnetos and their management, theory of flight, practical rigging, advanced work in wood and metal workshops, wireless telegraphy and telephony, machine and Lewis gun, instruction in aviation.

There is nothing remarkable in the conditions. They are, as we have already remarked, practically identical with those of the Army training colleges.

The main point is that they definitely mark the establishment of the R.A.F. as a separate and distinct Service, self-contained and self-centred in the same manner as the Navy and the Army.

LORD FISHER AND AIRCRAFT

IT was always recognised that Lord Fisher was a strong disciple of aviation, and the "disclosures" which he makes on Wednesday last in his "Memories," now appearing in *The Times*, are corroborative of this air-belief and of a distinctly interesting character. The reference of Lord Fisher to the importance ot aircraft in the War is as follows :—

"Somewhere about January 15, 1915, I submitted my resignation as First Sea Lord to Mr. Churchill because of the supineness manifested by the High Authorities as regards aircraft; and I then prophesied then raids over London in particular, and all over England, that by and by caused several millions sterling of damage and an infinite fright.

"I refer to my resignation on the aircraft question with some fear and trembling of denials; however, I have a copy of my letter, so it's all right. I withdrew my resignation at the request of Authority, because Authority said that the War Office and not the Admiralty were responsible and would be held responsible. The aircraft belonged to the War Office; why on earth couldn't I mind my own business? I didn't want the Admiralty building and our wireless on the roof of it to be bombed; so it *was* my business (the War Office was as safe as a church, the Germans would never bomb that establishment!).

"Recently I fortuned to meet Mr. Holt Thomas, and he brought to my recollection what was quite a famous meeting at the Admiralty. Soon after I became First Sea Lord on October 31, 1914, I had called together at the Admiralty a great company of all interested in the air; for at that moment I had fully satisfied myself that small airships with a speed of 50 miles an hour would be of inestimable value against submarines and also for scouting purposes near the coast. *So they proved.*

"Mr. Holt Thomas was a valued witness before the Royal Commission on oil and oil engines, of which I was chairman (a sad business for me financially; I only possessed a few hundred pounds and I put it into oil—I had to sell them out, of course, on becoming Chairman of the Oil Commission—and what I put these few hundreds into caused a disappearance of most of these hundreds, and when I emerged from the Royal Commission the oil shares had more than quintupled in value and gone up twenty times what they were when I first put in).

"Through Mr. Holt Thomas we obtained the very important evidence of the French inventor of the Gnome engine—that wonderful engine that really made aeroplanes what they now are. His evidence was of peculiar value; and so also was that of Mr. Holt Thomas's experience; and the result of the Admiralty meeting on aircraft was that we obtained from Mr. Holt Thomas an airship in a few weeks, when the experience hitherto had been that it took years; and a great number of this type of aircraft were used with immense advantage in the War. I remember so well that the very least time that could be promised with every effort and unstinted money was three months (but Mr. Holt Thomas gave a shorter time). In three *weeks* an airship was flying over the Admiralty at 50 miles an hour ('there's nothing you can't have if you want it enough'), and now we've reached the epoch—prodigious in its advent—when positively the air commands and dominates both land and sea; and we shall witness quite shortly a combination in one structure of the aeroplane, the airship, the parachute, the common balloon, and an aerial torpedo, which will both astound people by its simplicity and by its extraordinary possibilities, both in war and commerce (the torpedo will become cargo in commerce). The aeroplane has now to keep moving to live—but why should it? The aerial gyroscopic locomotive torpedo suspended by a parachute has a tremendous significance.

The Essence of War

"And let no one think like the ostrich that burying one's head in the sand will make invention desist. At the first Hague Peace Conference in 1899, when I was one of the British delegates, huge nonsense was talked about the amenities of war. War has no amenities, although Mr. Norman Angell attacked me in print for saying so. It's like two innocents playing single-stick; they agree, when they begin, not to hit hard; but it don't last long! Like fighting using only one fist against the other man with two; the other fist damn soon comes out! The ancient who formulated that 'All's fair in love and war' enunciated a great natural principle.

"'*War is the essence of violence.*'

"'*Moderation in war is imbecility.*'

"'*HIT FIRST. HIT HARD. KEEP ON HITTING.*'

"The following reports and letter will illustrate this history of my efforts in this direction :—

"'Lord Fisher returned to the Admiralty on October 30, 1914.

"'38 S.S. airships were at once ordered—single-engine type. Six improved type.

"'Before Lord Fisher left the Admiralty a design of a double-engine type was got out, and subsequently another 32 airships were ordered.'

"CIRCULAR LETTER issued by Lord Fisher in 1914 when First Sea Lord :—

"'Lord Fisher desires to express to all concerned his high appreciation of the service rendered by those who carried out the recent daring raid on Lake Constance.

"'He considers that the flight mentioned, made over 250 miles of enemy country of the worst description, is a fine feat of endurance, courage, and skill, and reflects great credit on all who took part in the raid, and through them on the Air Service to which they belong.'

"The following *précis* of correspondence is inserted because contributory to Lord Fisher's resignation. He had previously written to Mr. Churchill resigning on the ground of the disregard of his warnings respecting the aircraft menace :—

"'An official Secret German dispatch, obtained from a German source, dated December 26, 1914 :—

"'The General Staff of the German Army are sending aircraft to attack French fortified places. Full use to be made of favourable weather conditions for attack of naval Zeppelins against the East Coast of England with the exception of London. The attack on London will follow later combined with the German Army airships.

"'*Précis* of History of Rigid Airships of Zeppelin Type :—

"'Lord Fisher, when First Sea Lord, in December, 1908, instructed Admiral Bacon to press for the construction of rigid airships for naval purposes at the meetings of a Sub-Committee of the Committee of Imperial Defence, which held its first meeting in December, 1908, after many meetings at which Admiral Bacon presented the naval point of view with much lucidity. The Committee recommended on January 28, 1909, the following :—

"'(*a*) The Committee are of opinion that the dangers to which we might be exposed by developments in aerial navigation cannot be definitely ascertained until we ourselves possess airships.

"'(*b*) *There are good grounds for assuming that airships will prove of great value to the Navy for scouting and possibly for destructive purposes.* From a military point of view they are also important.

"'(*c*) A sum of £35,000 should be included in the Naval Estimates for the purpose of building an airship of a rigid type. The sum alluded to should include the cost of all preliminary and incidental expenses.

"'(*d*) A sum of £10,000 should be included in Army Estimates for continuing experiments with navigable balloons of a non-rigid type, and for the purchase of complete non-rigid airships and their component parts.

"'January 28, 1909.

"'Approved by Committee of Imperial Defence,

"'February 25, 1909.'

"And nothing more was done till I came back to the Admiralty on October 30, 1914!"

◆ ◆ ◆ ◆

The Raid on Kronstadt

FROM a statement issued by the Admiralty on October 10 dealing with the operations against Kronstadt during the night, August 17–18, 1919, it appears that eight aircraft took part in the operation. The intention was that aircraft should attract all attention in Kronstadt, so that the C.M.B.'s should be neither heard nor seen to approach the harbour.

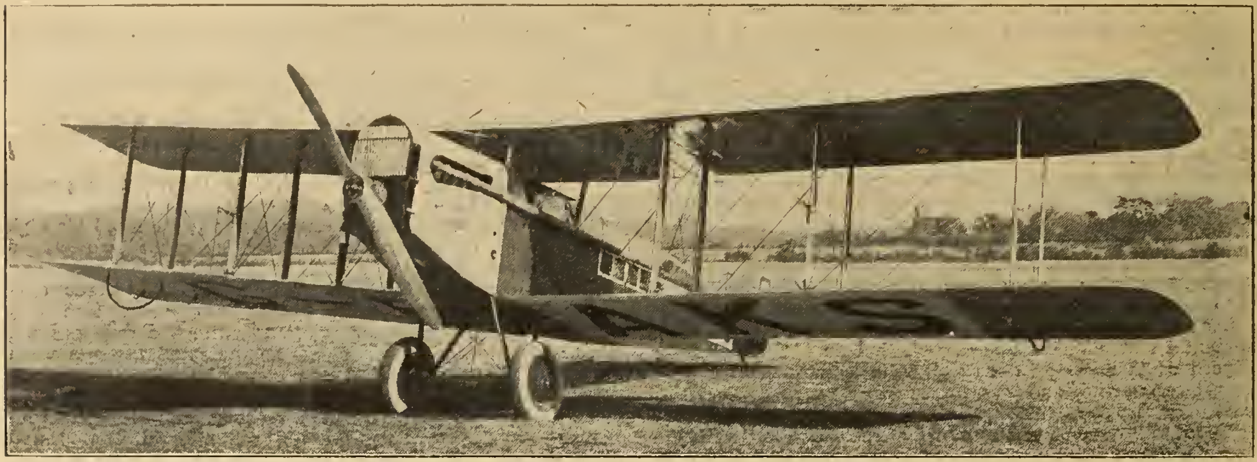
Although it is invidious to select any pilot or observer as particularly deserving of special mention for his work in an operation in which each fulfilled the duties allotted to him in a most efficient manner, the name of Capt. A. C. Randall, D.F.C., may perhaps be mentioned as showing devotion to duty. This officer experienced what was apparently complete engine failure when half-way to Kronstadt. Just as he was about to land his engine restarted, and although he knew it was liable to fail again at any moment, he proceeded to Kronstadt, and took a very active part in the operation. His engine failed completely on the return journey.

The success ot this operation reflects great credit on the part of the non-commissioned officers and airmen of the seaplane base and aerodrome. Their zealous and untiring work on machines no longer modern is most commendable.

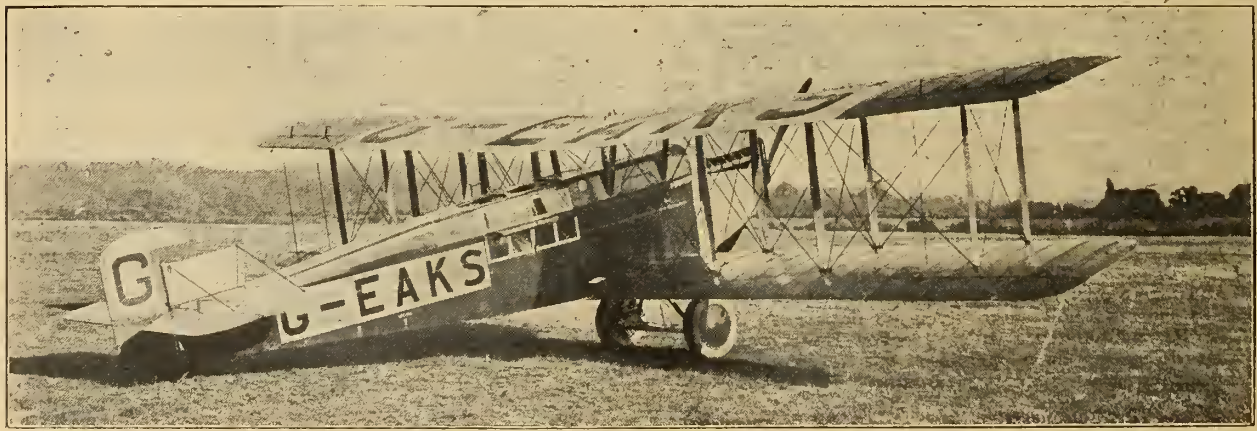
SOPWITH (AUSTRALIA) TRANSPORT MACHINE:

360 H.P. Rolls-Royce "Eagle"

Within the next few days, probably even before this week's issue of Flight is distributed—to wit, Wednesday is the actual day selected—at least one of the machines entered for the Australian Government Prize Flight from England to Australia will have left Hounslow on its long journey. This machine, a large biplane built by the Sopwith Aviation and Engineering Co., Ltd., is already finished, and during the last few days has been undergoing final tests at Brooklands, her performance and general ease of handling having proved very satisfactory. Through the courtesy of the Sopwith firm we are able this week to place before our readers a detailed description of this new Sopwith (Australia) Commercial aeroplane, illustrated by photographs and scale drawings. The machine, it will be seen, is not unlike the Transatlantic Sopwith in general outline, although being of somewhat larger dimensions. As a matter of fact, that machine has more or less formed a basis for the design of the "Wallaby," as the new biplane is called, and the experience gained with the Transatlantic 'bus has been made good use of in the design of the "Wallaby."

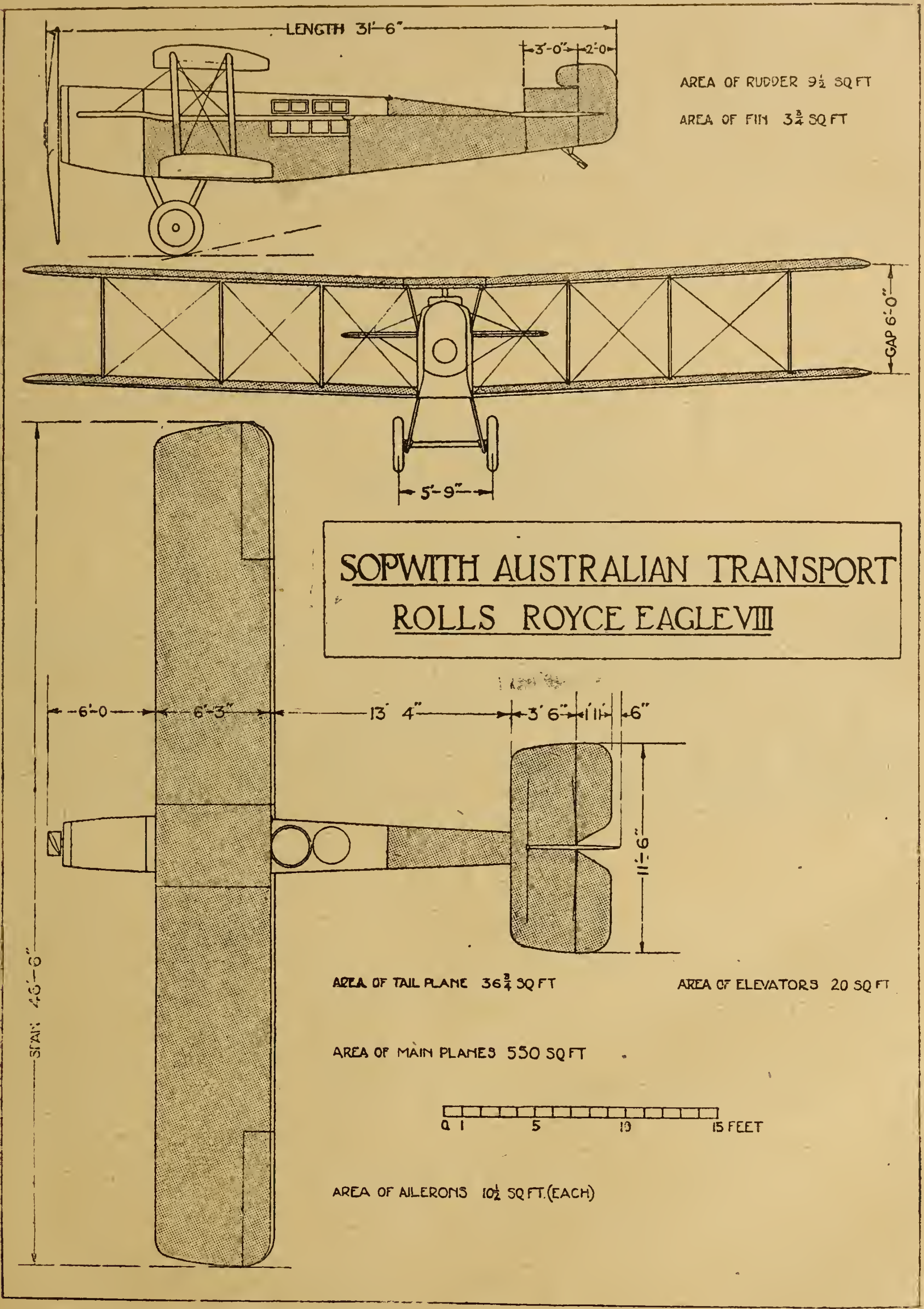


THE SOPWITH "WALLABY": Three-quarter front view



THE SOPWITH "WALLABY": Three-quarter rear view

Being designed for such a long journey, one of the first considerations, next to aerodynamical efficiency, has naturally been the provision of the maximum of comfort for the occupants. As will be seen from the accompanying illustrations, the "Wallaby" has a very deep *fuselage*, forming an enclosed cabin for the pilot and engineer. Inside this cabin are arranged the two seats, that of the pilot-navigator being in front. These seats are mounted on a tubular framework which can be raised and lowered, running on vertical tubular guides, and locked in any desired position. If, therefore, the pilot wishes to be absolutely protected from the weather he lowers his seat and draws the sliding panel in the roof of the cabin over the circular cockpit, when he is as comfortable as possible, out of the draught and noise. Just before landing, or if, for any reason, during the voyage he wishes to obtain a better view than that afforded from inside the cabin, it is a matter of a few seconds only to slide the panel forward, raise the seat, and he is then in the same position, relatively to the *fuselage* and wings, as in an open machine. The rear cockpit is similarly arranged.



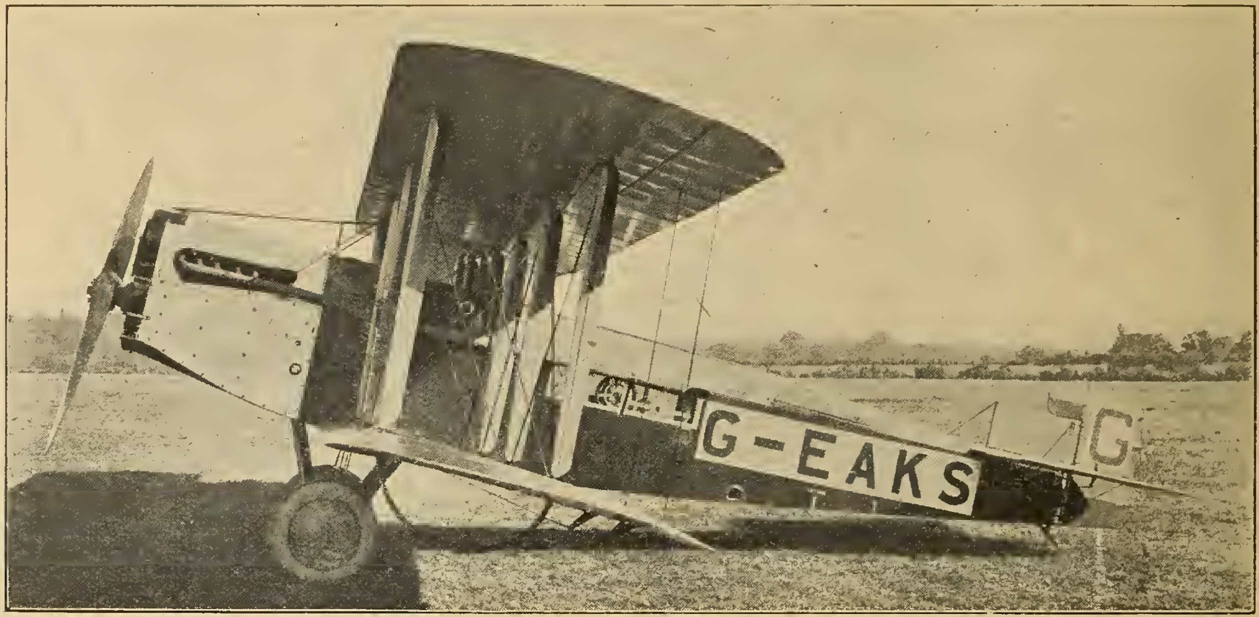
THE SOPWITH "WALLABY": Plan, side and front elevations to scale

All the controls are in duplicate, the "stick" being a tube which slips into the socket on the control shaft. At a moment's notice, therefore, either of the occupants can take over the control of the machine, the other withdrawing his "stick" and placing it on the side of the *fuselage*, where suitable clips are provided. An interesting feature of the pilot's controls is that the rudder bar is in duplicate, one bar being placed low near the floor, the other higher up to correspond with the highest position of the seat. In this manner, no matter at what height the seat is placed, one foot bar is in a comfortable position, and as a matter of fact even with the seat at its highest position the lower foot bar is within reach, thus allowing the pilot to stretch his legs without taking his feet off the rudder control. For a flight of the duration of that contemplated, this is a point that deserves consideration.

As the *fuselage* of the "Wallaby" is of considerable cross section, the instruments carried occupy only a small portion of the dash in front of the pilot. The space thus left is utilised by providing a locker, holding two ply-wood trays to which are pinned the maps of the country over which the machine is passing. Fixed to these trays with small metal clips are parallel rulers, dividers, etc., so that the pilot, who incidentally is also the navigator, has at his finger tips all the instruments required for working out his course. When not in use these maps are pushed into the locker and the door closed.

Triplex windows are provided in the sides of the *fuselage*, and a small window is also fitted in the floor in front of the pilot. The latter window is ruled with a set of lines, one running parallel with the longitudinal axis of the machine, and others forming various angles with it. By watching through this window the path traced out by objects on the ground the pilot can get a very good indication of the drift—that is to say, the angle between the course steered and the course made good. It is also of interest to note that Capt. Matthews has designed a special Azimuth Mirror, placed handy when not in use, which slides along the circular edge of the front cockpit, this being graduated all round.

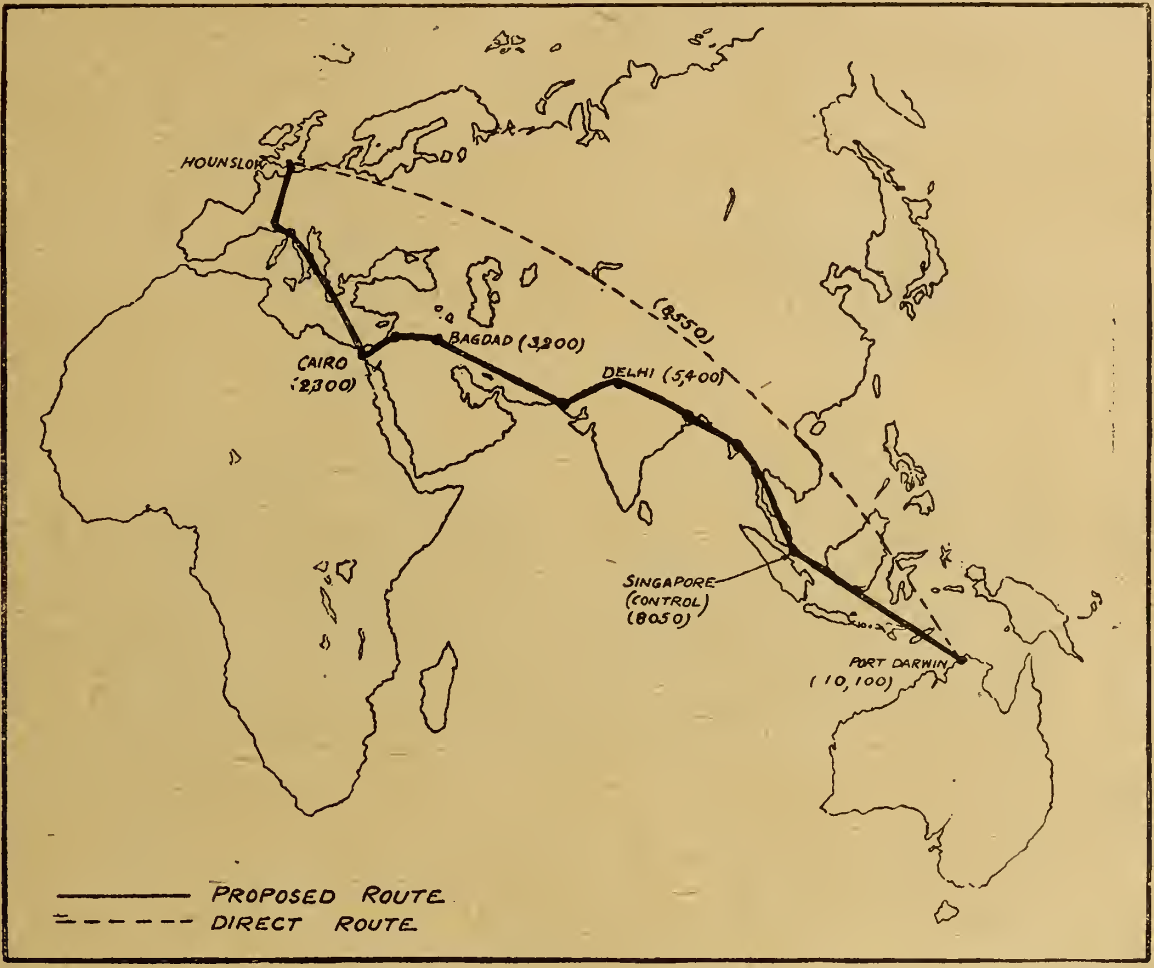
The pilot-navigator of the Sopwith "Wallaby," Capt. Matthews, is an old hand at sea navigation, and therefore knows the idiosyncrasies of compasses. He is taking no chances, and is carrying no less than three, one large and two smaller, one of which is mounted in the engineer's cockpit. In order to facilitate communication between pilot and engineer there is no partition between the two cockpits, and the back of the pilot's seat is in the form of a canvas flap, which can easily be pulled down out of the way, allowing him if desired to walk back to the rear of the cabin. Placed in racks along the sides of the *fuselage* are a number of smoke bombs, which after dropping some 500 ft. ignite and produce a dense black smoke. When the machine is out of sight of the ground these will form a very useful means of ascertaining the drift of the machine. Incidentally, one would imagine that they might be very useful in case of a forced landing far away from inhabited areas, as smoke signalling is one of the oldest in the world and is used by most native tribes.



THE SOPWITH "WALLABY": Side view

A very interesting instrument, which we do not remember having seen on a commercial aeroplane before, is fitted to the Sopwith. This is known as a turn meter, and consists of two swivelling tubes, terminating in a funnel at the rear, mounted one on each wing tip in front of the leading edge. These two tubes are connected up to an indicator in the cabin, on which the slightest turn is shown. This instrument, which is, we understand, very delicate, should be very useful in case of flying in clouds, when a machine usually begins to swing off her course first to one side and then to the other, until the compass swings to such an extent that the pilot no longer knows quite what the machine is doing.

The Rolls-Royce "Eagle," Mark VIII, is placed immediately behind a nose radiator, and is supplied with petrol from a gravity tank placed in the top centre section. Petrol is forced from the main tank, which is placed between the engine and the cabin and has a capacity of about 200 gallons, to this top tank. A very ingenious flow meter is fitted on the latter, indicating at any time the rate at which the fuel is being consumed. In the top centre section is also placed a water tank holding about 25 gallons of water, connected up to the radiator by a flexible rubber tube. Another tube, it might be mentioned incidentally, runs from the nose of the machine, through the engine housing and to the cabin, supplying the latter with fresh air. Two long exhaust pipes run back to the rear of the cabin, and serve as very effective silencers, the noise inside when the two panels in the roof are closed being almost negligible.



Diagrammatic sketch map of the route to Australia. The distances shown are approximate

As will be seen from the scale drawings, the Sopwith "Wallaby" is a three-strutter, the large span making this arrangement advisable. The under carriage is of the usual simple Vee type, with rather a narrow track. Wing tip hoops have therefore been fitted.

For the rest, the Sopwith "Wallaby" follows standard practice in design and construction. The tail plane is provided with the usual trimming gear, the wheel control of which may be seen in the side view of the machine. There is a rectangular-shape vertical fin, to which is hinged the balanced rudder.

As will be seen from the general arrangement drawings, the total wing area is 550 sq. ft. The weight of the machine, empty, is 2,780 lbs., which gives a wing loading, empty, of 5·05 lbs./sq. ft. and a power loading, empty, of 7·75 lbs./h.p. As already mentioned, the tanks have a capacity of 200 gallons, and with the weight of occupants and full equipment the weight "all on" is 5,200 lbs. This gives a wing loading of 9·45 lbs./sq. ft. and a power loading of 14·5 lbs./h.p. With full load the maximum speed is about 121 m.p.h., and the minimum speed 48 m.p.h. The cruising speed at 5,000 ft. and at a petrol consumption of 15 gallons per hour, is 107 m.p.h., which gives a range of about 1,500 miles. This is ample for any overseas distance that has to be covered during the flight to Australia, and should also give a very good margin for any of the overland stages over country unsuitable for landing. As an example of the efficiency of the Sopwith "Wallaby" it is of more than passing interest to note that the ratio $\frac{\text{Useful Load}}{\text{Total Weight}} = \frac{2,420}{5,200} = 46\cdot5$ per cent., which is distinctly good. Incidentally, it might be mentioned that the usefulness of the "Wallaby" is by no means restricted to the flight to Australia. By altering the cabin and seating accommodation it is possible to get in eight people (including the pilot), when the machine would have a range of 500 miles at a speed of 107 m.p.h.

The Flight Itself

With regard to the actual flight to Australia, the difficulties are many and the country over which the machine will have to pass is in many cases anything but inviting in case of engine failure.

However, the Rolls-Royce Eagle, Mark VIII, has a good reputation for "sticking it." All possibilities have, however, been taken into consideration, and a number of spare parts will be taken, including a spare propeller. This is, we think, a very wise precaution, since it is quite conceivable that during a forced landing the propeller might be damaged, which, even if no other damage occurred, would effectively prevent getting off again, while if a spare propeller is carried it should be possible to effect repairs and proceed on the journey. As to the route followed, this will, we understand, be that known as Air Ministry Route No. 1 to India. It is indicated in the accompanying sketch map, on which are also marked some of the distances in miles. These are, it should be pointed out, only approximately correct. The direct route to Australia is shown on the map in dotted lines. It will be seen that this goes a good deal farther to the north than the route which it is proposed to follow, and that it is very considerably shorter. The start will be made from Hounslow, and the machine will then fly across France, down to Pisa. From there to Capua and Taranto, from which latter place the machine will make for Valona, in Albania, and proceed down across Greece and hence to Cairo. From Cairo to Damascus and Bagdad, and hence to Karachi. From Karachi to Delhi, Calcutta, Rangoon and Singapore, at which latter place there is a control. From Singapore to Batavia, and along the Dutch East Indian Islands to Timor, and then the last stage across to Port Darwin, Australia. The journey is one full of dangers, and the pilot who makes it may well be proud of his achievement. According to the terms of the Australian Government Prize, the maximum time allowed is 30 days, but as Capt. Matthews points out, he is, as a member of the Larkin-Sopwith Company of Australia, far more interested in demonstrating the possibility of making such a long-distance flight on a single-engined machine than in winning the cash prize, although naturally he will do his best to win it. He is convinced that Australia offers an excellent field for aeronautical development, and that the successful completion of such a flight would give a strong fillip to aviation in that country.

The height at which it is intended to fly will vary with local conditions, but Capt. Matthews expects to do the flight at an average altitude of somewhere between 6,000 and 10,000 ft. For supplies of food, etc., Capt. Matthews is relying on the hospitality of the countries in which he will have to land, but it may be mentioned that, acting on the advice of the Air Ministry, he is carrying a repeating rifle in the aeroplane, so that if any natives among whom he may find himself show signs of hostilities, these may be answered in a suitable manner.

The Pilot-Navigator and the Engineer

Before concluding, it may be of interest to give a brief reference to the careers of the two men who will attempt this hazardous journey. The pilot-navigator is Capt. George Campbell Matthews, A.F.C., of the Australian Flying Corps, and the engineer is Sergt. Tom Kay, also of the Australian Flying Corps.

THE FLIGHT TO AUSTRALIA: On the left, the pilot-navigator of the Sopwith machine, Capt. G. C. Matthews, A.F.C.; and, on the right, his engineer, Sergeant T. Kay.

Capt. Matthews is 36 years of age, and has had a strenuous career, which particularly fits him for the rigours of this arduous flight. He has spent 12 years at sea in the Mercantile Marine as a practical navigator, and holds an extra-master's certificate. In his own words, he has been "all over the world and many other places."

On the outbreak of war, he was acting as chief officer of a passenger steamer off the Australian coast, but he at once left and joined the Australian Light Horse as a trooper. He received his commission at Gallipoli, and subsequently served 2½ years with that Force at the Dardanelles and also in Egypt. Whilst in the latter country, he found himself unable to resist the attractions of a flying career, and joining the R.F.C., he took his pilot's certificate in February, 1917, afterwards proceeding out to France with the 1st Australian Scout Squadron, No. 68 R.F.C., in September. After three months in France, he returned to England to be promoted Flight Commander of the No. 4 Australian Scout Squadron, which was then flying Sopwith Camels.

When the Australian Training Wing was formed in England, Capt. Matthews returned to it as Wing Examiner. He has flown some 21 different types of machines, and is a pilot of the most fearless and reliable type, his long maritime experience having proved of the greatest value to him in the air. A better air pilot could hardly have been chosen for this great air flight, for Capt. Matthews has an intimate knowledge of the Malay Archipelago, the Celebes Islands and other islands of the Pacific.

Sergt. Kay, who is accompanying him, is one of the best Australian mechanics, and has had a long experience of internal combustion engines. He is not himself a qualified pilot, but whilst waiting to start, Capt. Matthews has trained him in the management of the Australian machine, "The Wallaby," so that he can act as a relief when the machine is in the air and at a fair height.

As an instance of the sporting spirit and good will which exists between British aviation firms, we think it should be mentioned that the Airco firm, who have had about two months' experience in regular commercial air services, have placed all their logs of the London-Paris Air Service at the disposal of Sopwiths, containing a vast amount of extremely useful data and experience, which is acknowledged to be of the very greatest assistance to Sopwiths in planning this long flight.

◆ ◆ ◆ ◆

U.S. Advisory Committee to Erect Laboratory

At a meeting of the United States Advisory Committee for Aeronautics, recently, the construction of an engine dynamometer laboratory was authorised. The laboratory will be erected on the Committee's plot at Langley Field, and will cost approximately $15,000.

The purpose of the laboratory is to test internal combustion engines, conduct researches, and advance the development in aircraft engines. The study of related problems, including the co-relation of engine performance in free flight with the results obtained on the test stand, will also be made.

U.S. Aircraft Development

On October 10 the Senate Military Committee recommended an additional appropriation of $15,000,000 (£3,000,000) for Army aircraft construction in connection with the establishment of air routes to Panama, Alaska, and probably Asia.

It may be recalled that last August the United States Naval and Army authorities asked Congress for an appropriation of $129,000,000 (£25,800,000) for the current year, but got only $50,000,000 (£10,000,000), about one-seventh of the sum allowed the R.A.F.

East Fortune to be Abandoned

It is stated that the Air Ministry has decided to abandon East Fortune airship station in Haddingtonshire, the establishment, with all removable material and plant, being removed to a Yorkshire aerodrome.

It is understood that the airship R 29 is immediately to be broken up.

"Flight" Copyright.

LONDON FROM ABOVE: A glimpse through the clouds of St. Paul's Cathedral and the winding Thames, with its numerous bridges.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

First Direct Non-Stop Trans-Atlantic Flight

There has been a wide-spread expression of opinion that the first direct Trans-Atlantic Flight by Sir John Alcock and Sir Arthur Brown on a Vickers-Vimy-Rolls Biplane on June 14-15, 1919, should be permanently recorded in the Club House.

The idea has been fully considered by the Committee, and they have decided to obtain portraits in oils, for hanging in the Club, of both Sir John Alcock and Sir Arthur Brown.

Sir John Lavery has very kindly consented to paint the portraits at a purely nominal figure, the canvases being 30 ins. by 25 ins.

A subscription list has been opened, and subscriptions, limited to £1 1s., are invited towards the cost.

Coupe Henry Deutsch de la Meurthe

Organised by the Aéro Club de France under the Regulations of the Fédération Aéronautique Internationale and the Commission Sportive Aéronautique of France.

The Cup is an objet d'art of the value of 10,000 francs, with prizes of 20,000 francs each, to be awarded to the first three holders of the Cup.

1st Holder: Emmanuel Helen, May 1, 1912. Distance, 200 kils. Time, 1 hour 30 mins.
2nd Holder: Eugene Gilbert, October 27, 1913. Distance, 200 kils. Time, 1 hour 13 mins. 25 secs.

The third prize of 20,000 francs is now open for competition. It is a speed contest in a closed circuit of about 200 kilometres, embracing Terrasse de St. Germain, Senlis, Meaux, Melun, Terrasse de St. Germain.

On September 2 last Sadi Lecointe completed the course in 48 mins. 8 secs., giving an average speed of 249 kils. 307 m. per hour.

If this speed is not beaten by one-tenth within one year Sadi Lecointe will be the winner of the third prize of 20,000 francs, and the final holder of the Trophy.

Particulars of the Competition can be obtained from the Royal Aero Club.

Fédération Aéronautique Internationale Conference

The Conference of the Fédération Aéronautique Internationale will be held at Brussels on October 22, 23 and 24, 1919. The following delegates will represent the Royal Aero Club:—

Lieut.-Col. F. K. McClean.
Lieut.-Col. Alec Ogilvie.
Lieut.-Col. Mervyn O'Gorman, C.B.
Mr. Harold E. Perrin (Secretary).

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

THE R.A.F. CADET COLLEGE

The Air Ministry has just issued a small booklet containing the regulations for the Royal Air Force Cadet College. It is obtainable from H.M. Stationery Office or their agents and from any bookstall at 3*d*.

The R.A.F. Cadet College has been instituted for the purpose of affording special education to candidates for commissions in the R.A.F., and is intended exclusively for those who desire to make the R.A.F. their permanent profession in life.

The limits of age for admission to the College will be from 17½ to 19 years, with the exception of those who have served or are serving in the forces, and are recommended by their C.O. for a permanent commission in the R.A.F., in which case the upper age limit will be 21. All applications for the printed form of application for admission to the examination should be made to the Secretary, Civil Service Commission, Burlington Gardens, London, W. 1.

The booklet sets forth in detail the subjects for examination and possible marks. The subjects for the entrance examination which are obligatory are English, English history and geography, elementary mathematics, and one modern language. The optional subjects are Latin, Greek, another modern language, mathematics (elementary, intermediate and higher), science and elementary engineering. All the obligatory subjects must be taken, but not more than three of the optional class may be taken, and candidates will be expected to qualify (to obtain not less than 33 per cent. of the total marks allotted) in each of the four obligatory subjects. Candidates will receive extra marks if they hold Certificate A from the O.T.C., or if they have served in the senior division of the O.T.C., or if they have completed four months' continuous service as officers, warrant officers, or non-commissioned officers and men in the services. A certificate to this effect must be furnished on a form supplied to applicants by the Civil Service Commissioners.

A certain number of prize cadetships will be awarded to successful competitors in order of merit at such examination, carrying certain emoluments and financial benefits These are designed to give assistance to those who stand in need of the emoluments attached to them. Each candidate for cadetship will be examined by a medical board.

There will also be King's Cadets appointed by the Secretary of State for Air, and Honorary King's Cadets nominated by the Secretary of State for Air, and a limited number of cadetships will occasionally be filled by suitable candidates specially nominated by the Air Council, such recommendation being submitted by the candidate's headmaster.

The course of studies at the R.A.F. College during the first year will include: English literature and language; the British Empire; practical mathematics—including mechanics and draughtmanship; general elementary science; history of the R.A.F.; outline of Army and Navy organisation and characteristics of the various arms and types of ships; map reading; R.A.F. law and administration; drill (with rifles) and physical training; hygiene and sanitation; practical work in the workshops; the Morse code; passenger flying with instruction in map reading, and use of compass and machine gun.

During the second year the course will be: Theoretical and practical instruction in engines, including magnetos and their management; theory of flight; practical rigging; advanced work in wood and metal workshops; wireless telegraphy and telephony; machine and Lewis gun; instruction in aviation.

The terms of payment are under consideration, and will be issued shortly. They will correspond generally with those at the Royal Military Academy and Royal Military College, excepting that the R.A.F. Cadets will draw pay at 5*s*. a day during their first year's course, and 10*s*. a day during their second year's course. Other details concerning the syllabus of instruction at the College, government and organisation, discipline, etc., will be found in the booklet.

◆ ◆ ◆ ◆

Commercial Services in China

It is stated that the Chinese Government has entered into a contract with Messrs. Vickers, Ltd. for the supply of a large number of Vickers Vimy commercial aeroplanes of a type similar to the winner of the *Daily Mail* £10,000 prize for the first direct flight across the Atlantic, with certain modifications. To meet the cost of the purchase of machines, construction of aerodromes, repair depôts, and administration, the Chinese Government are making an issue of one million, eight hundred thousand pounds in Treasury Notes, all of which is to be expended in the development of commercial aviation.

HONOURS

The following announcements appeared in a supplement to the *London Gazette* on October 10:—

The King has been pleased to give orders for the following appointments to the Most Honourable Order of the Bath, in recognition of distinguished services rendered during the War:—

C.B. (Military Division)

Group Capt. P. R. C. Groves, C.M.G., D.S.O., R.A.F.

Wing-Com. A. J. L. Scott, M.C., A.F.C., R.A.F.

The King has been pleased to give directions for the following appointments to the Most Distinguished Order of Saint Michael and Saint George, in recognition of distinguished services rendered during the War:—

C.M.G.

Group Capt. R. H. Clark-Hall, D.S.O., R.A.F.; Maj. (A./Lieut.-Col. R. D. Waterhouse, R.A.F.

The King has been pleased to give orders for the following promotions in and appointments to the Most Excellent Order of the British Empire, in recognition of distinguished services rendered during the War:—

C.B.E. (Military Division)

Royal Air Force

Wing-Com. (A/Air Commodore) F. G. Willock, D.S.O.; Chaplain-in-Chief Rev. H. D. L. Viener, M.A.; Wing-Com. (A/Group-Capt.) A. D. Cunningham, O.B.E.; Hon. Col. L. Munro, O.B.E. (Col., Retd. List, Hants R.); Wing-Com. W. D. Beatty, O.B.E.; A.F.C., Squad-Leader (A/ Wing-Com. J. L. Birley, O.B.E.; Wing-Com. F. L. M. Boothby; Wing-Com. I. T. Courtney, O.B.E.; Wing-Com. E. H. Griffith, O.B.E.; Wing-Com. J. Mead, M.C.; Wing-Com. H. W. S. Outram; Wing-Com. R. C. M. Pink; Wing-Com. F. H. G. Playfiar; Wing-Com. H. L. Woodcock; Lieut.-Col. W. E. S. Burch (R. Ir. Regt.); Maj. (Hon. Lieut.-Col.) A. H. Cheatle, O.B.E.; Lieut.-Col. G. Dreyer, O.B.E.; Lieut.-Col. E. R. Peal, O.B.E., D.S.C.; Lieut.-Col. A. E. J. Reiss, O.B.E.; Dr. Miss J. L. D. Fairfield, M.D.; Maj. A. H. Hogarth, O.B.E., D.C.M.

O.B.E. (Military Division)

Flight-Lieut. (A/Wing-Com.) A. H. S. Baker, M.B.E.; Squad.-Leader (A/Wing-Com.) O. T. Boyo, M.C., A.F.C.; Wing-Com. J. L. Forbes; Squad-Leader (A/Wing-Com.) A. H. C. Kearsey, D.S.O.; Wing-Com. C. Kirby; Wing-Com. A. T. L. Nye; Wing-Com. F. Ranken; Squad-Leader (A/Wing-Com.) A. V. J. Richardson; Squad-Leader (A/Wing-Com.) J. D. K. Restler; Wing-Com. J. L. Travers; Lieut.-Col. I. B. Davson; Squad-Leader J. P. Bourke; Flight-Lieut. (A/Squad.-Leader) A. P. Bowdler; Squad-Leader A. R. Boyle, M.C.; Squad-Leader A. G. H. Carr; Flight-Lieut. (A/Squad-Leader) E. W. F. Cherry; Squad-Leader H. A. Cox; Squad-Leader W. J. Y. Guilfoyle, M.C.; Squad.-Leader D. H. Kennedy; Squad-Leader T. G. Leith, M.B.E.; Flying Officer (A/Squad.-Leader) C. H. Lewis; Squad.-Leader J. H. Lidderdale; Squad.-Leader E. S. Saunders; Squad.-Leader C. J. Stewart; Squad.-Leader H. C. Wakefield; Squad.-Leader R. H. Woods, M.C.; Maj. P. C. A. Bridgeman; Maj. E. C. Clements (R.A.M.C.T.); Capt. (A/Maj. J. de Francia; Maj. A. C. Hartley; Maj. T. G. Hull; Capt. (Hon. Maj.) T. O. H. Lees, A.F.C.; Maj. O. C. Macpherson (Canada); Capt. (A/Maj.) J. M. Mitchell, M.B.E. (Canada); Maj. W. Park; Maj. D. B. Sanders; Maj. A. E. Snape; Flight-Lieut. C. B Baker; Flight-Lieut. D. S .K. Crosbie; Flight-Lieut. G. F. Evans; Flight-Lieut. D. Gordon; Flight-Lieut. H. T. Humfress; Flight-Lieut. G. W. C. Kaye; Flight-Lieut. D. Munro; Flight-Lieut. G. C. Shepherd; Flight-Lieut. W. P. Smith; Flight-Lieut. J. B. Walker; Asst. Comdt. Miss K. L. Curlett, W.R.A.F.; A/Matron Mrs. L. O. Doughty-Wylie, M.B.E., R.R.C.

M.B.E. (Military Division)

Flying Officer (A/Squad.-Leader E. B. Barker; Squad.-Leader H. N. Wylie; Flight-Lieut. T. Armstrong; Flying Officer (A/Flight-Lieut.) W. E. Berwick; Flying Officer (A/Flight-Lieut.) H. B. Dakin; Flying Officer (A/Flight-Lieut.) D. B. Gunn; Flight-Lieut. H. G. Hutchinson; Flight-Lieut. J. H. Ledeboer; Flight-Lieut. J. A. C. Sumner; Flight-Lieut. F. Tedman; Flight-Lieut. F. K. Wells; Capt. L. Crooks; Capt. A. J. Dawson; Capt. I. N. Dracopoli; Capt. J. M. Furnival; Capt. T. Greening; Capt. G. Ralston; Flying Officer H. S. Burdett; Flying Officer D. P. Cameron; Flying Officer A. T. Hughes; Flying Officer H. D. Lehmann; Flying Officer W. L. Shaw; Flying Officer R. A. Shepheard-Walwyn; Flying Officer G. T. Stroud; Flying Officer C. H. Tancred; Flying Officer G. V. Walsh; Lieut. A. C. Blackmore; Pilot-Officer W. E. Critchley; Pilot-Officer W. E. Humphreys; Pilot-Officer T. A. Ross; Obs. Officer G. C. Shortridge; Pilot Officer J. E. Tyrrell; Pilot Officer S. G. Young; Administrator Miss A. L. Chauncey, W.R.A.F.

The King has been pleased to approve of the undermentioned rewards to Officers and other ranks of the Royal Air Force, in recognition of distinguished services rendered during the War:—

Distinguished Flying Cross

Squad-Leader C. H. Stringer; Flight-Lieut. E. D. Crundall; Flight-Lieut. F. W. Hudson; Flight-Lieut. the Hon. E. G. W. T. Knollys, M.B.E.; Flying Officer (A/Flight-Lieut.) A. D. Makins; Flight-Lieut. E. A. Packe; Flight-Lieut. F. X. Russell; Flying Officer E. L. Barrington, M.C.; Flying Officer R. S. Jameson; Flying Officer F. C. C. Yeats-Brown; Lieut. W. E. Bottrill (Can. Inf.); Lieut. G. M. Eiloart; Pilot Officer H. Lovelady; Pilot Officer F. W. Sinclair.

Air Force Cross

Wing-Com. W. D. Beatty, C.B.E.; Squad.-Leader (A/Wing-Com.) O. T. Boyd, O.B.E., M.C.; Wing-Com. R. B. Davies, V.C., D.S.O.; Squad.-Leader (A/Wing-Com.) E. H. Sparling; Squad-Leader (A/Wing-Com.) L. Tomkinson; Flight-Lieut. (A/Squad.-Leader) D. G. Donald; Flight-Lieut. (A/Squad.-Leader) R. F. S. Leslie, D.S.C., D.F.C.; Squad.-Leader T. K. Elmsley; Squad.-Leader V. Gaskell-Blackburn; Squad.-Leader M. E. A. Wright; Flight-Lieut. W. R. D. Acland; Flight-Lieut. C. H. Elliott-Smith; Flight-Lieut. F. M. Fox; Flight-Lieut. T. A. Gladstone; Flying Officer (A/Flight-Lieut.) A. F. Hordern; Flight-Lieut. Ft. Nuttall, M.C., D.F.C.; Flying Officer (A/Flight-Lieut.) L. N. Sutherland; Capt. R. M. Stirling; Flying Officer W. Armstrong; Flying Officer G. H. Boyce; Flying Officer H. E. Cardwell; Flying Officer R. Douglas (S.A.D.F.); Flying Officer W. T. Garrood; Flying Officer L. A. C. Hudson; Flying Officer L. M. Iles; Flying Officer A. Lanman; Flying Officer J. D. Mail; Flying Officer A. S. Meyrick Jones; Flying Officer J. McF. D. Mills; Flying Officer L. G. Paget; Flying Officer J. R. I. Scambler; Flying Officer G. J. Squires; Flying Officer M. L. Trapagna-Leroy; Flying Officer S. S. Turnbull; Lieut. H. A. Miller; Lieut. J. A. Smale; Lieut. A. J. G. Stryan, M.C.; Lieut. N. T. Thorneloe; Pilot Officer C. N. C. Dickson; Pilot Officer F. de M. Hyde; Pilot Officer T. Rennie; Pilot Officer P. S. Riach; Pilot Officer L. G. Warren; Obs. Officer E. A. Westall; Pilot Officer I. S. Woodhouse.

Air Force Medal

No. 1357 Sergt.-Maj. 2 J. Barrett; No. 5323 Sergt.-Obs. J. Gilhooly.

Medal of the Order of the British Empire (for Gallant Conduct in France)

No. 46031 Corpl. F. Harrison.

Meritorious Service Medal

No. 4395 Corpl. W. W. Adkins; No. 26805 Sergt. H. C. Ashwell; No. 30979 Corpl. F. S. Bowles; No. 219650 A/C 1 C. H. Greenwood; No. 40573 Corpl. T. W. E. Heath; No. 1169 S./M. 1 J. Hudson; No. 215 S./M. 1 J. Kerr; No. 302427 Corpl. J. Lister; No. 1783 Flight-Sergt. J. F. Morrison; No. 18304 Flight-Sergt. J. E. Pays; No. 36955 Corpl. G. Papworth; No. 23725 Sergt. W. J. Payne; No. 93866 Sergt. J. Poole; No. 33436 L.A.C. A. J. Pickering; No. 37883 Flight-Sergt. G. H. Toogood; No. 132183 A./C./H. 2 J. H. Walker.

The following have been mentioned in dispatches and reports for Distinguished Service in the Field:—

Squad.-Leader A. G. H. Carr; Squad.-Leader W. J. Y. Guilfoyle; Squad.-Leader H. C. Wakefield; Flying Officer J. R. Hovenden; Flying Officer E. F. L. Taylor; Lieut. J. McL. Pearson; Lieut. McL. N. Straight; No. 42792 Sergt. H. S. Dodd; No. 403621 Sergt. R. Fairbrother; No. 44805 Sergt. T. W. Harman; No. 66256 Corpl. F. W. J. Hunt; No. 115589 Sergt. H. E. Mee; No. 403646 Sergt. H. G. Mitchell; No. 90730 Sergt. G. T. Watt; No. 500 Flight-Sergt. T. E. Whittaker.

Royal Red Cross, 1st Class

A/Matron Miss J. M. Cruickshank (Q.A.I.M.N.S.R.).

Foreign Decorations

The King has granted unrestricted permission for the wearing of the following decorations, conferred on the officers and other ranks of the Royal Air Force indicated for valuable services rendered in connection with the War:—

CONFERRED BY THE PRESIDENT OF THE FRENCH REPUBLIC

Legion of Honour (*Croix de Chevalier*)

Lieut. G. G. Bell, D.F.C. (Canadian L. Forces); Lieut. J. S. E. Townsend, R.N.V.R., attd. Naval Air Service.

Croix de Guerre, avec Palme

Lieut. D. A. Davies, D.F.C.; Lieut. C. B. Green, D.F.C. (Can. L. Forces); Lieut. H. J. Gibson; Lieut. A. E. de M. Jarvis, D.F.C. (Can. L. Forces).

Croix de Guerre, avec Etoile en Vermeil

Lieut. H. G. Davis, D.F.C.

Médaille Militaire

No. 54267 Sergt.-Mech. C. R. L. Falcy, D.C.M.; No. 25197 Corpl. (A/Sergt.) H. R. Heys.

Médaille d' Honneur, avec Glaives en Vermeil

Capt. A. F. Nimmo.

Médaille d' Honneur, avec Glaives en Argent

No. 29991 Sergt. W. L. Reeve; No. 4705 Sergt. T. E. Williams.

Médaille d' Honneur, avec Glaives en Bronze

No. 4388 Corpl. J. C. Steadman.

CONFERRED BY THE KING OF ROUMANIA

Order of the Crown of Roumania (Commander)

Lieut.-Col. R. D. Waterhouse, C.M.G.

CONFERRED BY THE KING OF THE HELLENES

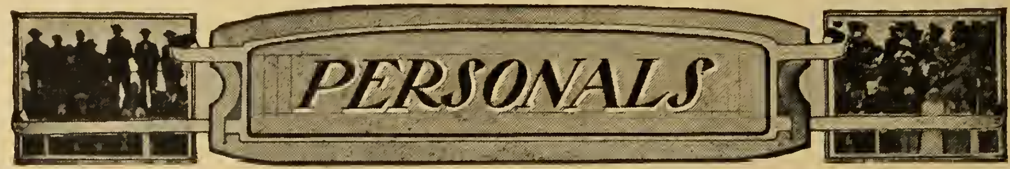
Greek Military Cross, 3rd Class

Capt. F. A. Bates, M.C., A.F.C.

Medal of Military Merit, 3rd Class

Squad.-Leader S. G. Hodges, M.C., A.F.C.

* * *



PERSONALS

Deaths

Capt. REGINALD GEORGE HEWETT PIXLEY, M.C., 7th London Brigade, R.F.A., attached R.F.C., who was reported missing on June 4, 1917, and is now ascertained to have been killed in action on that date, at the age of 24, was the younger son of Maj. and Mrs. Stewart A. Pixley, of Woking.

Married

Capt. GERARD FANE, D.S.C., R.F.C., was married on October 1 at St. Andrew's, Raveningham, Norfolk, to CONSTANCE RHODA ELIZABETH, daughter of Mr. and Mrs. NICHOLAS BACON, of Raveningham Hall.

Wing-Com. Sir NORMAN LESLIE, Bart., C.B.E., was married on October 4 at St. George's Church, rue Auguste Vacquerie, Paris, to BETTY ELISE SEWELL, daughter of Mr. J. T. B. Sewell, C.B.E., LL.D., and of Mrs. Sewell, of 47, Boulevard Lannes, Paris.

Items

Maj.-Gen. Sir FREDERICK SYKES (Controller-General of Civial Aviation) had the honour of being received by His Majesty at Buckingham Palace on October 11, when the King invested him with the Insignia of a Knight Grand Cross of the Most Excellent Order of the British Empire (Military Division).

Lieut.-Col. ROBIN GREY, R.A.F., also had the honour of being received by His Majesty, when the King invested him with the Insignia of a Companion of the Distinguished Service Order.

Mr. ALBERT VICKERS, of Cadogan Square, S.W., and of Vickers House, Broadway, Westminster, S.W., lately chairman of Messrs. Vickers, Ltd., who died at Eastbourne on July 12 last, aged 80, left a fortune of the gross value of £886,584, with net personalty £759,747. The duties on the property at the sworn valuation will amount to £177,400.

◆ ◆ ◆ ◆

THE AMERICAN TRANS-CONTINENTAL RACE

FOR the great race across the United States and back again, which started on October 8, New York was the favourite starting-place, 48 machines starting at two-minute intervals from 9 a.m. from the Mineola field, while 15 set out from San Francisco to fly in the reverse direction. Along the route of 2,700 miles, 21 controls had been established, and flying was restricted to daylight, while at the turning points two days had to be spent. Although the race was only open to U.S. service pilots, Air-Commodore L. O. Charlton, the British air attaché at Washington, was invited to start first. Slight trouble with the petrol supply precluded this, however, and the Bristol-Rolls-Royce fighter was the eleventh machine to leave Mineola. Unfortunately the petrol trouble recurred, and a forced landing was made at Ithaca, the machine hitting a fence and being wrecked. Air-Commodore Charlton and Flight Capt. T. Traill, escaped with a shaking.

Lieut. Maynard, who before the War was a clergyman, and who won the New York–Toronto race, took the lead of the westbound flyers, and reached North Platte, Nebraska, at 4.14 p.m., and five minutes later the leader from San Francisco, Capt. L. N. Smith, also landed there. Lieut. Maynard subsequently reached Cheyenne, Wyoming, where he was delayed for a day by a broken propeller, while Capt. Smith reached Omaha, Neb.

A number of accidents occurred on the first day. Maj. D. H. Chrissey, who had set out from San Francisco, was killed with his observer, Sergt. Vigil Thomas, when their machine crashed to the ground near Salt Lake.

Sergt. W. H. Neavitt, observer in a De Havilland flyer piloted by Col. Gerald C. Brant, was crushed to death when their machine fell at Deposit, N.Y., and Col. Brant was badly bruised.

A machine, carrying Mr. B. C. Crowell, Assistant Secretary of War, also crashed, but pilot and passenger were not hurt.

On Saturday Lieut. Maynard reached San Francisco, and unofficially his time is given as 75 hours 47 mins., while his time in the air was 24 hours 56 mins. Two competitors from San Francisco reached New York, these being Maj. Spatz, whose time was 83 hours 41 mins., and Lieut. Kiel, 83 hours 44 mins. All these machines were De H. 4's fitted with 400 h.p. Liberty engines.

Capt. Smith also arrived at New York on Sunday, the cause of his delay being a smashed propeller.

Announcement has been made that the start of the return journey has been postponed to October 20, but in the meantime it is rumoured that the race may be discontinued on account of the adverse weather conditions.

◆ ◆ ◆ ◆

The Royal Aeronautical Society

ALTHOUGH the full syllabus for the next session of the Royal Aeronautical Society has not yet been completed, it has been decided to hold the opening meeting on October 29, when Sir Horace Darwin, F.R.S., will deliver an address. Lectures will be held fortnightly, the meeting place, as in former years, being the Royal Society of Arts, John Street, Adelphi.

The Committee are inviting applications from among the members for the position of secretary, which will shortly become vacant.

Detecting Flaws by the Camera.

ONE of the most fascinating sections of the exhibition now being held by the Royal Photographic Society at 35, Russell Square, W.C., is the series of photo-micrographs, showing how defects in aeroplane parts were detected, although quite invisible to the eye, and in some cases concealed by the linen wrappings. In one instance a strut had been cut off too short, and a false packing piece inserted; in another a wooden block was misshaped and split by the screws, and in yet another case extensive beetle borings were discovered. The exhibition will be open, free, daily, until Nov. 29.

SOME FRIEDRICHSHAFEN "MILESTONES"

Probably no other German aircraft firm can show such a series of seaplanes as that produced by the Friedrichshafen Aircraft Works (Flugzeugbau Friedrichshafen) during the War, and for this reason a brief reference to the various types, illustrated by photographs, may not be without interest to readers of Flight. The illustrations have been published in *Flugsport*, and the following is a translation of the descriptive matter accompanying the photographs :—

"The Friedrichshafen Aircraft Works is the oldest German firm which has devoted its energies almost exclusively to the production of seaplanes. The firm was founded in 1912 and has produced a great number of seaplane types, under the efficient leadership of its founder and managing director, Dipl. Ing. Theodor Kober, who has been ably supported by his associates, in close co-operation with the Naval authorities and with various scientific institutions. The main sphere of activity of the firm was the construction, testing, and quantity production of seaworthy single-engined seaplanes of the types used by the German Navy for reconnaissance flights over the North Sea and the Baltic. That the firm was successful in this is proved by the fact that they have been able to supply practically all the requirements of the German Navy, and that a number of other firms have built their machines under licence. Among these may be mentioned the Luftfahrzeug Gesellschaft, the Sablatnig Aircraft Works, the Gothaer Waggonfabrik and the Warnemünde Aircraft Works. As the seaworthiness of a machine depends not only on the right shape of float, but also upon the strength of the floats and undercarriage, on the correct amount of buoyancy and on controllability when alighting, it will be seen what an abundance of experience has to be collected in order to fulfil the specifications for a seaworthy seaplane. A large proportion of the experiments was formed by tests on floats, of which over 100 types were produced. The F.F. machines, which have been well proved during the War, are all of the twin-float type, although before the War single-float machines and flying boats were also tried.

"One object of the experiments was, among other things, to determine the number and placing of steps which best suited the different types of machines for starting and landing, and what float shape gave the best results for taxying. At the same time the floats should combine small air resistance and great rigidity with small weight, while the most suitable, strongest, and lightest construction of float details also required much work and very many experiments. The following are the most important types of seaplanes produced by the Friedrichshafen Aircraft Works :—

"The F.F. 29

is a bomber with a 120 h.p. Mercedes engine (Fig. 1). The main floats are comparatively short, and a tail float is therefore fitted under the stern of the *fuselage*. The radiator is placed above the engine, and the exhaust pipes are passed under the lower plane. The pilot occupies the rear seat, while the observer sits in front, where are also the bomb releases. The petrol gravity tank is hung on the *cabane* struts.

"The F.F. 31

is shown in Fig. 2. It was a reconnaissance machine designed also to carry bombs. As the machine was required to have a free field of fire in a forward direction, the tail was carried on open tail booms and the Maybach (160 h.p.) engine was placed in the rear of the *nacelle* and drove a pusher airscrew. The observer was placed in front with his moveable machine gun, and the pilot occupied the rear seat. Behind the pilot was the radiator. As the main floats were also fairly short in this machine a tail float was fitted.

"The F.F. 33,

which is shown in Fig. 3, was fitted with a 120 h.p. Mercedes engine. It was a bomber of very similar design to the type F.F. 29, except for the floats, which were of considerably different shape.

"The F.F. 33B

was designed for reconnaissance and had a 160 h.p. Maybach engine (Fig. 4). It was similar to the 29 and 33 types in general design, but the pilot sat in front, the observer occupying the rear seat where was mounted on a gun ring a machine gun by means of which he could fend off attacks. The radiator is in two halves, mounted on each side of the *fuselage*. While the floats of the F.F. 31 were provided with a Vee bottom nose, those of the F.F. 33B had a Vee bottom at the heel, and were flat-bottomed in front.

"The F.F. 33E,

shown in Figs. 5 and 6, was used for bombing and reconnaissance, with and without wireless. In general arrangement it is similar to the 29 and 33 types. While the first machine of this type still retained the tail float (see inset Fig. 5) later machines were found not to require this on account of the long main floats with which they were fitted. The radiator was mounted on the leading edge of the top plane. Generally speaking, the *fuselage*, wing bracing, wings and *ailerons* were designed to give good aerodynamic efficiency.

"The F.F. 33F,

shown in Fig. 7, was a development of the 33. It was, however, designed as a fighter, and was probably the first to be successfully employed by the German Navy in various theatres of war. The wing area was considerably reduced, which resulted in greater manœuvrability. The pilot sat in front, and the observer, who was provided with a machine gun mounted on a gun ring, occupied the rear seat. In addition to the substitution of the smaller wings, with only two pairs of struts on each side, this machine was altered later on by being fitted with a shorter and better stream line *fuselage*.

"The F.F. 33H,

which is shown in Figs. 8 and 9, was a development of the 33F. The *fuselage*, which was much shorter, was provided with a fin below as well as above, and the *ailerons* were redesigned to give smaller resistance. The radiator was built in flush with the top plane, which also contained the petrol gravity tank. The floats were also redesigned to give smaller air resistance. A great improvement in this machine was the incorporation of horizontal struts between the floats instead of cables, so that it was possible for the gunner to fire forward, between the inner pair of inter-plane struts and the propeller tips, since any damage accidentally done to the wing bracing in the inner bay was of minor importance as the load would be taken by the float tubes.

"The F.F. 33J.

"This type was fitted with a 150 h.p. Benz engine, and was used as a reconnaissance machine, fitted with wireless. It has been extremely successful, and has given excellent results during the War. The 33J (Figs. 10 and 11) is a direct descendant of the 33E. It is particularly seaworthy, is easy to fly, and very reliable, even for long-duration work. This machine is the first seaplane to be used successfully on all the seas of the world, and was used as a ship's 'plane on the *Wolf*. The main specification of the F.F. 33J is as follows : Weight, empty and without water, 2,300 lbs. ; load, 1,185 lbs. ; total weight, 3,485 lbs. ; length overall, 34 ft. ; span, 55 ft. ; float capacity, 61 cu. ft. ; speed, 71–77·5 m.p.h. according to load ; speed when taking off, 50 m.p.h. ; climb to 4,950 ft. in 25 mins. ; duration, 5 hours. This type is, so to speak, unbeaten in any theatre of war, as it was purely for military reasons that the 33J was supplanted by machines of 200 h.p. Owing to its proved capabilities the type was retained as a practice and school machine, in which form it was known as

"the F.F. 33S.

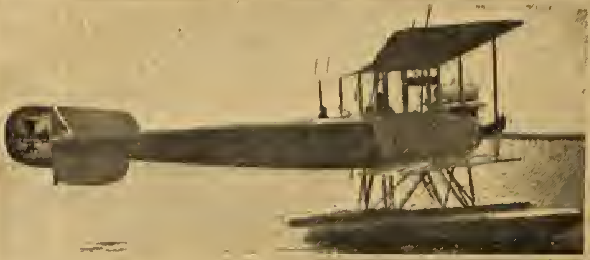
"During the last years of the War practically all the German seaplane pilots were trained on this type (Fig. 12), and nothing more need, therefore, be said about its utility as a practice and school machine.

"The F.F. 33L.

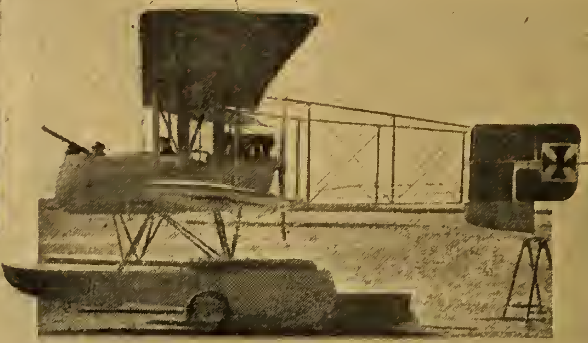
"This machine, which is shown in Figs. 13 and 14, is a further development of the 33H. It is fitted with 150 h.p. Benz or Mercédès engines. It formed a very happy compromise between the demands for seaworthiness and for performance. In accordance with its use as a fighter the 33L possesses great manœuvrability, and is very seaworthy in any sea up to a rougness degree of 3. It is easy and comfortable to fly. Its main characteristics are : Weight, empty and without water, 2,070 lbs. ; load, 1,045 lbs. ; total weight, 3,115 lbs. ; length overall, 30 ft. ; span, 43 ft. 6 ins. ; float capacity, 49 cu. ft. ; horizontal speed, 80 to 86 m.p.h. ; climb, 6,600 ft. in 30 mins ; duration, 3½ hours. This machine was equipped with one movable and one fixed machine gun, or one movable gun and a wireless outfit.

"The F.F. 34

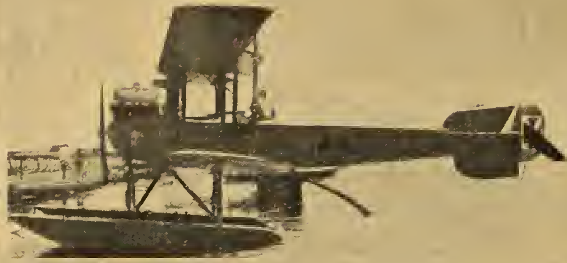
is of the pusher type, like the 31, but it has two plywood *fuselages* carrying the tail instead of the open tail booms of the 31. The machine, which is shown in Figs. 15 and 16, was fitted with a 240 h.p. Maybach engine, and as the engine was placed in the rear of the *nacelle*, the field of fire in a forward direction was very good. It was used as a reconnaissance machine, and was equipped with wireless. Figs. 17 and 18 show



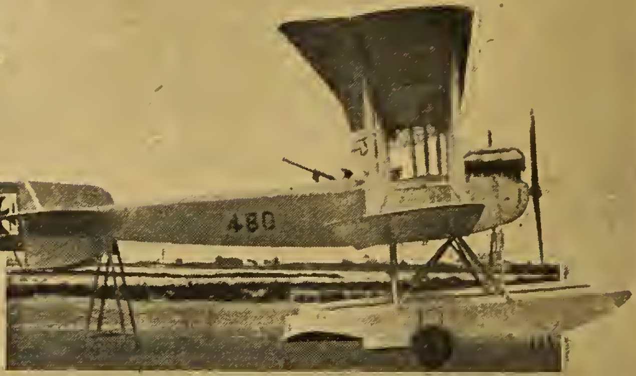
1.



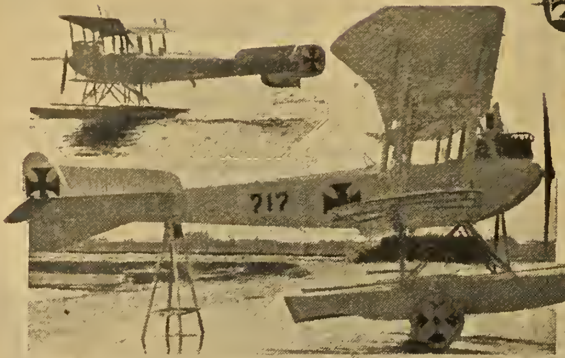
2.



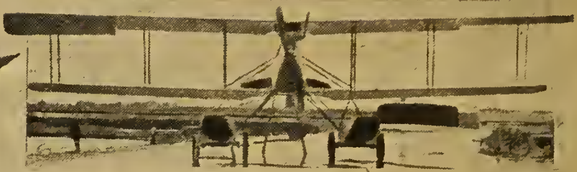
3.



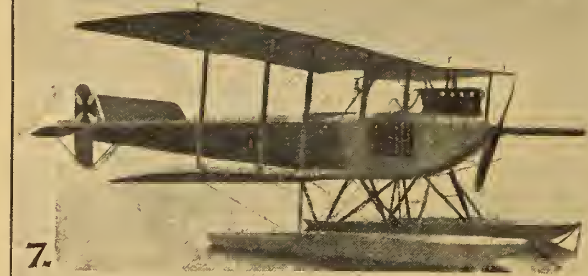
4.



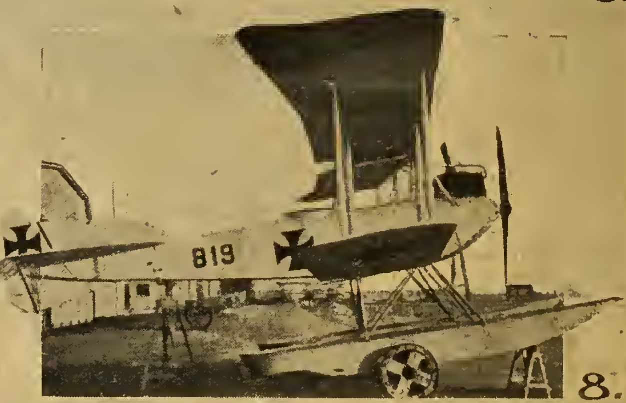
5.



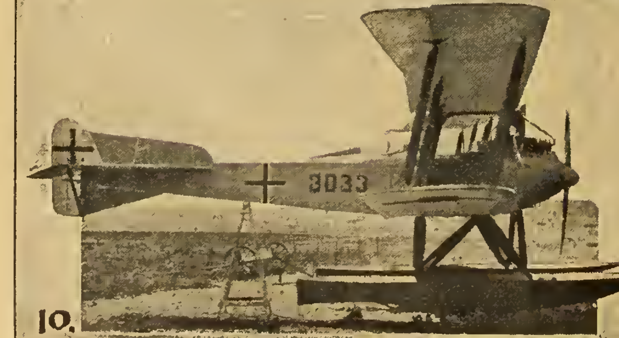
6.



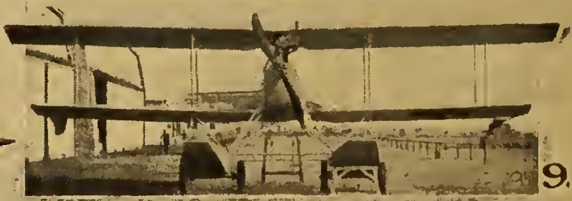
7.



8.

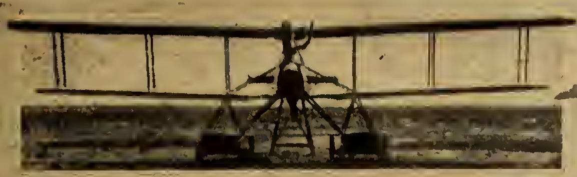


10.

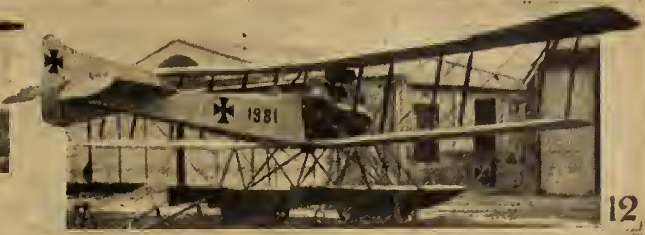


9.

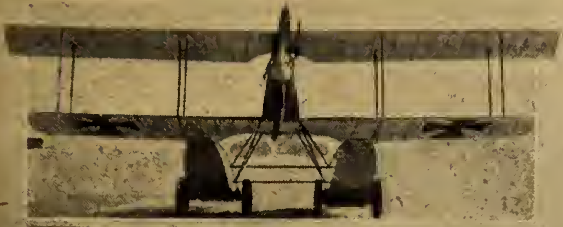
THE FRIEDRICHSHAFEN SEAPLANES: Figs. 1 to 10



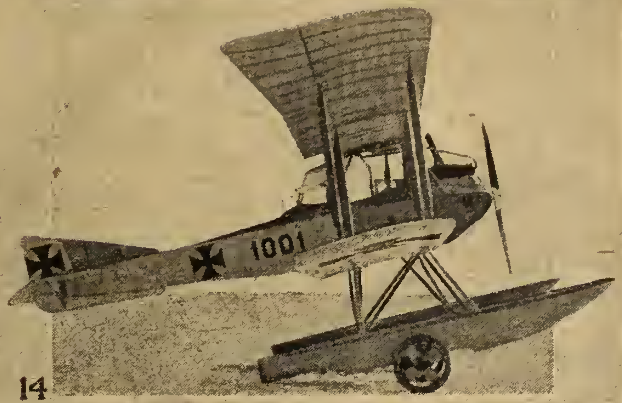
11.



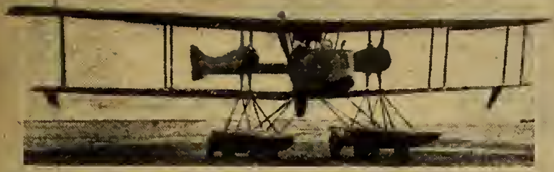
12.



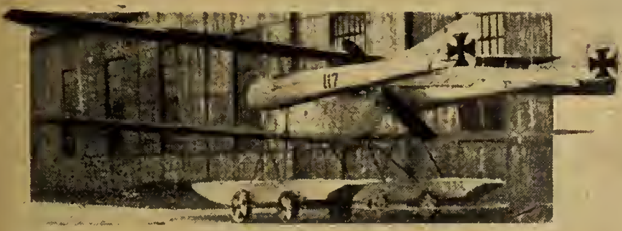
13.



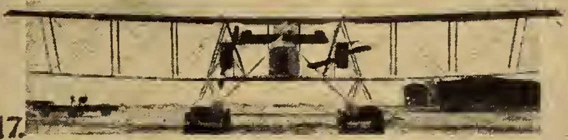
14



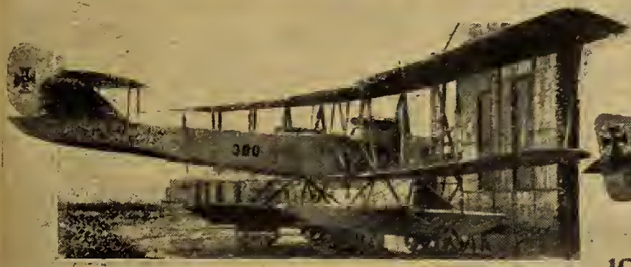
15.



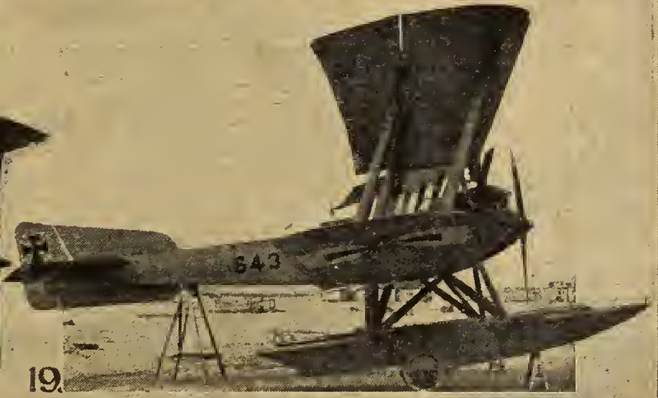
16.



17.

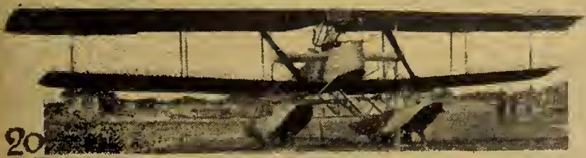


18.

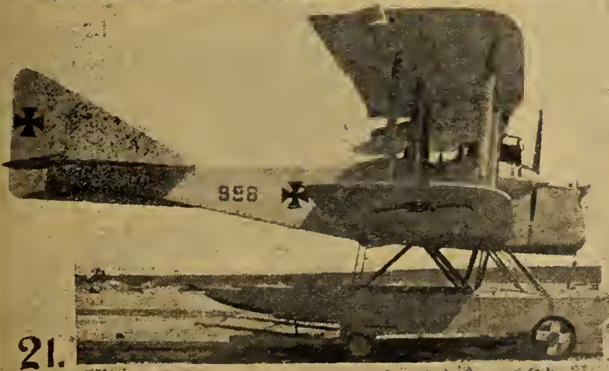


19.

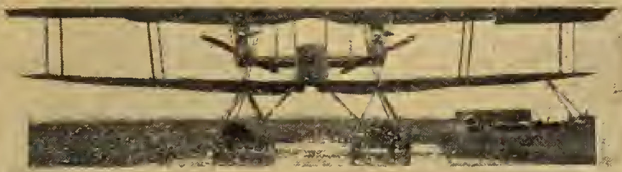
THE FRIEDRICHSHAFEN SEAPLANES: Figs. 11 to 19



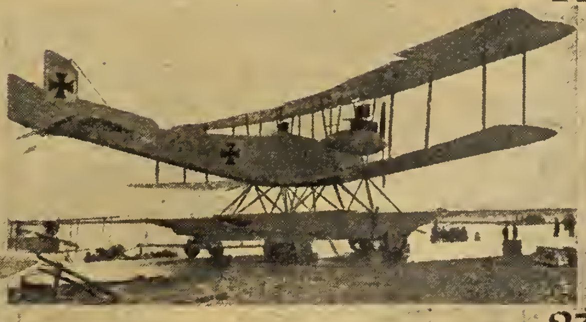
20



21.



22.



23.

THE FRIEDRICHSHAFEN SEAPLANES: Figs. 20 to 23

" the F.F. 35,

which was fitted with two Mercédès engines of 150 h.p. each. This was the first twin-engined seaplane turned out by the Friedrichshafen Aircraft Works. One of the features of this machine was the method of mounting the engines. As will be seen from the illustrations (Figs. 17 and 18), the engines were supported by a framework of struts from the bottom plane, and the engine mounting is independent of the wing truss. The stern of the *fuselage* was built of three-ply wood, and had a Vee bottom in order to act as a tail float, the Vee bottom lessening the shock of the tail coming in contact with a rough sea. In order to protect the tail plane and elevator against the sea the tail plane is mounted on top of the vertical fin and braced by struts. During a number of flights the 35 has proved itself a very good machine. Another remarkable feature of this machine is that all metal fittings in the wings, *fuselage* and floats were made from solid steel by forging, milling, drilling and planing. Starting handles were provided in front of the radiators.

" The F.F. 39C.

" As a result of the ever-increasing military demands, the reconnaissance machine type F.F. 33J, which was fitted with a 150 h.p. Benz engine, and which had already done extremely good work, had to be replaced by the F.F. 39C, which was fitted with a 200 h.p. Benz. Generally speaking the construction of the 39C was similar to that of the 33J, but on account of the larger engine, the dimensions were increased. Also the floats were of a different form (Fig. 19). The stagger was somewhat greater than that of the 33J, and various details were different so as to combine light weight with small resistance.

" The F.F. 40.

" This was a very interesting experimental machine, fitted with a 240 h.p. Maybach engine driving two tractor screws placed between the planes (Fig. 20). The performance and general handling of this machine were good, but the transmission was too heavy in proportion to the engine power.

" The F.F. 41A.

" As a consequence of the good results obtained with the Friedrichshafen land machines of the G type, and with the first F.F. twin-engined type seaplane, the 35, the F.F. works received from the Naval authorities instructions to proceed with the design and construction of twin-engined seaplanes specially designed for dropping torpedoes. Of these the F.F. 41A has done particularly well. This machine, which is shown in Figs. 21, 22 and 23, was fitted with two 150 h.p. Benz engines. As a result of the experience with the large F.F. land machines, the engines were mounted between interplane Vee struts, which arrangement was found to combine great reliability with small weight and low air resistance. The chief characteristics of the F.F. 41A are as follows: Weight, empty and without water, 5,050 lbs.; load, 3,000 lbs.; total weight, 8,050 lbs.; length overall, 45 ft.; span, 72 ft. 6 ins.; float capacity, 135 cu. ft.; horizontal speed, 71 to 77 m.p.h.; speed on taking off, 52·5 m.p.h.; climb to 3,300 ft. in 25 mins.; duration, about 5 hours. The machine is easy to fly, and also possesses good seaworthiness. On account of its large span it is not, of course, so handy as a single-engined machine.

(*To be concluded.*)

THE SHIPPING EXHIBITION

Those who have not yet visited the Shipping and Engineering Exhibition at Olympia have still an opportunity of doing so, as, on account of the railway strike, it has been decided to keep it open until October 21. While, it is true, that the aeronautical industry is not directly represented, those who are interested in that branch of engineering will find much to engage their attention, apart from the fact that many names, such as W. Beardmore and Co., Boulton and Paul, Vickers-Petters, etc., are familiar. What is applicable to one department of engineering may often be adapted with advantage to use in another branch, and, anyway, it is always useful to keep in touch with the latest developments. The building of ships calls for handicraft in both wood and metal, and as aircraft are produced from the same materials, it is unnecessary to emphasize how much the aircraft engineer can learn by a tour of inspection of the stands in Olympia.

Those whose business is with the building of aircraft will be naturally impressed by the many exhibits concerned with welding, a process which has been largely used in connection with the making of aeroplane fittings and what makes these stands more than usually instructive is that the actual process of metal fusion or the cutting through of thick plates can be watched through specially coloured screens which cut out the injurious rays of light.

Among the stands may be mentioned those of the Dissolved Acetylene Co., Ltd., Carbic, Ltd., the British Oxygen Co., Ltd., Thorn and Hoddle Acetylene Co., Ltd., who give demonstrations of their oxy-acetylene systems, while on the stand of the Alloy Welding Processes, Ltd., electric welding sets are shown in operation.

Another stand which is of great interest to the manufacturer is that of the McGruer Hollow Spar Co., Ltd., whose products have proved so efficient for *longerons*, struts, etc. They were used on five out of the eleven entrants for the Transatlantic flight, and were actually fitted on Sir John Alcock's Vickers-Vimy-Rolls. The Aluminium Plant and Vessel Co. show a most varied assortment of sand and die castings in aluminium, and the display of the Smethwick Stamping Co. indicates what can be done by them in the way of high-grade drop-forgings and stampings. The Galvanising Equipment Co. have samples of galvanised material which illustrate the advantage of their Galeco process, and their exhibit also includes the Cropley heating and drying set, delivering air free of combustion products at all temperatures up to 400° F.

The Herbert Frood Co., Ltd., who are more familiar as the makers of Ferodo, show a number of applications of their material to engineering purposes. The North British Rubber Co., Ltd., have on view a comprehensive display of their rubber manufactures, including hose, mats, boots, shoes and gloves, waterproof clothing, etc. Apart from their Valor chemical fire extinguisher the Valor Co., Ltd., show many of the accessories they produce for works' use, such as heating stoves, storage cabinets, petrol cans, oil filters. The stand of F. Pratt and Co. is another stand which will appeal to the manufacturer, as this firm show chucks, of British manufacture, for practically every conceivable purpose. The Aerograph Co., Ltd., show samples of the work done by their spraying apparatus for applying liquid coatings to surfaces, including enamelling, varnishing and polishing. Coatings of all types are seen on the stand of Pinchin Johnson and Co., Ltd., which is a veritable showcase of the firm's products, as varied as they are beautiful.

The Gledhill-Brook Time Recorders demonstrate their systems of recording workmen's time, costs, etc., and their exhibit also includes a mass of informative detail with regard to time-checking and saving appliances.

Messrs. C. C. Wakefield and Co. exhibit under working conditions various types of the Wakefield mechanical lubricator and lubricants, for many different types of plant can be seen together with the chemical apparatus used in testing and research work on oils, as well as plant for waste elimination and general apparatus as applied to the Wakefield system of lubrication.

Two stands which never fail to attract are those of the Marconi Co., on which are seen at work various types of transmitters and receivers. A wireless telephone set connects the two stands, which are at opposite ends of the buildings.

Air Work in the Caspian

In a dispatch from Rear-Admiral M. Culme-Seymour, C.B., published in the *London Gazette* of October 9, dealing with operations in the Caspian Sea, it is stated that in dealing with the Bolshevist force the naval units were assisted by an air unit under Lieut.-Col. Bowhill, D.S.O., which made its first raid on April 21. In the attack on Alexandrovsk, on May 21, good work was done by the aircraft, five bombing raids being carried out in one day by a single seaplane working from a seaplane-carrier.

Admiral Culme-Seymour draws attention to the good work of the following officers of the R.A.F. who between them carried out five raids in one seaplane on the same day with excellent results, and attempted a sixth, and also the services of Lieut. Chilton, R.N.R., commanding *A. Yousanoff*. Pilots: Sec. Lieut. Howard Grant Thompson, Capt. John Archer Sadler, and Sec. Lieut. Robert George Kear Morrison. Observers: Lieut. Frank Russell Bicknell, Sec. Lieut. Frank Leslie Kingham, and Sec. Lieut. Henry Godwin Pratt.

AIRISMS FROM THE FOUR WINDS

Levelling down in regard to the Air Service seems to be the slogan this side the herring-pond, while across yonder it is a case of levelling up. Last week the U.S. Senate Military Committee recommended an additional appropriation of 15 million dollars for Army aircraft construction in connection with the establishment of air routes to Panama, Alaska and probably Asia.

- - -

And further, when one sees the Chinese Government plumping for progress in aerial work by placing a two million sterling aeroplane order with Messrs. Vickers, Ltd., why it makes one wonder whether this may be the first move in the "Yellow Peril" breakaway so long forecast.

- - -

Amongst those Hun criminals who will be claimed for trial by the Supreme Council on behalf of Britain, for committing acts of violation of recognised rules of warfare, it is now authoritatively stated, will be a number of pilots in charge of the Zeppelins and aeroplanes which bombed London. So mote it be.

- - -

Looks as if at last action were being taken in connection with the aircraft activities in neutral countries of Germany. It is stated that on Monday the Supreme Council in Paris directed Marshal Foch to warn Germany that the sales of aeronautical material in Sweden are considered null and void by the Allies, because they are contrary to the stipulations of the Treaty of Peace.

- - -

Nobody ever took seriously the Hun claim that the first act of war in 1914 was perpetrated by France in the sending of war planes over German territory for spying and aggressive purposes. As this *casus belli* has been so categorically set out from the first, it is surprising that no explanation and an equally categorical denial has been forthcoming long since. From a Paris report to hand some light is now let in upon this "made in Germany" concoction. The exact War lie circulated was that on the eve of the War a French aeroplane had bombed Nuremberg. On Wednesday of last week, at a Court-Martial in Paris, an explanation of this plausible excuse for hostilities was forthcoming; It was in the case of M. Unné, an engineer of a motor company, who last year was sentenced *in contumaciam* to five years' imprisonment and a fine of 27,210 fr., and the loss of civic rights, for having, it was alleged, sought to bribe receiving officers of the Aviation Corps. M. Unné was in America at the time, and knew nothing about the charges against him. He explained at the Court-Martial that towards the end of July, 1914, a Salmson aeroplane, piloted by M. Laporte, set out from Paris to attempt a flight to Constantinople, and win the Municipal Council Prize of 10,000 fr., and the Pommery Cup Prize of 60,000 fr. While he was flying over Bavaria, his motor broke down, and M. Unné was sent from Paris to mend it. The German authorities, however, threw obstacles in the way of a fresh start, and it was not till August 1 that they were granted permission to continue the flight, on condition that M. Laporte should follow a fixed itinerary leading him over Nuremberg. As the aeroplane passed above the latter town it was fired at. Immediately afterwards the fictitious *casus belli* was wirelessed by the Germans throughout the world. It is somewhat unfortunate that M. Laporte is no longer alive to confirm this story, having lost his life in a fall outside Paris in January, 1915. It is well that the Court-Martial acquitted M. Unné.

- - -

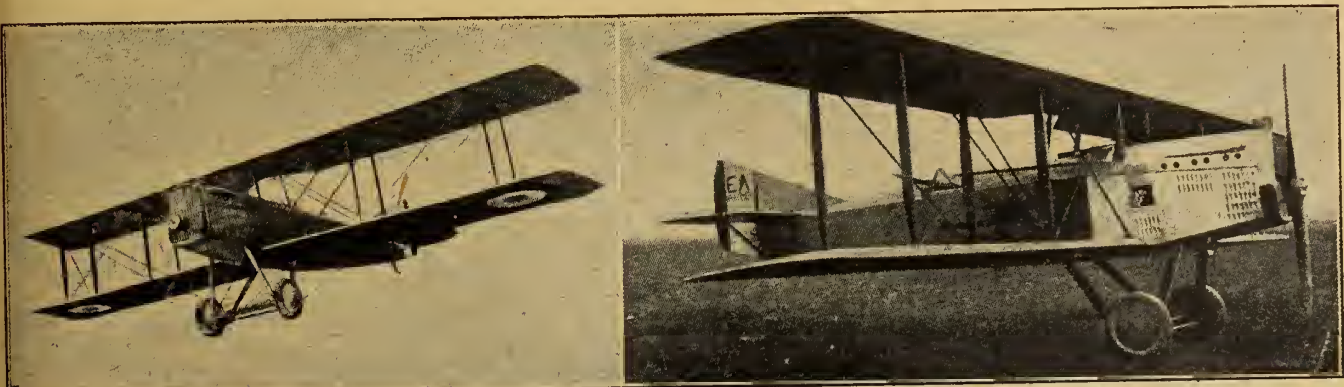
Having regard to the development of flying, it seems an absurdity that attempts should still be made to establish possibilities for the "Aviette," or humanly-propelled "cycleplane." What earthly good can be achieved by demonstrating that some particular man can accomplish a glorified jump when riding a push-bike with a plane or two added to its structure, passes comprehension. But in Paris there seems still to be a fascination to persevere. It will be a good job when the Peugeot prize of 10,000 fr. offered for "flying" 10 metres in two directions in a machine worked by human propulsion, is won. In all probability, to "lift" this sum of money is the real object of the continued efforts to "lift" a push-bike into a 10-metre jump. Therefore we are not overmuch disgruntled at seeing that the Paris authorities are upon a side-issue trying to stop this sort of fooling, they having served Poulain, the French cyclist, who has been unsuccessfully trying to "lift" this 10,000 fr. prize, with a summons for riding in a city garden to the public danger. "Avietting" is *not* aviation.

- - -

Autres temps, autres mœurs. Curious how consistently the uncanny of today becomes the commonplace of tomorrow. Fortune-telling is no new fable. It has existed for all time. It is only in its application and its utilisation of modern science that it differs as the ages pass. Only last week one Ellen Lucy Bloodwort was arraigned before the South-Western Police Magistrate upon a charge of fortune-telling, the case being dismissed by the magistrate, as he was satisfied that "the accused believed she had the power of foretelling the future." That is the whole point. After all, many a person has in past dark days been burnt at the stake for less foretelling of events than the flying for a thousand or more miles at a stretch. And so in this case, presumably, Mr. Bankes' full judgment given below is worth noting under the circumstances, although we think had he brought airships into a 20 years' category instead of the 100 years' period, we think he would have been much nearer the mark, as may be judged by the following :—

"Mrs. Bloodwort is charged under the Vagrant Act of 1824 as a rogue and vagabond, an Act passed 100 years ago, when anyone who talked about railways, telephones, airships, or votes for women would have been looked upon as a lunatic. It is not for me to express any opinion upon spiritualism, or whether it is a delusion or not. All I have to decide is whether the case comes within the section.

"A decision was given in 1918 in the High Court Davis



Two views of the French S.E.A. two-seater biplane, which has a speed of 129 m.p.h. at 6,500 ft., and climbs to 17,000 ft. in 21 mins. It is fitted with a 390 h.p. Lorraine-Dietrich engine, and has a span of 39 ft. 5 ins., an area of 404 sq. ft., and a loading of 8·4 lbs./sq. ft.

case which I must follow. In that case Mr. Justice Avory was of opinion that fortune-telling was of itself an offence. I must say I agree with him; but I must follow the decision of the Court, Justices Darling and Sankey, who held that evidence of belief on the part of the medium must be received and acted upon if believed. I am absolutely satisfied that she believes she has these powers. Whether I believe it or not does not matter; so I shall dismiss the summons."

- - -

A propos fortune tellers, according to official statistics quoted by the *Petit Parisien* there are in Paris 35,000 clairvoyants, fortune-tellers, and seers of various kinds, who, on the whole, do a very good business. These days, almost numerous enough to start a fortune-tellers' union.

- - -

Whilst our Post Office authorities are boggling over giving aerial post a reasonable trial in actual practice, an aeroplane object lesson is recorded by Mr. Percy G. Donald, of Upper Thames Street, of not only the postal service being bettered, but of our wonderful telegraph service being beaten to a frazzle. Here is what Mr. Donald writes :—

"I have just returned from the Balkans to find out the exact details of an incident connected with aeroplane service in comparison with the telegraph.

"On leaving London I found I had left the keys of my baggage behind. I telephoned through to London for an endeavour to be made to send them on by aeroplane, as I was leaving Paris the same night for Rumania.

"The keys duly arrived and were delivered to me within four hours from the time at which they left London, together with a letter stating that my firm had 'telegraphed me that the keys had been despatched.'

"The telegram announcing that the keys had left arrived in Paris late on the following day!

"Surely this question of telegraphic delays is one which might suitably be dealt with at once by the Postmaster-General in connection with the aeroplane service.

"By the use, we will say, of the telegraphic messenger service with district offices in London and in Paris, it would be possible to send letters to Paris at a nominal charge, ensure that they would get through within six hours of the despatch from London, and thereby in turn considerably relieve the telegraphic department, which apparently is incapable of carrying out the service which its acceptance of telegraphic payment involves."

- - -

A pretty sequel to the Transatlantic voyage of R 34 was the reception by the Queen at Buckingham Palace last week of Miss Lizzie Chestnut, a Glasgow worker upon the airship at Inchinnan. Miss Chestnut, who was presented to Her Majesty by Lady Sybil Grant, handed to the Queen, on behalf of her fellow-workers, a replica of the figure-head of R 34 in the form of an aluminium shield, bearing the Lion of Scotland and the airship's motto, mounted on mahogany.

- - -

Another pleasant incident and well judged recognition likely to help in the estimate of the duties of life, also stands to be recorded last week. In Ravenscourt Park, Hammersmith, the Mayor, Alderman H. Foreman, M.P., presented 20 silver medals to boy scout buglers who sounded the "All Clear" after air raids in the borough.

- - -

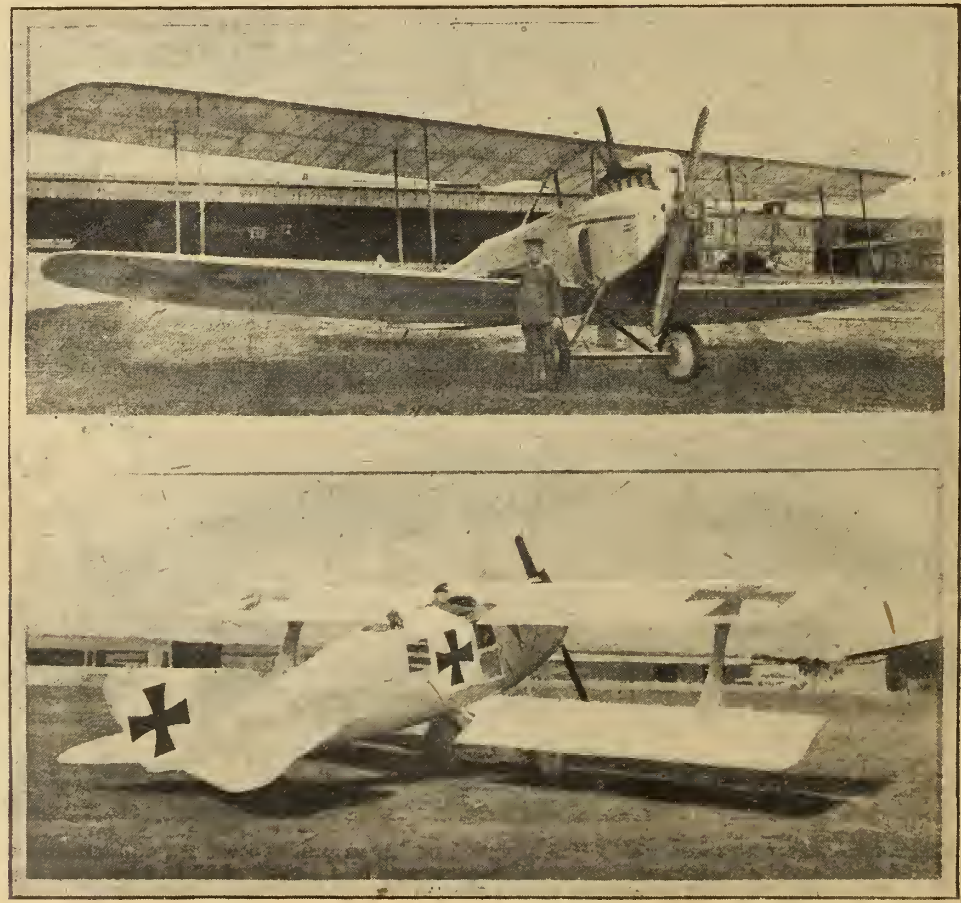
It is with regret we hear that it has been necessary for Lady Sybil Grant's medical advisers to order her complete rest, even to receiving no correspondence. Lady Sybil's strenuous airship work at the Admiralty during the War, followed by her great efforts to ensure success to the Airship Exhibition at Princes' Galleries, is no doubt responsible for this result, which we hope may be but of a very temporary character.

- - -

General Ludendorff, in "My War Memories, 1914-18," just published by Hutchinsons, lets in some light upon Hun developments of attacks by aircraft, which fortunately never developed, upon Paris and London. In this book it emerges that in the summer of 1918 the German chemists had placed in the hands of the Headquarters Staff bombs of deadlier potence than have ever been devised by the destructive wits of man. The only reason why these devices of the devil were not employed against the French and English capitals was that their use would not have saved the already beaten German army, and would have meant attacks on German towns by the airmen of the Allies.

General Ludendorff, surveying the prospect of the fearful fire-bombs in August, 1918, writes :—

"Our position was now so serious that G.H.Q. could not hope that air raids on London and Paris would force the enemy to make peace. Permission was, therefore, refused for the use of a particularly effective incendiary bomb, expressly



Two types of Hun fighters. At the top the D.F.W.C.V. 200 h.p. Benz, and below the Roland (L.F.G.) C.11 160 h.p. Mercédès, both two-seaters

designed for attacks on the two capitals, sufficient supplies of which were ready in August. The large amount of damage that they were expected to do would no longer have affected the course of the War. Destruction for its own sake had never been permitted. Count Hertling, too, had requested G.H.Q. not to use these new incendiary bombs on account of the reprisals on our own towns that would follow."

* * *

Ludendorff it would seem, however, was too farseeing a man to resort in the eleventh hour of Germany's approaching doom to these terrible burners of cities. He endeavoured, however, to "carry on as usual" with the raids with which Germany had gradually familiarised the world. In the late summer and autumn of 1918 it was thought that the decreasing raids on London were due to German policy. The true reason, now revealed by General Ludendorff, was that the climatic conditions were against German success in these aerial attacks.

"I retained the policy of ordinary raids on London and Paris," he said, "in order to keep enemy anti-aircraft material far from the front, and to prevent the troops noticing the reduction in our strength, but I no longer pressed matters. Only a few more small raids were made on Paris, while London could not at this time be reached owing to adverse weather conditions."

Possibly the "welcome" which the raiders of London received at the hands of General Salmond and his organisation *may* have had something to do with this magnanimous state of mind brought about in the commander and his co-conspirators at German G.H.Q.

* * *

Mrs. George Renwick's interesting experiences in a Zeppelin Pullman car during a journey from Berlin to Friedrichshafen, recorded in the *Chronicle* the other day, give a very vivid impression of an aerial voyage under modern luxury conditions. One item included in her narrative we are just wondering about. She gives the luncheon menu served on "a small red shelf hooked across the front of my armchair." It is as follows:—

"I DONT WANNA BE AROUND HERE WHEN THE DOG THAT LIVES IN THAT HOUSE COMES OUT!"

The Pop and the Dirigible Hangar—Fontaine Fox in the N. Y. Globe

Strasbourg goose-liver	15s.
Box of French sardines	12s.
Liver pasty	8s.
Plate of mixed cold meat	12s.
Westphalia ham	14s.
Salad	2s. 6d.
Small roll sandwich	4s.

* * *

What has set us wondering is whether Mrs. Renwick really managed to get through the little list of things provided for her £3 6s. 6d., even if washed down with a 38s. bottle of champagne, as it may suggest aerial voyages as an antidote to those blase *nouveaux riche* folk who have lost their appetites.

◆ ◆

AIR CARNIVAL AT BRIGHTON

On Saturday, 11th inst., the Avro Co. organised an air carnival at Brighton on a scale not previously witnessed, at least in the south of England. At 10 a.m. eight Avros started from Hounslow in close formation under the command of Maj. McMinnies and Maj. A. G. Taylor. The mist was thick in the morning, but they flew comparatively low across country, and at Brighton joined forces with the Avros already there under the charge of Capt. Kennard. The other pilots who took part in the display were Capts. Davis, and Le Blanc Smith and Messrs. Park, Sadler, Sullock, Broad, Pitt, Sparks and Weeks.

The Ladies' Mile at Patcham had not proved a very convenient aerodrome, and a much better one had been secured at West Blatchington Farm, easily reached by road or rail from both Brighton and Hove. Admission to the ground was free, and a huge crowd had collected to witness the display.

The carnival commenced at noon, and the show put up by the pilots was perfectly magnificent. The air was thick with aeroplanes in every conceivable position—straight (occasionally), upside down, on their sides, on their tails, on their noses, spinning, diving, climbing, looping and turning. The roar of the engines drowned the cheers of the crowd, as they gazed wide-eyed at the bewildering sight.

A special thrill was provided by three descents from aeroplanes made with Guardian Angel parachutes—one by Miss Nellie Gibson and two by Professor Newall, the second being a double one.

Next day the whole performance was repeated. Several showers of rain came on, but they did not stop the aeroplanes from flying or damp the enthusiasm of the crowd. Professor Newall showed great skill in manipulating his Guardian Angel parachute through a 20-mile wind. Many indulged in ordinary flights and enjoyed views of the aerobatics from the same level as the manœuvring machines. On one occasion a man of 85 and his granddaughter, a grown woman, made a flight together in the same machine. It was a splendid wind-up to the season, and the enthusiasm of the crowd and the number of applications for passenger flights showed that the work of the Avro Co. at various places has, without doubt, opened the eyes of the public to the advantages and possibilities of aviation.

WINDERMERE-DOUGLAS FLYING

The Avro seaplane season has now finished on Lake Windermere. Last Saturday Capt. Pixton flew a machine over to Douglas to escort Mr. Moxon back on his land machine. He made two journeys from Windermere to Douglas, and also alighted at Blackpool to pick up Mr. Moxon and take him back to fetch the second machine. The weather was perfect except for a thick mist, which made it difficult to find the way.

On Wednesday Capt. Pixton called at Blackpool by car and brought Mr. Moxon back to fly one of the seaplanes to Blackpool, where it was to be fitted with a land chassis. On arrival at Blackpool, it was found to be impossible to fit the land chassis without a lot of alterations, so Moxon flew the machine back to Windermere the next day, having to take off in a very rough sea.

All's well that ends well.

◆ ◆

Commercial Aviation in South America

Among the interesting items in Brazil's budget for 1920 is the setting aside of the necessary funds to establish an aerial postal service.

It is announced from Buenos Aires that a Franco-Argentine aerial transport company has been formed there.

Jansen Wins the Deutsch Cup

On Tuesday Jansen on a new Nieuport monoplane succeeded in winning the Deutsch Cup, covering the 190·4 kiloms. of the Meaux, Melun, Senlis course in 56 min. 55 secs., an average speed of 200·655 kiloms. an hour. Sadi Lecointe started on an attempt, but owing to trouble with his motor, was obliged to land at Jurisy.

A Handley Page in the U.S.

On October 10 the Handley Page machine, piloted by Maj. Brackley, and including Admiral Kerr among its 12 passengers, flew from Parrsboro (Nova Scotia) to Greenport, Long Island, and on the following day it went on to Mineola.

THE ALTITUDE LABORATORY FOR THE TESTING OF AIRCRAFT ENGINES

BY H. C. DICKINSON AND H. G. BOUTELL

[During the War aircraft design has made such enormous progress that we can now be said to have reached a stage when there is little hope of any very great improvement in the performance of aeroplanes. Progress there will be, undoubtedly, but it will be chiefly in the matter of reliability, and only to a relatively small extent can the performance be expected to improve. There is one field, however, which we had really barely commenced to touch when Peace was signed, and which would appear to offer very great possibilities, especially as regards very long flights. We are referring to problems connected with flying at great altitudes. It is, of course, a well-known fact that as the altitude increases the power of an aero engine drops off, unless means are provided for insuring that the engine gets a full charge of air into its cylinders so as to receive on each induction stroke the same weight of air as it is getting at the ground level. It will be seen that if the engine power can be maintained, and the screw efficiency also, a machine will be able to travel very much faster at a great height, owing to the lesser density—and, consequently, smaller resistance—of the air. It is already fairly well known that in America a considerable amount of research work has been done relating to this subject, and that the Bureau of Standards (which corresponds to our National Physical Laboratory at Teddington) has had constructed an "Altitude Laboratory" in which aero engines can be tested under conditions that are practically identical with those obtaining in the rarefied air at great altitudes. As we consider the subject is one that will play a very important part in the development of long-distance flying, we have thought that a description of the American Altitude Laboratory and the results of some of the tests carried out there would be of more than passing interest to readers of FLIGHT. In the present and subsequent issues we, therefore, publish some of the reports dealing with this Laboratory and with the tests carried out, advance copies of which have very courteously been placed at our disposal by the Director of the U.S.A. Bureau of Standards.—ED.]

Introduction

A brief description of the Altitude Laboratory constructed at the Bureau of Standards for the National Advisory Committee for Aeronautics was published in the third annual report of the Committee. This description was prepared shortly after the equipment had been completed, and before a sufficient number of observations had been made to much more than demonstrate the practicability of operating aeroplane engines in a test-chamber at any desired air pressure and analysing their performance. Since the preparation of that report the laboratory has been in continuous service for more than a year, except for the occasional delays incident to the usual minor revisions of apparatus and perfecting of means and methods of observation to be expected in any new research work. It may be stated, without reservation, that the laboratory has fully justified the most sanguine expectations as to its practicability, and has already yielded results of much importance.

Factors in Engine Performance Studied in the Altitude Laboratory

The principal factors in engine performance—aside from general reliability and useful life, which can be determined only from statistics of performance of a large number of engines—are as follows:—

(1) Horse-power and brake mean effective pressure at full throttle for:—(*a*) All air pressures down to the lowest to be encountered in flight. (*b*) All air temperatures to be expected. (*c*) All operating speeds. (*d*) Different grades of fuel. (*e*) Various petrol-air proportions. (*f*) Various spark settings. (*g*) Various jacket water temperatures. (*h*) Various oil temperatures. (*i*) Various back pressures on the exhaust.

(2) Horse-power and brake mean effective pressure at part throttle, under the same conditions as (1).

(3) Mechanical losses:—(*a*) Total mechanical losses at operating speeds under any condition mentioned in (1) and (2) with full and part throttle. (*b*) Elements of mechanical loss, including friction of bearings, friction of piston on cylinder walls, pumping losses, and variation of these losses with oil temperature or viscosity.

(4) Heat distribution, including the following:—(*a*) Total heat of fuel. (*b*) Heat equivalent of brake horse-power. (*c*) Heat loss in jacket. (*d*) Heat loss in exhaust. (*e*) Heat loss in direct radiation. (*f*) Heat gain in combustion of lubricating oil. (*g*) Heat lost through mechanical friction. The dependence of these quantities on:—1, air density and temperature; 2, engine speed; 3, mixture ratio (fuel to air); 4, atomisation of fuel; 5, composition of fuel; 6, throttle opening.

(5) Fuel consumption, depending upon:—(*a*) Air density. (*b*) Air temperature. (*c*) Engine speed. (*d*) Throttle opening or power output. (*e*) Carburettor adjustments for maximum power, or for maximum economy. (*f*) Miscellaneous operating conditions.

(6) Exhaust gas analysis:—(*a*) Quality of exhaust for the different operating conditions listed in (5).

(7) Pressure distribution in power stroke:—(*a*) As affected by engine operating conditions at various air densities and with fuels of different compositions and with various timings of the ignition.

(8) Oil consumption.

(9) Oil deterioration.

(10) Carburettor performance:—(*a*) Compensation for variations in atmospheric pressure. (*b*) Compensation for throttle changes. (*c*) Compensation for varying air temperatures. (*d*) Idling and acceleration characteristics.

(11) Supercharging devices as applied to engines.

(12) Low air pressures and temperatures as affecting general performance of engines and miscellaneous accessories.

The Altitude Laboratory has been designed and equipped to supply data concerning most of the foregoing factors.

Provisions for Controlling Operating Conditions

The conditions of air pressure and temperature, as well as humidity if necessary, can be varied and controlled at will to simulate conditions at altitudes as high as 30,000 ft.; the pressure being independently controlled at the intake and exhaust of the engine, as well as in the test-chamber.

Temperature of the jacket-water is controlled either automatically or by hand; and oil temperatures can be regulated by means of special arrangements adapted to the particular engine under test.

Engine speed and load are controlled by means of an electric dynamometer, combined with a water brake to care for excess load. Mixture ratio, spark setting, etc., are adjusted in the usual manner from outside the chamber.

Provisions for Measurement

Torque and speed are measured by direct methods, while fuel consumption is determined by direct weighing, with a rate of flow meter for convenience. Separate weighing tanks are provided in order to compare different fuels.

Rates of water flow are measured at the following points by means of calibrated venturi meters:—(*a*) In the water-jacket line, measuring water circulation through the cylinder-jackets. (*b*) In the line supplying cooling water to the exhaust, permitting measurement of the heat in the exhaust. (*c*) In the line supplying cooling water to the oil cooler, permitting measurement of the heat in the oil.

Rate of air flow to the carburettor is measured by means of a large venturi tube, which has been compared with a Thomas meter, the latter also having been used for metering the intake air. Where the carburettor design permits of it, measurements of air flow can be made by previous calibration of the carburettor choke in the carburettor test plant at different air densities. This is a newly developed method which offers promise of excellent results.

The rate of oil flow is to be measured in special cases by oil venturis, but these have not yet been completed.

Pressure measurements are made at numerous points, depending upon the special problem in hand. For this purpose, there are provided an adequate number of copper tube connections running from the chamber to a gauge board on the outside, which is fitted with glass "U" tubes for use with mercury or water, as may be required. This gauge board is described in detail in a subsequent paragraph.

Measurements of maximum compression pressure and maximum explosive pressure are made by two different types of pressure-indicators, which give very satisfactory check results. No satisfactory measurements of cylinder pressures, other than maximum pressures have yet been made. Much time has been devoted to the perfecting of a satisfactory pressure-indicator. This device has now reached the stage of trial observations, and promises good results. None of the several pressure-indicators on the market can be readily adapted to use on an engine in a closed test-chamber, where the indicator cannot be reached by the operator. The design under construction is adapted to this condition.

Temperature measurements are all made by means of calibrated thermo-electric couples, which in the hands of a skilful observer can be relied upon to an accuracy of 0·1° F., or much better than this if occasion requires.

Exhaust gas samples can be withdrawn from any one of the cylinders of a twelve-cylinder engine by means of copper tubes connected to the independent exhaust manifold of each cylinder. Comparatively few exhaust gas analyses have been made up to the present time. Apparatus has been perfected and is under construction which will permit of continuous indication of all the important constituents of the exhaust gases, but the apparatus is not yet complete.

General Description of the Altitude Laboratory

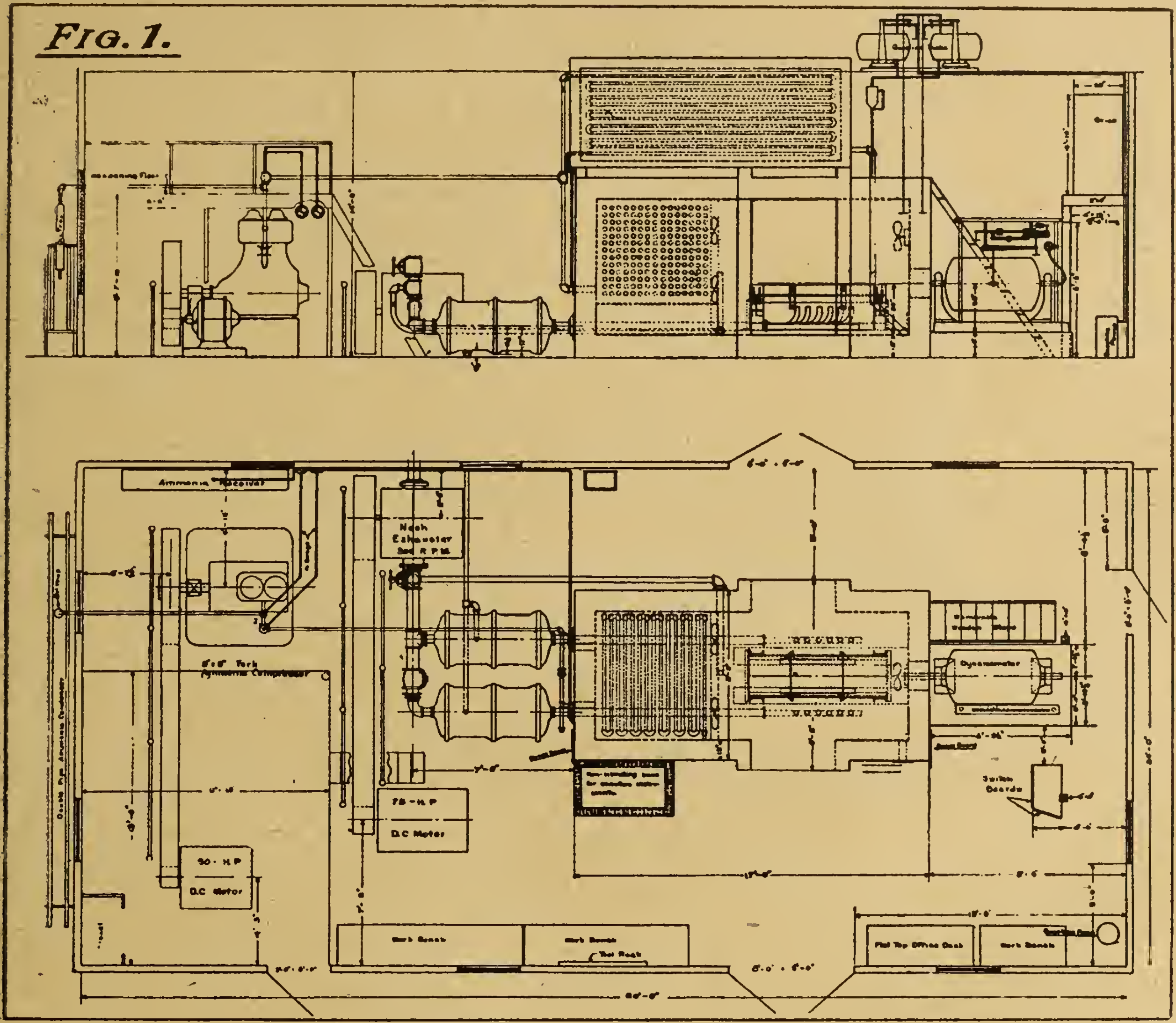
Briefly, the laboratory consists of a concrete chamber, within which the engine is mounted, and from which the air may be exhausted to any pressure as low as one-third of an atmosphere, by means of a Nash centrifugal exhauster. At the same time the air is cooled to a temperature corresponding as nearly as possible to that encountered at the altitude of the test, by passing it over refrigerating coils. In the interior of the chamber electrically-driven fans are mounted which circulate the air over the coils and about the engine. As before mentioned, the power of the engine is absorbed and measured by an electric dynamometer and a water-brake mounted outside the chamber and connected to the engine through a flexible coupling. The general arrangement of the laboratory is shown in Fig. 1.

It will thus be seen that the conditions encountered in actual flight can be closely duplicated, while at the same time all the necessary data can be taken and easily recorded under the most favourable conditions for observation. A detailed description of the laboratory follows:—

Building

The altitude laboratory is housed at present in a temporary building of frame and stucco, having a rectangular floor plan, measuring about 24 by 50 ft. In the near future the present equipment, together with a duplicate set of apparatus, will be set up in a permanent brick and concrete structure, which is being built especially for this purpose. There are no features of the present building to call for special comment.

FIG. 1.



The Altitude Chamber

Early in the preliminary work it was decided that in order to obtain satisfactory results the engine under test would have to be surrounded by the conditions obtained during an actual flight. This necessitated the design of a test-chamber of sufficient size to accommodate the largest engine with the necessary auxiliary apparatus, such as cooling coils and fans, and with sufficient space to work around the engine for adjustments and repair. To meet these requirements a concrete chamber, 6 ft. 2 ins. wide by 15 ft. long by 6 ft. 6 ins. high, inside measurements, was constructed. The walls of the chamber are 1 ft. thick, heavily reinforced with ¾-in. steel bars to withstand the pressure of the atmosphere outside the chamber. There are two doors opening on opposite sides of the chamber, 4 ft. by 6 ft. 6 ins. in size. The doors swing on hinges and close against heavy rubber gaskets. They are built up of 2 by 7 in. oak beams, 4½ ft. long and spaced 7 ins. between centres, the outside being covered with ⅞-in. soft wood loosely held with headless nails, and covered over with air-proof roofing paper. This construction was adopted to safeguard against possible explosions inside the chamber, in which case the light covering of the doors might be blown off without injury to the concrete walls. Each door contains three small glass windows through which a view of the engine may be obtained during a test. The interior of the chamber is lined with cork for insulation, and to guard against excessive air leaks, the outside is covered with a very heavy coating of asphalt paint.

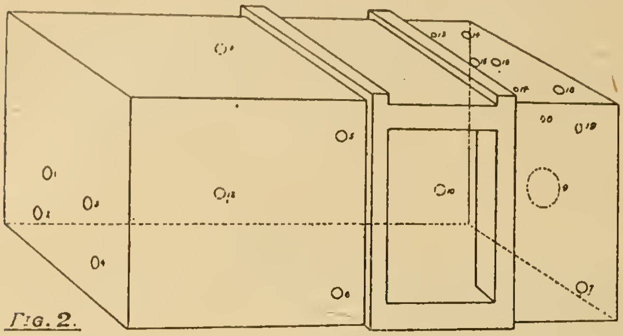


FIG. 2.

The chamber may be considered as divided into two parts; the first containing the engine, and the second the cooling coils. The engine is mounted on a special stand at the right end of the chamber as shown in Figs. 1 and 9. In order to control the engine during a test, cables are led from the spark and throttle levers, etc., through holes in the walls. The walls are also pierced for the necessary pipes and wiring, each hole being closed by a flange and gasket, through which the connections are made. A perspective view of the chamber with these openings numbered is given in Fig. 2, while a plan view is given in Fig. 3. The uses of these openings vary somewhat with the particular type of engine being tested, but the following may be taken as typical:—

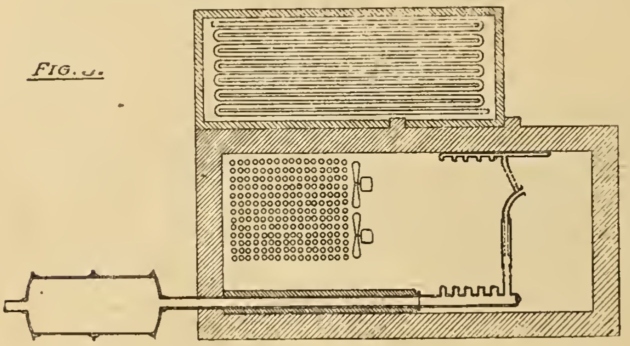


FIG. 3.

(1) Air inlet to chamber. Controlled by a valve.
(2) Exhaust outlet from engine. (One side of "V" motor.)
(3) Ammonia to cooling coils in chamber.
(4) Exhaust outlet from engine. (One side of "V" motor.)
(5) Thermocouple leads.
(6) Oil inlet, connecting oil-pressure tank outside chamber to engine sump.
(7) Bleeder valve to admit air to chamber.
(8) Gasoline inlet to carburettor.
(9) Shaft connecting engine to dynamometer.
(10) Oil cooling water pipes.
(11) Electric light and ignition wires.
(12) Air pipe connecting chamber to exhauster.
(13) Exhaust gas sampling tubes.
(14) Exhaust cooling water inlet.
(15) Jacket water inlet.
(16) Jacket water outlet.
(17) Pressure tubes to manometer board.
(18) Carburettor air inlet.
(19) Pressure tubes to manometer board and engine controls.

The Engine Support

The engine support was designed for the purpose of duplicating as nearly as possible the flexibility and the inertia of the typical *fuselage* mounting. The design developed makes possible an accurate adjustment of stiffness as regards transverse and vertical vibration and rotation about each of the three principal axes of the engine. Since no data were at hand as to the corresponding characteristics of any *fuselage* mountings, the support was constructed on the bases of estimates of these constants, and appears to possess nearly the desired characteristics for the engines mounted on it up to the present time.

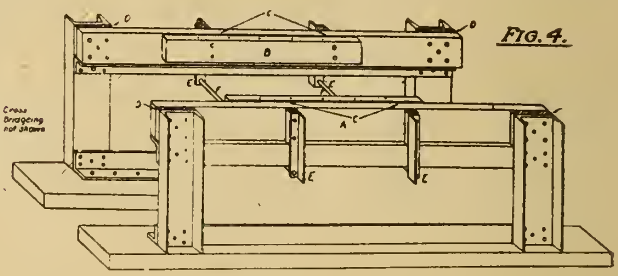


FIG. 4.

The design of this support is illustrated in Fig. 4. Two oak beams, A, in this case 2 by 6 ins. by 6 ft. 3 ins. long, are supported at the ends to form the basis of the mounting. The engine is mounted directly on two supplementary beams, B, of 2 by 4 in. section and of the length required for the particular engine under test. These supplementary beams are free from the main beams except at two points where they are bolted together through a thin separating block, C. Two yokes, E, are provided to prevent torsion of the individual beams, but have no other effect, as they are free from contact with any other part of the structure.

Selection of the dimensions of the main beams and adjustment of the spacing between the points of support of the secondary beams permits of adjustment of vertical and lateral stiffness and approximate adjustment of resistance about vertical and horizontal axes at right angles to the axis of the crankshaft. Stiffness as regards rotation about the latter axis can be adjusted by a third beam of proper dimensions rigidly connected at the ends and to the yoke rods, F, although the addition of this member has not been found necessary.

(*To be continued.*)

◆ ◆ ◆ ◆

More French Pilots for Russia

A MESSAGE sent out by wireless from Moscow, last week end, stated that a party of French pilots had arrived with their aeroplanes at Krasnoyarsk, in order to assist Admiral Koltchak's troops.

A Lady Airship Pilot

FROM Paris comes word that Mdlle. Gaby Morlay, the well-known actress, has passed the necessary tests to qualify her for an airship pilot's certificate. It is claimed that she is the first lady airship pilot.

Germany Wants an Aerodrome at The Hague

ACCORDING to the Rotterdam correspondent of *The Times*, many applications have been received from Germany to arrange the aviation ground which is to be established at The Hague. British firms, he points out, ought not to neglect the opportunity to compete.

Aerial Services in East Germany

WITH reference to the restoration of express train traffic in East Germany, it appears from a message sent out from Berlin, that consideration is being given in Berlin to the possibility of instituting aerial routes over the territory in question in order to secure the more rapid transport of passengers and mail services.

An Italian Aeroplane Visits Berlin

FOR the first time since the beginning of the War a foreign aeroplane has landed in Berlin. The machine in question was of Italian make, and carried two Italian couriers. It had flown from Rome *via* Venice, Vienna, and Warsaw.

The "Bodensee's" Trip to Sweden

THE Hamburg-America Line's aerial liner "Bodensee" has completed a trip from Berlin to Stockholm and back in 17 hours.

The "Bodensee," which carried 16 passengers from Berlin, got into wireless telephone communication with the military wireless station near Stockholm from a distance of about 80 miles.

THE ROYAL AIR FORCE

London Gazette, October 2

Hampshire Aircraft Parks

Lieut. C. L. Cleburne resigns his commn.; March 9.

London Gazette, Oct. 3

Permanent Commissions

The undermentioned are granted permanent commns. in the ranks stated, with effect from Aug. 1:—Wing-Com. W. D. Beatty, O.B.E.; Squad-Ldr. B. H. N. H. Hamilton, D.S.O.; Flight-Lieut. R. D. Oxland. The initials of Flight-Lieut. P. E. Maitland are as now described and not "P. E. N.," as stated in the *Gazette* of Sept. 26.

The following temporary appointment is made:—

Staff Officer, 2nd Class (P.).—Squad-Ldr. E. M. Murray, D.S.O., M.C.; (Sept. 25).

Flying Branch

Sec. Lieut. C. C. Loretto is granted the hon. rank of Lieut; (Sept. 19, 1918).

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. J. E. H. Chadwick (Sec. Lieut., Manch. R.); (Feb. 21). Lieut. J. B. P. Phillips (Lieut., R. West Surr. R.); (Sept. 8). Lieut. R. C. Hartland-Rowe (Lieut., Leinster R.); (Sept. 12). Sec. Lieut. (Hon. Lieut.) C. E. C. Penny (Lieut., R. Fus.); (Sept. 16). Sec. Lieut. (Hon. Maj.) F. J. S. Murray (Maj., Brit. Col. R.); (Sept. 21).

(Then follow the names of 183 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank:—J. F. Hughes; (Aug. 22). C. B. H. Lcfroy (contracted on active serv.); (Sept. 27). The following Lieuts. resign their commns.:—C. N. S. Ackers (Lieut., K.R.R.C.), P. W. Rutherford, M.C. (Lieut., W. Yorks R.); (Oct. 4). Sec. Lieut. J. A. Peterson relinquishes his commn. on account of ill-health and is permitted to retain his rank; (Oct. 4). Sec. Lieut. D. C. Fraser is removed the service for absence without leave; (June 4). The initials of Sec. Lieut. G. C. Robinson are as now described and not "J. C.," as stated in the *Gazette* of June 28, 1918. The initials of Sec. Lieut. R. R. H. Taylor are as now described, and not "R. H.," as stated in the *Gazette* of July 1. The surname of Sec. Lieut. H. T. Barrett is as now described, and not "Barnett," as stated in the *Gazette* of June 24. The surname of Lieut. E. C. Burtin is as now described, and not "Burton," as stated in the *Gazette* of June 24. Surname of Lieut. A. Thomson is as now described, and not "Thompson," as stated in *Gazette* July 15. Notification in *Gazette*, June 18, 1918, concerning Cadet W. F. Granger is cancelled. Notification in *Gazette*, April 18, concerning Lieut. J. J. Lanctot is cancelled. Notification in *Gazette*, May 30, concerning Capt. E. R. H. Pollak, M.C., is cancelled. Notification in *Gazette*, July 25, concerning Sec. Lieut. (Hon. Lieut.) G. F. A. Lewin, M.C., is cancelled. Notification in *Gazette*, July 29, concerning Sec. Lieut. H. F. Skelton is cancelled. Notification in *Gazette*, Aug. 15, concerning Lieut. H. C. Leavers is cancelled.

Administrative Branch

Following Sec. Lieuts. are graded for purposes of pay and allowances as Capts. while employed as Capts.:—(Hon. Lieut.) W. H. Hills, (Hon. Capt.) H. Milman, O.B.E.; (to July 7). (Hon. Lieut.) S. U. Dent; (to July 28) (May 1). Sec. Lieut. G. R. Biggs is graded for purposes of pay and allowances as Capt. whilst specially employed, from (A.); (April 1). Sec. Lieut. T. Bathurst to be actg. Lieut. whilst employed as Lieut (Oct. 10, 1918, to April 30).

Following Sec. Lieuts. are graded for purposes of pay and allowances as Lieuts. whilst employed as Lieuts.:—H. Auliff, J. E. Elliott, R. W. Stoner, T. H. Youens; (May 1). C. P. Andrews (to May 13); E. H. Hebden-Phillips (to June 18); L. P. Kirk (to June 26). Sec. Lieut. A. H. Jones relinquishes the grading for pay and allowances as Capt. on ceasing to be employed as Capt.; (July 11). Sec. Lieuts. (A.) to be Sec. Lieuts.:—G. R. Biggs; (April 10). G. B. Demaiue, H. W. F. Rendall; (April 17). Pilot Officers (A.) to be Pilot Officers:—F. G. Clarkson; (Aug. 26). J. M. Dandy; (Sept. 1) Pilot Officer P. Gent. to be Pilot Officer, from (S.O.); (Aug. 27). Sec. Lieuts. (O.) to be Sec. Lieuts.:—C. H. White; (Jan. 23). J. R. Brown; (Oct. 12). (Hon. Lieut.) W. Miller, D.F.C.; (June 12), and to be Hon. Lieut. The following relinquish their commns. on ceasing to be employed:—Lieut. E. A. Aldhelm-White (Lieut., Scots Guards); (April 17). Lieut. C. F. C. Turner (Lieut. Middlesex R.); (Sept. 12).

(Then follow the names of 33 officers who are transfd. to the Unemployed List under various dates.)

Flying Officer N. E. S. Simon; (Oct. 1). Capt. G. Mitchell (Capt. and Qrmr., Rifle Bde.) relinquishes his commn. on account of ill-health contracted on active service; (Oct. 1). Lieut. R. L. G. May (Lieut., R. Fus.) resigns his commn. and is granted rank of Capt.; (Aug. 27) (substituted for notification in the *Gazette* of Aug. 26). Sec. Lieut. (Hon. Lieut.) R. Worton relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Lieut.; (Sept. 25). Surname of Sec. Lieut. (Hon. Lieut.) C. A. Luce is as now described, and not "Lace," as stated in the *Gazette* of June 24. Notification in the *Gazette* of May 9 concerning Sec. Lieut. C. W. Slarke is cancelled. The notification in the *Gazette* of Aug. 29 to stand. Notification in the *Gazette* of July 8 concerning Sec. Lieut. F. C. Hilbert is cancelled.

Technical Branch

Capt. E. P. Smyth to be actg. Maj. whilst employed as Maj., Grade (A.) from Aug. 1, 1918, to Feb. 27 (substituted for the notification in the *Gazette* of Aug. 1, wherein this officer's name was described as Capt. E. P. Smith).

Following Sec. Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (A):—W. E. Townsend; (May 1). A. E. Faver; (June 1).

Following Sec. Lieuts. are graded for purposes of pay and allowances as Lieuts. whilst employed as Lieuts., Grade (A):—C. R. Brown; from Feb. 3 to July 21. A. V. Baker, C. H. Bell, J. A. Joyce, E. Taylor; (May 1).

The following Sec. Lieuts. are graded for purposes of pay and allowances as Lieuts. whilst employed as Lieuts., Grade (B):—J. Dow, from March 4 to July 21; (Hon. Capt.) F. O. Sonderbye, (Hon. Lieut.) H. A. L. Way, W. Liniker (to July 31); (May 1). Sec. Lieuts. relinquish the grading for pay and allowances as Capts. on ceasing to be employed as Capts., Grade (A):—E. F. Thorpe; (June 30). N. B. Hemsley; (July 10). Sec. Lieut. (Hon. Lieut.) G. F. Antell relinquishes the grading for pay and allowances as Capt. on ceasing to be employed as Capt., Grade (B); (July 21). Pilot Officer D. M. Rees relinquishes the grading for pay and allowances as Flight-Lieut. on ceasing to be employed as Flight-Lieut., Grade (A); (Sept. 29). Pilot Officer J. Sutherland relinquishes the grading for pay and allowances as Flight-Lieut. on ceasing to be employed as Flight-Lieut., Grade (B); (Sept. 22). Sec. Lieuts. relinquish the grading for pay and allowances as Lieuts. on ceasing to be employed as Lieuts. Grade (A):—C. H. N. Nunn; (May 13). T. J. E. Thornton; (June 30). H. Williams; (July 13). Pilot Officer W. St. J Littlewood relinquishes the grading for pay and allowances as Flying Officer on ceasing to be employed as Flying Officer, Grade (A); (Sept. 17). Pilot Officers relinquish the grading for pay and allowances as Flying Officers on ceasing to be employed as Flying Officers, Grade (B):—(Hon. Flying Officer) H. Allsebrook; (Sept. 5). R. Fell; (Sept. 8). W. Walmsley; (Sept. 13). Pilot Officer (actg. Flying Officer) C. Littlejohn relinquishes the actg. rank of Flying Officer on ceasing to be employed as Flying Officer, Grade (B); (Sept. 18). Sec. Lieuts. (Ad.) to be Sec. Lieuts., Grade (A):—A. A. M. Durrant; (April 10). (Hon. Lieut.) G. F. A. Lewin, M.C.; (July 22), and to be Hon. Lieut. H. B. Brown; (July 17) (substituted for the notification in the *Gazette* of Sept. 5). Pilot Officers (Ad.) to be Pilot Officers, Grade (B):—E. J. Newman; (Sept. 18). (Hon. Flying Officer) J. J. Galvin; (Sept. 22), and to be Hon. Flying Officer. Pilot Officer R. M. Thomas to be Pilot Officer Grade (B) from (K.B.); (Sept. 18). Sec. Lieuts. (Ad.) to be Sec. Lieuts., (Grade (B):—H. J. G. Male; (Feb. 25). (Hon. Capt.) F. O. Sondcrbye; (May 1), and to be Hon. Capt. Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in rank as Sec. Lieuts, Grade (B):—R. A. Sibun; (April 1, 1918). T. M. O'Neill; (Aug. 17, 1918). Sec. Lieut. R. A. Sibun to be Sec. Lieut., Grade (A), from Grade (B); (June 23).

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. E. B. Flanagan; (Jan. 11). Lieut. L. R. Staddon (Warrant Shipwright, R.N.); (Sept. 11).

(Then follow the names of 41 officers who are transfd. to the Unemployed List under various dates.)

Medical Branch

Lieut.-Col. N. H. Harris (Surgn.-Com., R.N.) relinquishes his commn. on ceasing to be employed; (Sept. 19). The initials of Capt. J. I. Russell are as now described, and not "J. R.," as stated in *Gazette* of Nov. 26, 1918.

Dental Branch.

Flying Officers to be Flight-Lieuts.:—A. C. S. Cottam; (Sept. 21). H. O. Salt; (Sept. 23).

Memoranda

H. W. Morgan (Capt., ret. pay, Army), late Capt. (actg. Maj.), R.A.F., is granted the rank of Maj.; (Oct. 4).

(Then follow the names of 100 Overseas Cadets who are granted temp. commns. as Sec. Lieuts. and 65 Cadets granted hon. commns. as Sec. Lieuts.)

Sec. Lieut. A. F. Cook relinquishes his commn. on account of ill-health, and is permitted to retain his rank; (Aug. 13).

Royal Flying Corps.—Military Wing, Schools of Instruction

School of Military Aeronautics.—Instr. (graded as an Equip. Officer, 1st Class).

London Gazette, October 7

Flying Branch

Second Lieutenants to be Lieutenants.—(Hon. Lieut.) W. V. Tyrrell; Aug. 30, 1918. O. P. Gosling; April 13.

The following relinquish their commns. on ceasing to be employed:—Lieut. W. J. Hooke; Feb. 13 (substituted for notification in *Gazette* of April 1). Lieut. C. C. Miller (Lieut., W. Rid. R.); May 28. Lieut.-Col. R. A. Bradley, C.M.G. (Maj., N. Staffs. R.); Aug. 27. Lieut. D. B. Aitken, D.F.C. (Lieut., Sea. Highrs.); Sept. 8. Lieut. L. C. Tims (Lieut., R. War. R.); Sept. 9. Capt. C. C. Haynes (Capt., Devon. R.); Sept. 15. Capt. G. A. Turton (Lieut., Yorks. R.); Sept. 23.

(Then follow the names of 146 officers who are transfd. to the Unemployed List under various dates.)

Capt. C. P. O. Bartlett relinquishes his commn. on account of ill-health, and is granted rank of Maj.; Sept. 3 (substituted for notification in *Gazette* of Sept. 16).

Lieut. H. A. Reid relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Oct. 4.

Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—J. R. Johnson; May 20 (substituted for notification in *Gazette* of June 27). C. W. Savignac; July 12 (substituted for notification in *Gazette* of April 15). J. S. McGeown (contracted on active service); Sept. 28. W. Woods (contracted on active service); Sept. 29.

The initials of Sec. Lieut. J. R. D. Goadsby are as now described and not "G. R. D.," as stated in *Gazette* of Aug. 13, 1918.

The notification in *Gazette* of April 1 concerning Lieut. W. J. Hooke is cancelled.

The notification in *Gazette* of May 23 concerning Sec. Lieut. W. T. Ward is cancelled.

The notification in *Gazette* of May 30 concerning Sec. Lieut. H. B. Mills is cancelled.

The notification in *Gazette* of July 11 concerning Sec. Lieut. C. R. Abell is cancelled.

The notification in *Gazette* of Sept. 5 concerning Sec. Lieut. (Hon. Lieut.) R. Bowman is cancelled.

Administrative Branch

Sec. Lieuts. to be Lieuts.—(Hon. Capt.) A. J. Dawes (April 2, 1918); G. J. Maunsell (April 25, 1918).

R. White is granted a temp. commn. as Pilot Officer; Sept. 10.

The following relinquish their commns. on ceasing to be employed:—Maj. I. A. S. Cooke, O.B.E. (Capt., Conn. Rang.); Sept. 30. Lieut. C. E. Crowne (Lieut., E. Yorks R.); Oct. 4.

(Then follow the names of 25 officers who are transfd. to the Unemployed List under various dates.)

Lieut. (actg. Maj.) D. G. Northam relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain rank of Maj.; Sept. 27.

Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—F. C. Hilbert; June 13 (substituted for notification in *Gazette* of July 15). N. B. Edwards; Aug. 7 (substituted for notification in *Gazette* of Dec. 13, 1918). H. C. Thomas; Sept. 26 (substituted for notification in *Gazette* of Aug. 1).

The notification in the *Gazette* of Sept. 5 concerning Lieut. B. Burton is cancelled.

Technical Branch

Lieut. A. G. Ridgon is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (A); May 1.

Sec. Lieut. R. M. Weaver to be Lieut. without pay and allowances of that rank; June 6.

Sec. Lieut. O. B. Paton to be Sec. Lieut., Grade (B), from (Ad.); Oct. 29, 1918.

The following relinquish their commns. on ceasing to be employed:—Lieut. F. R. Davis (Lieut., R.E.); Oct. 13, 1918. Sec. Lieut. (Hon. Lieut.)

G. P. Harding (Lieut., Ches. R.); Sept. 19. Capt. M. D. McFarlane (Capt., Midd'x. R.); Sept. 25.

(Then follow the names of 40 officers who are transfd. to the Unemployed List under various dates.)

Capt. (actg. Lieut.-Col.) L. B. Cook, O.B.E., relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain the rank of Lieut.-Col.; Sept. 29.

Capt. J. Stewart, O.B.E., relinquishes his commn. on account of ill-health caused by wounds, and is granted the rank of Maj.; Sept. 27.

Sec. Lieut. G. R. Rankine relinquishes his commn. on account of ill health contracted on active service, and is permitted to retain his rank; Sept. 27.

The surname of Pilot Officer (Hon. Flying Officer) J. C. Graddon is as now described and not "Graydon," as stated in the *Gazette* of Sept. 12.

The notification in the *Gazette* of Sept. 12 concerning Sec. Lieut. A. G. Rigdon is cancelled.

Medical Branch

Flying Officer A. E. Collie to be Flight Lieut.; Sept. 28.

Flight Lieut. F. H. Wallace is transfd. to Unemployed List; Sept. 6.

(Then follow the names of 87 cadets who are granted hon. commns. as Sec. Lieuts.)

Lieut.-Col. (actg. Brig.-Gen.) J. A. Houison-Craufurd, C.M.G., C.B.E. (Lieut.-Col., retired pay) relinquishes his commn. on ceasing to be employed, and is granted hon. rank of Brig.-Gen.; June 1.

The notifications in *Gazettes* July 25 and Sept. 12 concerning Lieut.-Col. (actg. Brig.-Gen.) J. A. Houison-Craufurd, C.M.G., C.B., are cancelled.

Capt. R. R. L. Thom (Capt., Bedford R.) relinquishes his commn. on ceasing to be employed; Oct. 2.

Temp. Hon. Lieut. (Hon. Capt.) H. T. Wright relinquishes his commn. on ceasing to be employed; Sept. 16.

(Then follow the names of seven officers who are transfd. to the Unemployed List under various dates).

CORRESPONDENCE

R.A.F. RECORDS

[1983] May I have your permission to bring before your readers a matter of national importance? I am engaged in preparing, from official material, a history of the War in the Air. When our army took the field, in August, 1914, it was assisted by Nos. 2, 3, 4 and 5 Squadrons of the Royal Flying Corps. The value of the help given by these squadrons cannot easily be overestimated; indeed, but for the information they supplied the Germans might possibly have succeeded in surrounding and destroying the whole of our Expeditionary Force. The Royal Flying Corps were thoroughly trained for their work. From the date of the formation of the Corps, in May, 1912, down to the outbreak of War, they had been engaged in preparing themselves, by constant exercise and manœuvre, for just such a task as fell to them. Their numbers were small, but they were perhaps the most efficient and best-trained Air Force in Europe. The training was carried out at the centres—Farnborough, Netheravon, Montrose—where the squadrons were stationed, and a record of the work done was entered by the commanding officers in the squadron record books.

These record books have all disappeared. When the War broke out the commanding officers were ordered to forward their record books to the Royal Flying Corps Headquarters at South Farnborough, and this was done. Then year followed year; the Flying Corps, as everyone knows, developed at an enormous rate; the Royal Aircraft Factory at South Farnborough grew out of all recognition; and in the growth and change of the time, the record books, packed in Renault or Gnome engine boxes, were shifted from place to place at South Farnborough. When a man is fighting for his life he has not time to spend on the relics of his infancy. Nevertheless, the record books were preserved, and when the Royal Air Force was formed, later on in the War, they were despatched from South Farnborough to the depôt that was being formed at Blandford. There is evidence of their despatch, but direct first-hand evidence of their receipt is lacking, and they have not been found at Blandford.

The Royal Air Force is now rapidly being demobilised, but among past or present members of the force someone who reads this letter may remember seeing the record books and may have something to tell. Any clue to their whereabouts would be more than welcome at the Historical Branch of the Royal Air Force, 2, Cavendish Square, London, W. 1. Their importance is great. They were written by men whose names are now widely known, and whose early work did much to win for us our dominant position in the air.

WALTER RALEIGH.

CIVILIAN LANDING GROUNDS

THE Air Ministry announces that the following lists of aerodromes are issued as an addition or in amendment to the lists already published:—

LIST A.—*Service Aerodromes only available for Civilian Machines in emergency.*

(AMENDMENTS.)

The following aerodrome has been transferred to List E, and is now published in that list.

Aerodrome.	Nearest railway station.	Nearest large town.
Detling	Bearstead	Maidstone

LIST C.—*Aerodromes temporarily retained for Service purposes*

(AMENDMENTS.)

The following aerodromes have been transferred to List E, and published in that list previously:—

Beverley	Beverley	Beverley
Chattis Hill	Stockbridge	Winchester
Doncaster	Doncaster	Doncaster
Killingholme	Habrough	Grimsby
London Colney	Radlett	St. Albans
Penston	Macmerry	Haddington
Seaton Carew	Seaton Carew	West Hartlepool
Shoreham	Shoreham	Shoreham-by-Sea

The following aerodromes have been transferred to List E., and are now published in that list:—

Buckminster	Witham	Grantham
Harpswell	Kirton Lindsey	Gainsborough

LIST D.—*Aerodromes licensed as suitable for "Avro (504 K) and similar types of aircraft" only.*

Except in very few instances, accommodation does not exist. The licences have also in the majority of cases been issued for limited periods.

Aerodrome.	Location of aerodrome.	Nearest large town.
Gleneagles	Adjoins Station on main Glasgow-Perth railway.	Crieff
Coleford	South of Coleford on road parallel to G.W.R. line.	Gloucester
Wormwood Scrubs	South-west corner of Wormwood Scrubs.	London (Hammersmith).
West Blatchington	West of Hove Park, Brighton, at S.E. corner of West Blatchington.	Brighton

LIST E.—*Stations no longer in use by the R.A.F.*

These stations have been passed to the Government Property Disposal Board. They will be relinquished as soon as the Government property thereon has been disposed of. In many cases the aerodromes are now under cultivation, but it is probable that the sites still form the best emergency landing grounds in the immediate neighbourhood.

Aerodrome.	Nearest railway station.	Nearest large town.
Buckminster	Witham	Grantham
Detling	Bearstead	Maidstone
Harpswell	Kirton Lindsey	Gainsborough

Poulet's False Start

ON Sunday last, at 7.30 a.m., Etienne Poulet, accompanied by his mechanic Benoit, on his Caudron, set out from Issy-les-Moulineaux on the first stage of his flight to Australia. The fog was so thick along the Seine valley that, after covering about 30 miles, Poulet deemed it prudent to return. He made a fresh start at 12.30 p.m., but had not proceeded far, however, before magneto trouble obliged him once more to land. He made a fresh start on Tuesday morning.

In Memory of Fallen French Aviators

A COMMITTEE is now at work in Paris organising a memorial service for members of the French Air Services who fell in action. The chief service will be held in Notre Dame, and simultaneously services will be held in a Protestant church and a Jewish synagogue.

Excess Profits Duty and Engine Manufacturers

AN order of the Board of Referees relating to increase of the statutory percentage for excess profits duty appeared in the *London Gazette* of October 10 in respect of the following trade:—

Manufacture of aircraft engines.—In the case of a company increased to 9 per cent.

SIDE-WINDS

Messrs. Gilbert Campling, Ltd., of 1, Albemarle Street, W 1, announce that the selling price of the A.B.C. Skootamota has been advanced to 49 guineas.

* * *

It is announced that the businesses of Brown Brothers, Ltd., London, and James Thomson and Son (Motor Factors), Ltd., Edinburgh, have amalgamated. Mr. J. Albert Thomson, chairman and managing director of the Edinburgh company, becomes one of the managing directors of Brown Brothers, Ltd., while several of the London company's directors will join the Edinburgh board.

* * *

One of the most important items in the engineers' spares box is a plentiful supply of gaskets for all joints. Moreover, the gaskets must be made of a reliable material tested to resist high power and withstand the action of steam, acid, oil and alkalis. A dependable joint is a great boon to engineers and those to whom this important supply counts so much, and the news that Powerite jointing is now available, will be of great interest. The proprietors of Powerite are a body of engineers whose accumulative engineering experience totals well over a hundred years. This strong combination has produced Powerite, a black sheet jointing stated to be of super-tensile strength. The company claim that Powerite shuts out all the old element of failures (that Powerite never burns out and never blows out) and embodies every possible improvement. Already some of the largest engineering firms in England have adopted Powerite. Firms who are experiencing difficulty in obtaining jointing that does not need constant renewing, should drop a line (mentioning Flight) to the Powerite Steam Jointing Co., Ltd., 16 and 17, Devonshire Square, London, E.C., who will send a liberal sample. The proprietors have installed a large factory at Oakamoor, North Staffs, and are equipped to meet large demands at once. They will also be pleased to quote for particular kinds of washers, gaskets, for joints or bedding, on receipt of blue prints.

* * *

On Friday, October 10, Messrs. J. Samuel White and Co., East Cowes, Isle of Wight, delivered to the Navy, a new and powerful destroyer of the "W" class. She was built in the oldest shipyard on the Admiralty list, and is named the *Witherington*, a name not hitherto applied to any war vessel, but which recalls the ballad of Chevy Chase—

> "Witherington needs must I wayle
> As one in doleful dumps;
> For when his legs were smitten off
> He fought upon his stumps."

* * *

H.M.S. *Witherington* was laid down on July 29, 1918, and launched on January 16, 1919. She is of 1,450 tons displacement and 28,000 h.p., and has attained a speed of 35 knots. The *Witherington* has been constructed, engined and fully equipped by Messrs. White, and her armament consists of superimposed guns fore and aft, anti-aircraft high-angle guns and triple sets of torpedo-tubes amidships.

* * *

Ever extending business has caused the Lazilite Co. to seek larger premises, and they have been fortunate in securing possession of suitable accommodation next door to their present headquarters at 5, Baldwin's Gardens, Gray's Inn Road, E.C. They have installed new and up-to-date plant, which is now fully engaged on turning out the "Lazilite" devices which have proved so efficient and convenient in offices and factories. To those who are not yet acquainted with the advantages of the Lazilite fittings, the company will be pleased to send full particulars.

* * *

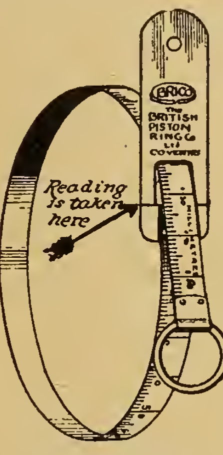
M. Alfred Leblanc has been elected President of the Chambre Syndicale des Industries Aéronautiques for the coming year, while the Vice-Presidents are MM. Louis Bréguet, Henry Kapferer, Fernand Lioré, Luquet de St. Germain.

* * *

During the War the list of records achieved by the aid of Claudel-Hobson carburettors could not be added to to any considerable extent, although up to the time of the Armistice we believe the list included all records for height, speed, lifting and duration. Since then the Claudel-Hobson carburettor has played a worthy part in a number of outstanding performances, including the Transatlantic flight of Sir John Alcock on the Rolls-Vickers-Vimy, the double journey of the Sunbeam-engined R 34, the London-Madrid flight of the Alliance-Napier machine, the Aerial Derby (in which machines fitted with Claudel-Hobsons finished first, second and third). Also the regular running of the Airco machines between London and Paris during the past seven weeks is incidentally an excellent testimonial to the efficiency of these famous carburettors.

* * *

An ingenious device for measuring the external or cylinder diameter of piston rings has just been placed on the market by the British Piston Ring Co., Ltd., makers of Brico piston rings, Holbrook Lane, Coventry. The Brico Piston Ring Meter, as the makers call it, is a band of flexible steel graduated in millimetres from 50 to 150. One end of the tape is broad and has a slot through which the graduated part slips. An indicating point at the side of slot makes the reading point. To use the tape one end is screwed to the table, bench or other convenient point, a screw and washer being provided for this purpose. The piston ring to be measured is simply inserted in the loop of the tape, taking care to have the gap of the ring in a position where it can be seen. The tape is then pulled tight by means of finger ring until the gap of piston is closed, the diameter being seen at the slot indicated in illustration. The whole operation takes but a few seconds, and gives accurate results. The piston ring meter is sold complete in box at 7*s*. 6*d*. and a liberal discount is given to the trade. At present samples are sent to the trade at 5*s*. 6*d*. each, post free. Anyone who measures piston rings will find this a most useful tool.



The Brico Piston Ring Meter

* * *

The two-seater D.H.4 with Rolls-Royce engine which Messrs. S. Instone and Co., shipowners, of Billiter Street, E.C., and Cardiff, have added to their equipment, commenced its regular work on Monday, when it flew from Cardiff to London in 56 minutes, bringing a parcel of letters, etc. About an hour later, Lieut. Barnard, the pilot, left for Paris with letters and parcels, and landed safely 1 hour 55 minutes later at Le Bourget, near Paris.

The aeroplane flew Messrs. Instone's house flag.

* * *

One exhibit which never fails to attract will be missing from the forthcoming Motor Car Show at Olympia. Lack of floor space precludes Palmer Tyre, Ltd., from showing the wonderful cord-laying machine at work building-up the fabric which plays such an important part in the longevity and efficiency of these famous tyres. The company will, however, have on view a full range of their covers, tubes and other tyre specialities, and visitors will, therefore, find much to interest, even if they are deprived of the fascination of seeing the wheels go round.

◆ ◆ ◆ ◆

B.A.T. Trips Abroad

On Tuesday, October 7, the British Aerial Transport Co. despatched a saloon passenger machine, piloted by Mr. Cyril Turner, to Amsterdam. This machine carried a quantity of merchandise, and returned from Holland on Friday afternoon, 10th instant, with the full complement of passengers. On Friday morning, 10th instant, Maj. C. Draper, D.S.C., left Hounslow piloting a saloon passenger machine of the British Aerial Transport Co. for Paris, completing the journey in 2 hours 20 minutes. This machine was specially chartered, the passengers being Sir Percival Perry, Col. Warwick Wright, D.S.O., Maj. Lennard and Mr. Van den Bergh. On Tuesday morning, October 14, the British Aerial Transport Co., Ltd., despatched a passenger saloon machine to Amsterdam from Hounslow, piloted by Mr. C. Turner. Passengers and merchandise were carried, and it is proposed to make the service a weekly one.

LONDON-PARIS AIR SERVICES

Having flown just on 25 000 miles with passengers and parcels, the Airco London-Paris aeroplanes completed, last Saturday, their first seven weeks of continuous operation.

"As the commercial future of flying depends mainly upon reliability," said Mr. Holt Thomas, "I consider it very significant that, in our first 42 days' flying, during which 30 were unfavourable climatically, we should have been able, as we have, to reach a percentage of reliability as high as 97. That the aeroplane is still an unreliable vehicle cannot be argued in face of the fact that, during these seven weeks of daily flying, we should have had to record only one forced landing through any mechanical defect. As speed is the essence of aerial transport, I myself consider it specially significant that, in weather which rarely favoured us, we should have been able to obtain an average air speed throughout as high as 100 miles an hour.

"Each day, now, our organisation improves. Our passengers, who are booking seats as far as a month ahead, are now picked up by motor car at any point within a mile of Piccadilly Circus, and taken out to Hounslow in time for the departure of the 12.30 p.m. air express; while, on arrival at Le Bourget, at 2.45 p.m., they are immediately driven into Paris. It is not only by far the quickest, but also the simplest, way of travelling. You have one ticket, one vehicle; you avoid hosts of irritating delays. The business man in a hurry saves more than four hours on the journey in actual time; and, assuming he writes down the value of his time at only a few pounds an hour, the difference between our 20-guinea air-fare and that of the ordinary land and sea route is not merely not an extravagance; it is a sound business proposition."

During the first five weeks of their London-Paris service, up to October 4, the Handley Page Transport, Ltd., accomplished 15 flights each way, and carried a total of 219 passengers and approximately 6,000 lb. of freight. With regard to their Brussels service, which has been in operation for a shorter period, nine trips each way have been made in a fortnight, and the number of passengers carried averaged six per flight. On four consecutive days during the railway strike the company carried mails. The average time occupied in taking the mails across Channel was 2½ hours.

⁂

COMPANY MATTERS

Boulton and Paul, Ltd.

The directors of Boulton and Paul, Ltd., announce a dividend of 12½ per cent. (2*s*. 6*d*. per share), free of income-tax, on the ordinary shares for the year, carrying £5,984 forward, after providing for depreciation and War taxation, writing off the item of goodwill, and raising the general reserve to £20,000.

⁂

PUBLICATIONS RECEIVED

General Theory of Blade Screws (Report No. 29).
Self-Luminous Materials (Report No. 33).
Aluminium and its Light Alloys (Report No. 34).
Fabric Fastenings (Report No. 37).
Airplane Dopes and Doping (Report No. 38).
Testing of Balloon Fabrics (Report No. 39). The National Advisory Committee for Aeronautics, 4th Street and Missouri Avenue N.W., Washington, D.C., U.S.A.

Aeroplane Structures. By A. J. Sutton Pippard, M.B.E., M.Sc., and Capt. J. L. Pritchard, late R.A.F. London: Longmans, Green and Co. Price 21*s*. net.

Aircraft in Peace and War. By Sir John Foster-Fraser, F.R.G.S. Blackburn Aeroplane and Motor Co., Ltd., Leeds.

Handbook of Modern Aeronautics. London: The Library Press, Ltd., 26, Portugal Street, Kingsway.

Through Lapland with Skis and Reindeer. By Frank Hedges Butler, F.R.G.S. London: T. Fisher Unwin, 1, Adelphi Terrace, W.C.

Aeroplane Timbers. By Gilbert R. Keen. London: William Rider and Son, Ltd., 8–11, Paternoster Row. Price 6*s*. net.

The Aviation Catechism. By Major W. T. Blake, R.A.F. London: Nisbet and Co., Ltd., 22, Berners Street, W. Price 1*s*. 6*d*. net.

Airplane Design and Construction. By O. Pomilio. London: Hill Publishing Co., Ltd., 6-8, Bouverie Street. Price 25*s*. net.

Reminders for Company Secretaries. By H. W. Jordan. London: Jordan and Sons, Ltd., 116, Chancery Lane. Price 9*d*. net., postage 2*d*.

Private Companies: Their Utility and the Exemptions They Enjoy. By H. W. Jordan. London: Jordan and Sons, Ltd., 116, Chancery Lane. Price 1*s*. net.; post free 1*s*. 4*d*.

IMPORTS AND EXPORTS, 1918-1919.

Aeroplanes, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "Flight" for January 25, 1912; for 1912 and 1913, see "Flight" for January 17, 1914; for 1914, see "Flight" for January 15, 1915; for 1915, see "Flight" for January 13, 1916; for 1916, see "Flight" for January 11, 1917; for 1917, see "Flight" for January 24, 1918; and for 1918, see "Flight" for January 16, 1919.

	Imports.		Exports.		Re-Exportation.	
	1918.	1919.	1918.	1919.	1918.	1919.
	£	£	£	£	£	£
January ...	49,402	555,989	24,765	57,571	—	—
February	51,941	453,822	13,545	57,972	—	—
March ...	47,930	704,424	11,451	72,716	1,000	400
April ...	33,342	97,662	10,815	25,433	—	—
May ...	942,866	136,631	67,224	38,428	—	—
June ...	864,296	1,410	35,658	41,526	—	—
August ...	566,137	67,292	71,503	60,581	—	—
September	505,160	172,192	8,033	65,349	100	—
	4,895,367	2,325,885	253,794	460,866	1,000	400

⁂

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl.=cylinder; I.C.=internal combustion; m.=motors.

APPLIED FOR IN 1916

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published October 16, 1919

7,183. Fairey Aviation Co. and C. R. Fairey. Aeroplane controlling devices. (132,541.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published October 16, 1919

14,467. J. R. S. Hayes and W. Dunwell. Aerial propellers, etc. (132,587.)
15,081. D. Ivers. Petrol tanks for aeroplanes. (132,602.)
15,198. E. Hooker. Apparatus for holding Verey pistol upon aircraft. (132,612.)
15,321. H. T. Johnson. Silencing-arrangements for flying-machines. (132,615.)
15,348. Educational Supply Association, H. Woolard and C. A. Lodge. Folding doors or partitions for aircraft sheds. (132,617.)
15,596. J. S. White and Co. and T. C. Letcher. Watertight joints for floats, etc. (132,624.)
15,929. A. Wright. Inclinometers. (132,637.)
16,140. Nieuport and General Aircraft Co. and H. P. Folland. Struts, etc. (132,640.)
16,435. Nieuport and General Aircraft Co., H. P. Folland and H. E. Preston. Control and stability of aircraft. (132,644.)
16,500. A. A. Lewis and F. O. Dutton. Safety device for use with aircraft. (128,896).

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlv, xlvi, xlvii, and xlviii).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates*:—

United Kingdom	s.	d.	Abroad*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "Flight" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 565 (No. 43, Vol. XI.) OCTOBER 23, 1919 [Weekly. Price 6d. Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY W.C. 2.

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28*s.* 2*d.* Abroad .. .. .. 33*s.* 0*d.**

These rates are subject to any alteration found necessary under abnormal conditions

**European subscriptions must be remitted in British currency.*

CONTENTS

PAGE

Editorial Comment

The Flight to Australia .. 1385

The Route to be Followed .. 1385

Cutting Down the Services .. 1386

The Future of the R.A.F. .. 1386

Flight—and the Men: Captain de Havilland .. 1387

The Camera and the 'Plane: Brighton .. 1389

The "Bristol" Coupé .. 1390

More N.P.L. Reports .. 1391

Royal Aero Club: Official Notices .. 1392

Some Friedrichshafen "Milestones" .. 1395

The Australian Government Flight Competition .. 1396

An Altitude Laboratory .. 1398

Honours .. 1404

Airisms from the Four Winds .. 1405

The Royal Air Force .. 1408

Personals .. 1409

London-Paris Air Services .. 1410

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Nov. ...	Entrance Examination for R.A.F. College.
Nov. 7-15 ...	Olympia Motor Car Show.
Dec. 3 ...	"The Air Force." Lecture by Air-Commodore H. R. Brooke-Popham before R.U.S.I.
Dec. 19 to ... Jan. 4, 1920.	Paris Aero Show.

EDITORIAL COMMENT

The Flight to Australia

THE most ambitious attempt on aerial records is now in the making. Captain Matthews and Sergeant Kay left Hounslow this week with the object of reaching Australia in a Rolls-Royce-engined Sopwith machine and gaining the prize of £10,000 offered by the Commonwealth Government for the first successful flight between England and the Antipodes. For the moment it is futile to talk of success or failure in a task which is undoubtedly a most searching test of mechanical and physical endurance; but, even so, we may venture the opinion that it is one which is demonstrably within the compass of the well-found aeroplane of today, and we see no reason for thinking that either Captain Matthews, as the first ready for the start, or one or even more of the other three entrants will not accomplish a feat which even a couple of years ago would have been voted humanly impossible. The severity of the test may be judged from the fact that the last lap of the journey is one of no less than 1,750 miles, from Bandoeng, in Java, to Port Darwin, in Northern Australia. This alone is comparable in distance to the Atlantic flight, with the added factor that it comes after 10,000 miles of flying. Still, everything that organisation and foresight can accomplish to make the enterprise successful has been done. The Air Ministry and the Commonwealth Government, as well as the Royal Aero Club, under whose supervision the competition is being carried out, have combined to render every possible assistance to the daring competitors. The Air Ministry has arranged for fuel supplies *en route*, and is giving the services of personnel where-ever available. In addition, it has carried out a survey of the route between Calcutta and Australia, and has investigated the meteorological problems and those of navigation, cable and wireless communications. The one direction in which organisation seems to fall short of perfection is in the matter of landing grounds. Arrangements, however, have been made for the use of the racecourses at Rangoon and Singapore to be used for landing, while the Netherlands Government has agreed to the use by competitors of its aerodrome at Bandoeng. But even when this route is followed machines will still have great distances to cover between landing stations, and in view of this the Air Ministry has suggested to competitors that their machines should be converted to seaplanes by the substitution of floats for wheels either at Calcutta or some other suitable place, so that, in the event of forced landings, the machines would be able to use the many available harbours and inlets along the route.

◆ ◆ ◆

The Route to be Followed

The first section of the route to be taken is that followed a few months ago by Brig.-Gen. MacEwan and Major Maclaren, and crosses France, Italy and Malta to the north coast of Africa and on to Aboukir in Egypt. Thence to Karachi the route is that explored a year ago by General Salmond, by way of Damascus, Baghdad, Basra and the coasts of Persia and Baluchistan. Over this section the landing grounds are said to be quite good, and landing in the desert is usually practicable in emergency, but the possible hostility of the natives, together with the shortage of water and the absence of methods of communication, add considerably to the risks of a forced landing. From Karachi the next stage is across India to Calcutta, by way of Nasirabad, Delhi and Allahabad. This is a comparatively easy stage, especially as the Indian Government has promised every possible assistance from the R.A.F. in India. Beyond Calcutta the competitors will be thrown upon their own resources so far as concerns the necessary supplies of fuel and spares, etc., in view of the fact that no British aerodromes exist. On the aeroplane route from Calcutta there is a landing ground at Akyab, 280 miles away, and there is no other available until the Rangoon racecourse is reached—a further 500 miles. There is another long stretch of more than 1,300 miles before Singapore is reached, where the only possible landing ground is the racecourse. After leaving Singapore the next possible stopping place is the Dutch Government aerodrome at Bandoeng. Thence to Port Darwin is 1,750 miles, of which 500 miles are over the sea. There are no aerodromes or possible landing-places for aeroplanes on this final stretch of the course. By converting the machines to seaplanes, as the Air Ministry has suggested, the number of available stopping-places on the final stages of the journey are multiplied very materially. There are practicable harbours all along the route, and by the adoption of the advice of the Ministry the competitors will ensure a stopping-place at least every 500 miles. The longest stretch would be from Koepang Bay to Port Darwin, a distance of 518 miles. Obviously, it would make for a far greater margin of safety, and would, therefore, contribute much to the possibilities of success to carry out the conversion recommended, and, although we are not in the secret of the competitors' intentions, it will probably turn out that the advice will be taken. However that may be, and whether the several competitors elect to chance things and accept the risks of the long non-stop flights by aeroplane, or to take what seems to be the more prudent course, the test is certainly one which will search out every weak point both of men and machines. If they fail, the failure will be a glorious one. If they succeed they will have erected a landmark in the history of aviation dwarfing everything that has been done before. We need hardly say that we wish every luck and success to Captain Matthews and his companion, and also to those who are preparing to follow them on their long trail.

◆ ◆ ◆

Cutting Down the Services

The first task of Parliament, after purely routine business has been disposed of, will be to enquire how far the Prime Minister's precept to reduce expenditure to "£2,000,000 a day and not more" has been complied with. It does not seem, on the face of things, that economies have been effected on a sufficient scale to have brought the national expenditure down to the required level, nor does there appear to be too hopeful a prospect of effecting the needed reductions for some time to come. The new Departments created during the War are, as everyone foresaw who was at all familiar with the ways and methods of officialdom, taking a great deal of rooting out—the limpets are clinging tightly to their rocks and intend to hang on until they are literally dragged from their anchorages. There has been a great show of cutting down the staffs in these war Ministries, but so far as it is possible to judge this has been to a large extent "eye-wash." The minor officials, whose salaries rule low, and numbers of the women helpers have been dismissed, but the big men who draw the big money find themselves too comfortable and are hanging on to their jobs for all they are worth. It really looks as though we had been right a year or two ago when we said that, when the War was over, it would be harder to get rid of the new bureaucracy than it was to beat the enemy in the field.

In the meantime, there does seem to have been a serious effort made to cut down the expense of the fighting Services. The total cost of the three Services is being got down rapidly to the required level of £160,000,000 per annum, which is rather more than double the cost of the Navy and Army before the War. Manifestly, if this figure really is reached, there will be no further room for economy in that direction. There is now a third Service—the R.A.F.—to be estimated for, and when we come to regard the vastly-increased pay of officers and men in all three, and the much greater costs of material of all kinds, the thought must arise whether we are not going to an extreme and cutting our means of defence too fine. Of course, we have no longer to provide against the German menace, and, so far as it is humanly possible to foresee, the horizon seems clear and another great war no more than a remote possibility. It should not be forgotten, however, that great wars break out suddenly and without any period of warning which will enable the country which is unprepared to make good the deficiencies of neglect. What our own state of unpreparedness cost us in the late War it would be futile to discuss—it cannot be estimated, but we know it was a stupendous total of life and treasure. Indeed, there are some authorities who say with certitude that if we had been able to throw a million men into the field in the first month of European war, properly trained and equipped, Germany would never have taken the risk she did, and the world would have been spared the horrors of the greatest war in history. However, these speculations are perhaps idle now, but they are interesting, nevertheless.

◆ ◆ ◆

The Future of the R.A.F.

Naturally, in this drastic cut at the expense of the fighting Services, we are more keenly interested in what is happening to the R.A.F. than to the others. It certainly does not seem that an annual expenditure of £25,000,000 on aerial defence is exactly a lavish provision. Still, we are not inclined to quarrel with it on the score of inadequacy, if only because we realise that the nation cannot at present afford to waste a shilling on unnecessaries, and what we simply cannot pay for we must do without. The principal thing to be seen to now is the getting of value for every penny spent on the R.A.F. After all, even when the present cost of material is taken into account, £25,000,000 is a substantial sum of money, and a great deal can be done with it if it is

Flight—And the Men

Captain GEOFFREY DE HAVILLAND, A.F.C., O.B.E., Technical Director of the Aircraft Manufacturing Co., Ltd., Designer of the Airco De H. Machines wisely expended. In order that we may get the best value in defence, we would urge again that a great part—we will not say the bulk—of the money voted for the services of the Air Ministry should be devoted to the encouragement of civilian aviation in such a manner as at the same time to build up a properly trained and equipped Flying Reserve against another *dies iræ*. We are most firmly convinced that this is the way not only to get the best value for our money, but would really result in a far more efficient war machine in the end than as though we spent the money in keeping up a large active fighting force. At the same time, aviation at large would develop at a much faster rate than as though it were left to private enterprise alone, and we should get our reward in increased wealth due to better and faster communications.

The fighting man pure and simple is a parasite on the community—we do not use the term in any offensive sense, but it is, nevertheless, the only one that illustrates the point. He produces nothing, but takes from the community in the shape of pay, allowances, subsistence and so forth—he is an absolute charge and returns nothing, unless he can be found productive work while waiting to carry out his proper function of making war. As he is seldom making war, it follows that he is nearly always a charge on the community, remunerative, it is true, since he guarantees the community against danger. Therefore, if in the intervals of making war he can be made productive, he not only ceases to be a dead charge, but becomes a valuable asset apart from that connoted by his readiness to fight in defence of the community. In aviation the opportunity for making him into a productive asset exists to a far greater extent than in the other Services. You cannot make the infantry man a producer. It is difficult—impossible, indeed, to make a fighting marine service productive, since the requirements of a fighting and a mercantile navy are absolutely dissimilar. But you can under a system of a well thought-out Flying Reserve make the soldier of the air a producer, and it is that system which must be invoked now.

◆ ◆ ◆ ◆

The International Air Convention

It was announced from Paris on October 14 that thirteen Allied Powers had signed at the French Foreign Office the International Air Convention; the United States and Japan were not included among the signatories.

It may be recalled that the regulations under the International Air Convention were published in FLIGHT of July 31.

Service Dress Uniform for Officers

The Air Ministry announces that a new pattern Service uniform for officers of the Royal Air Force has been approved by His Majesty the King.

The change of uniform has been decided upon because it was found that the colour of the lighter shade was not sufficiently durable in wear and was liable to fade. Apart from the colour, however, the only variations from the previous pattern are as noted below.

(1) Substitution of black and blue braid for distinguishing ranks on the sleeve instead of the present gold braid.
(2) Drab pilots' or observers' badges instead of gold.
(3) Abolition of gold embroidery round peak of cap. The peak of the cap will now be of the same material as the crown of the cap.

Officers will not be required to purchase the new uniform until they need to replace, owing to wear, the blue or khaki uniform, now in use, but have been informed that no more of the old pattern uniform should be purchased.

Jackets, trousers, and caps will be made of the barathea, though there would be no objection to whipcord of the usual weights being utilised for this purpose if manufacturers can supply such to the correct shade.

Breeches will be made of cavalry twill.

For the present the existing pattern blue greatcoat may be worn, but steps are being taken to provide a suitable cloth of the new shade.

The remarks relating to the greatcoat also apply to the raincoat.

Patterns of the complete garments and of materials used (cloth, braid, buttons and buckle) can be seen on application to Room 177, Air Ministry, Kingsway, London, W.C.2. The buttons and buckle are the same as on the old pattern blue uniform. Patterns have also been sent to the Chambers of Commerce of the following towns:—

Bradford, Leeds, Huddersfield, Halifax, Galashiels, Glasgow, Manchester, London, Troubridge and Bristol.

R 80 Nearing Completion

Work is now in full swing again on the R 80 at Barrow-in-Furness, and it is anticipated that it will be possible to complete the vessel by Christmas in readiness for her to be handed over to the Admiralty. The frame work of the vessel is finished, the planes and rudders in position and tanks fixed, while the cars now only await the engines.

R 34 to Come South Again

It is understood that the R 34, which, now that Maj. Scott has been demobilised, is commanded by Col. Hicks, will when the East Fortune airship station is closed be transferred to Pulham aerodrome, Norfolk.

Waste at Andover

It was asserted by the chairman at the last meeting of the Andover Guardians that enough wood is being wasted at Andover Aerodrome to provide the town with fuel all through the winter. There was a big heap of hangar material—containing wood good enough for building purposes—which was being left to rot and was at present harbouring 500 to 600 rats! It was unanimously decided to send a strong resolution of protest against such waste to the Air Ministry and the Government.

The Royal Aeronautical Society

As announced in our last issue, the new session of the Royal Aeronautical Society will open on Wednesday, October 29, and the following is the programme for the first four meetings:—

Wednesday, October 29.—"The Static Head Turn Indicator for Aeroplanes," by Sir Horace Darwin, K.B.E., M.A., F.R.S. Chair to be taken by Brig.-Gen. R. K. Bagnall Wild, C.M.G., C.B.E., R.E.

Wednesday, November 12.—"Some Physical and Psychical Effects of Altitude," by Chas. Atkin Swan, L.R.C.P., M.R.C.S., M.B., Ch.M. Chair to be taken by Sir W. Arbuthnot Lane, Bart., C.B., F.R.C.S.

Wednesday, November 26.—"Some Kite Balloon Experiments," by Griffith Brewer. Chair to be taken by Brig.-Gen. E. M. Maitland, D.S.O.

Wednesday, December 10.—"Aircraft Undercarriages," by J. D. North. Chair to be taken by Lieut.-Col. M. O'Gorman, C.B.

In each case, a discussion will follow the reading of the paper. The meetings will be held at the Royal Society of Arts, John Street, Adelphi, commencing at 8 p.m. Tickets can be obtained upon application to the Secretary, 7, Albemarle Street, W. 1.

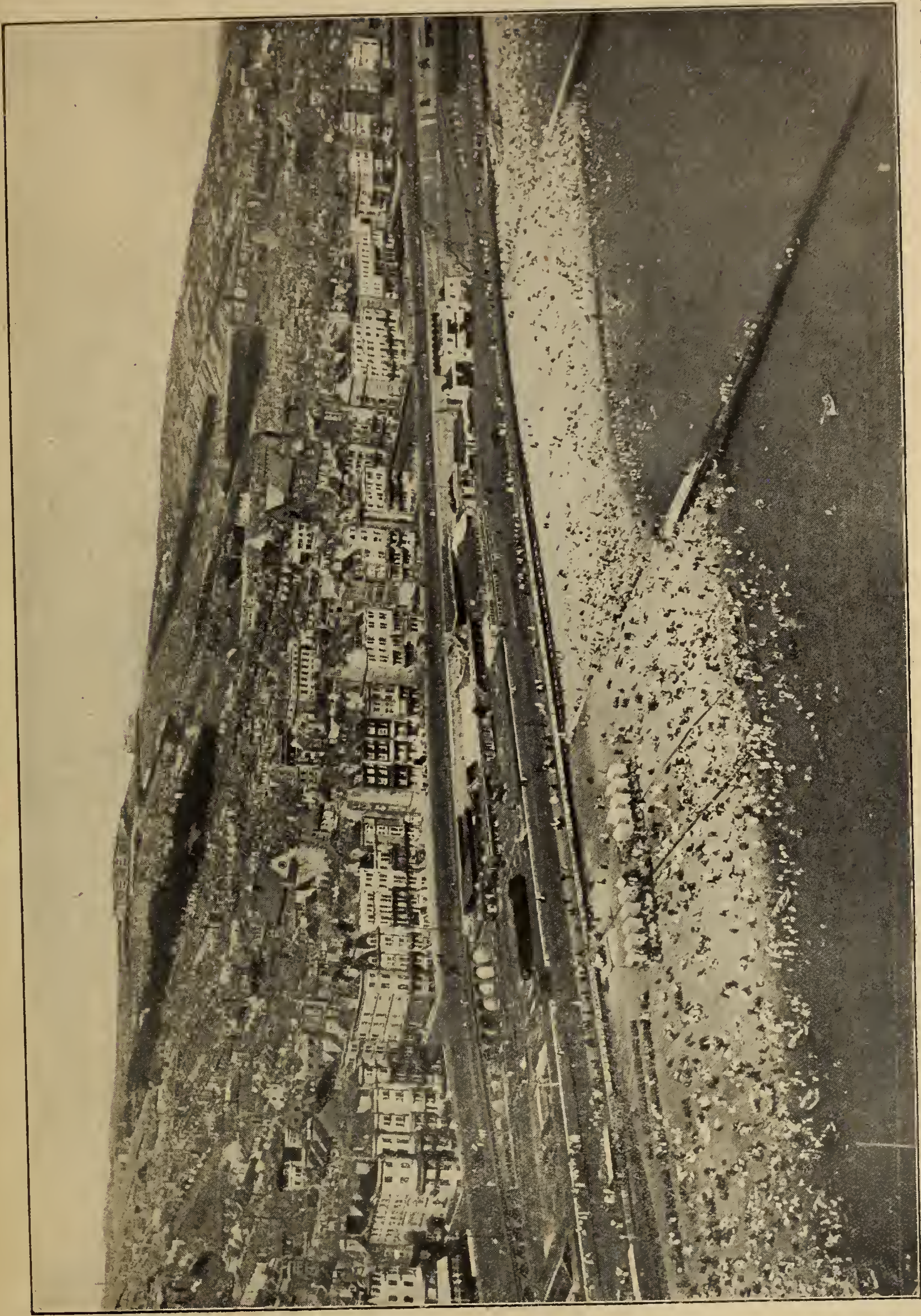
The American Trans-Continental Race

In spite of rumours to the contrary, it was decided to complete the race for United States service aviators, the first stage of which was described in our last issue. Lieut. Maynard set out from San Francisco to fly to New York, and on October 14 he reached Sidney, having flown, with the aid of a following wind, the 93 miles from Cheyenne in 33 min. The next day he went on but a broken crankshaft brought him down at Omaha, Nebraska. There he was able to obtain the use of a Liberty engine from a wrecked machine, and so was able to get on. He landed at Mineola on the afternoon of October 18.

Capt. Smith, returning from New York to San Francisco, reached Buffalo on October 14, but while his mechanics were attending to the machine it caught fire and was completely destroyed. Another machine, piloted by Lieut. Kirby, with Lieut. Miller as observer, fell in Utah, and both occupants were killed.

Lieut. Maynard was flying a D.H. or Airco 4 machine, designed by Capt. Geoffrey de Havilland, the technical director of the Aircraft Manufacturing Co., Ltd., this machine having been adopted by the United States on entering the war as one of their standard types.

The Camera and the 'Plane



"Flight" Copyright

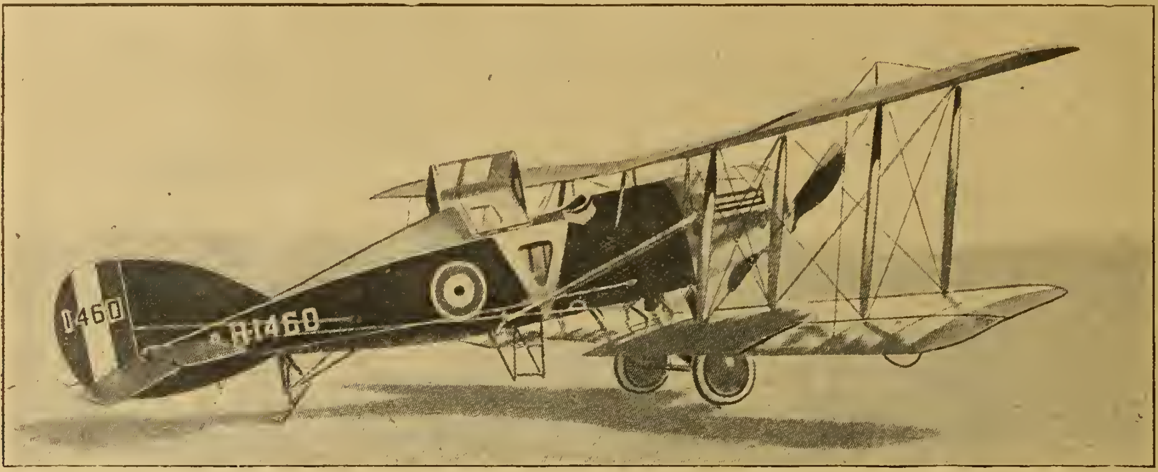
Brighton, as viewed from an Avro biplane

THE "BRISTOL" COUPÉ:

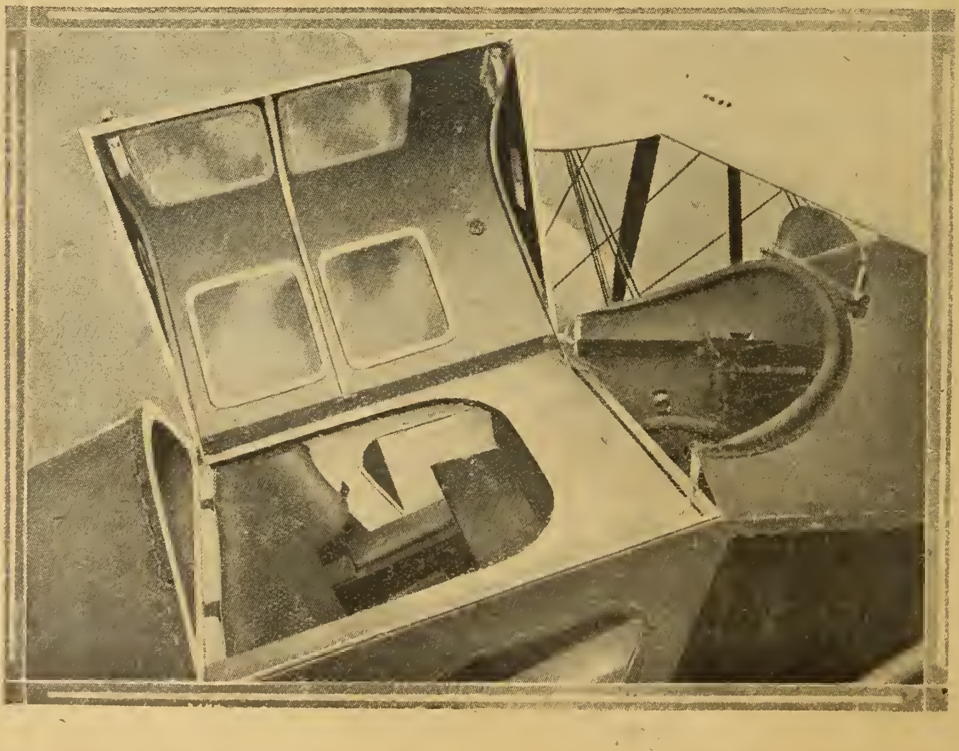
275 H.P. ROLLS-ROYCE FALCON

During the War the "Bristol" aeroplanes, notably the Bristol Fighter, type F. 2 B, have established an excellent reputation for performance, stability and ease of handling. As every pilot who has flown the F. 2 B knows, this machine is exceptionally easy to fly in straightforward flight, having a very great amount of inherent stability, and yet it is sufficiently quick on the controls to respond readily and perform any manœuvre required in aerial fighting. For civilian flying stability is of far more importance than manœuvrability, and as the "Bristol" Coupé illustrated below is a development of the F. 2 B, it may safely be assumed that its stability is as good as was that of the War machine. This fact should render it particularly suitable for commercial flying, especially as it combines with this stability an excellent performance, both as regards speed and climb.

From the illustration it will be seen that the Coupé is to all intents and purposes an F. 2 B, in which the gunner's seat, gun ring, and other paraphernalia of the trade have disappeared to give room for a comfortable cabin in which the passenger is completely protected from the wind. The pilot, as before, sits in the front seat, from which he has an excellent view, while at the same time he is well protected from the weather by means of suitably shaping the cowl around his cockpit and by a wind screen. Thus by the simple expedient of adding a roof to the rear portion of the



THE "BRISTOL" COUPÉ, 275 H.P. ROLLS-ROYCE FALCON III ENGINE : **Three-quarter rear view**



The "Bristol" Coupé : View into the passenger's cabin.

fuselage the machine is converted from an up-to-date fighting machine into an equally up-to-date touring aeroplane.

With regard to the machine as an aeroplane, there is really no need for any comment, since it follows so closely the lines of the standard F. 2 B which is already well known. The main feature distinguishing the F. 2 B from other two-seater fighters, and which has been retained in the Coupé, is the high placing of the *fuselage.* Instead of attaching the two halves of the bottom plane to the sides of the *fuselage,* as is the usual practice, the bottom plane runs right through underneath the body. In this manner the maximum cross section of the body has been kept comparatively small, with, it may be assumed, a considerable saving in body resistance. It is, we think, to a very great extent to this arrangement that the "Bristol" owes her good performance and stability.

Dealing with the cabin of the "Bristol" Coupé, this, although small, is very comfortable, the seat being well upholstered and the head room sufficient for all practical purposes. The cabin is entered from the top, the roof being hinged along the top port *longeron,* as shown in the illustrations. Not only the sides of the cabin but also the hinged roof is provided with windows so that the passenger can look sideways and downwards through the side windows and upwards through the skylight. There is, further, a small window in the front wall of the hinged roof, through which the passenger can give his instructions to the pilot, communication being facilitated, if desired, by the employment of a speaking-tube. Small cupboards are provided both in the front and in the rear of the cabin, suitable for the stowage of light luggage, while the upholstered arm rests are hinged to give access to two smaller receptacles in which may conveniently be placed papers and other light articles likely to be wanted during the journey.

Hinged to the front wall of the cabin is a small writing-desk, which folds up flat against the wall when not in use. To ensure thorough ventilation of the cabin, adjustable ventilators have been fitted in the roof, ensuring that even during a long flight the air is fresh and pure. To the business-man who has to do a great amount of travelling the "Bristol" Coupé should offer an excellent means of doing so in comfort and at great speed. A very complete set of instruments is provided with this machine, including compass, altimeter, revolution indicator, air speed indicator, electric lighting set, starting magneto, oil pressure gauge, air pressure gauge, radiator thermometer, watch, cross level, and a Rolls-Royce doping pump with reservoir. The weight of the machine empty is 1,700 lbs.; fully loaded (including 200 lbs. of luggage), 2,800 lbs. The wing span is 39 ft. 3 in., and the overall length 25 ft. 9 in.; the maximum height is 10 ft. 1 in., and the total wing area 405 square ft. At ground level the maximum speed is 128 m.p.h., at 5,000 ft. 125 m.p.h., and at 10,000 ft. 115 m.p.h. The machine climbs to 6,000 ft. in 5 minutes, to 10,000 ft. in 11½ minutes, and to 15,000 ft. in 21½ minutes. The landing speed is 48 m.p.h. These figures relate to the machine as fitted with a 275 h.p. Rolls-Royce Falcon engine. If desired it can be modified to take either of the following engines: 300-h.p. Hispano-Suiza, 200 h.p. Hispano-Suiza, 240 h.p. B.H.P. (Siddeley) Puma.

MORE N.P.L. REPORTS AVAILABLE (LIST NO. 2)

In our issue of July 3, 1919, we published a list of Advisory Committee Reports which were then published for the first time since the War. These reports were placed on sale by His Majesty's Stationery Office, and were published separately so that it was possible for those interested to purchase only those reports containing subjects in which they were specially concerned. We have now received a further list of reports issued, which also may be obtained from His Majesty's Stationery Office. In the following list the reports and memoranda numbers are given in brackets at the end of each publication, as are also the dates and prices.

Conditions at the Surface of a Hot Body Exposed to the Wind. By G. I. Taylor, M.A. Presented by the Superintendent, Royal Aircraft Factory. (272, May, 1916. Price 2*d.*)

The R.A.F. Chart. Presented by Superintendent, Royal Aircraft Factory. (280, July, 1916. 4*d.*)

Note Relative to the Weight of Hydrogen. By Guy Barr, B.A., B.Sc., and E. A. Owen, B.A., M.Sc. (293, January, 1917. 2*d.*)

Notes on Cellulose Acetate. By Guy Barr, B.A., D.Sc., and L. L. Bircumshaw. (303, revised, June, 1916, to November, 1917. 2*d.*)

The Lateral Stability of an Aeroplane Over the Whole of Its Speed Range. By E. F. Relf, A.R.C.Sc. (327, March, 1917. 6*d.*)

Exploration of the Airspeed in the Airscrew Slipstream of a Tractor Machine. Presented by the Superintendent, Royal Aircraft Factory. (438, November, 1917. 6*d.*)

The Construction of the R.A.E. Experimental Variable Pitch Airscrew. Presented by the Controller of the Technical Department, Aircraft Production. (471, April, 1918. 4*d.*)

Methods Employed at the Royal Aircraft Establishment for the Experimental Determination of the Ultimate Strength of Aeroplane Structures. By Wm. D. Douglas, A.R.C.Sc.I., and A. W. Clegg, B.Sc., of the R.A.E. Presented by the Controller of the Technical Department, Aircraft Production. (476, June, 1918. 9*d.*)

Tests on a Complete Model of R.E. 8. By E. F. Relf, A.R.C.Sc., and T. Lavender. (515, August, 1917. 6*d.*)

Some Further Notes on the Hydrogen Permeameter. By Dr. G. A. Shakespeare. (516, August, 1917. 3*d.*)

Equilibrium of the M Type Caquot Balloon, Based on the Results of Wind Channel Experiments given in the Advisory Committee's Report, R. and M. 247. By Lieut. E. G. Walker, R.N.V.R. (535, March, 1918. 4*d.*)

Note on a Possible Economy of Solvent in Doping Aeroplane Wings. By Guy Barr, B.A., D.Sc., and Edith G. Wilson, B.A., Sc.B. (539, May, 1918. 1*d.*)

The Best Gliding Angle in Space for an Aeroplane in a Wind, the Engine being Shut Off. By the Aerodynamics Staff of the R.A.E. Presented by the Controller of the Technical Department, Aircraft Production. (544, September, 1918. 1*s.* 3*d.*)

The Bending, Vibrating and Whirling of Loaded Shafts. By J. Morris, B.A., Captain, R.A.F. (551, October, 1918. 9*d.*)

On the Action of Wind on Flexible Cables, with Applications to Cables Towed Below Aeroplanes, and Balloon Cables. By A. R. McLeod, M.A. Presented by Controller, Technical Department, Aircraft Production. (554, October, 1918. 6*d.*)

A Description of a Hot-Wire Anemometer which is Sensitive Over a Large Range of Wind Speed. By A. Fage, A.R.C.Sc. (556, November, 1918. 4*d.*)

Investigation of the Wind Forces and Moments Acting on a Model of Mark III Type Kite Balloon. By L. F. G. Simmons, B.A., A.R.C.Sc., and R. A. Frazer, B.A., B.Sc. (561, September, 1918. 6*d.*)

Tests with Two Model Monoplanes of the Woyevodsky Type. By L. F. G. Simmons, B.A., A.R.C.Sc. and E. Ower, B.Sc. (571, January, 1919. 4*d.*)

The Effect of Aspect Ratio and Shape of Wing Tip on Aerofoil Characteristics. By H. Glauert, of the Royal Aircraft Establishment. Presented by the Controller, Technical Department, Department of Aircraft Production. (575, January, 1918. 3*d.*)

Analysis of Phugoids Obtained by a Recording Airspeed Indicator. By H. Glauert, of the Royal Aircraft Establishment. Presented by the Controller, Technical Department, Department of Aircraft Production. (576, January, 1918. 2*d.*)

Engine Sub-Committee Reports

Notes on the Sparking of Two Spark Gaps in Series. Simple Theory of the Process. By C. C. Paterson, M.I.M.E., and N. R. Campbell, ScD. (28, February, 1918. 4*d.*)

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

First Direct Non-Stop Trans-Atlantic Flight

There has been a wide-spread expression of opinion that the first direct Trans-Atlantic Flight by Sir John Alcock and Sir Arthur Brown on a Vickers-Vimy-Rolls Biplane on June 14-15, 1919, should be permanently recorded in the Club House.

The idea has been fully considered by the Committee and they have decided to obtain portraits in oils, for hanging in the Club, of both Sir John Alcock and Sir Arthur Brown.

Sir John Lavery has very kindly consented to paint the portraits at a purely nominal figure, the canvases being 30 ins. by 25 ins.

A subscription list has been opened and subscriptions limited to £1 1*s*. are invited towards the cost.

Society of British Aircraft Constructors and the Royal Aero Club

A Meeting of the Joint Standing Committee of the Society of British Aircraft Constructors and the Royal Aero Club was held at the Royal Aero Club, 3, Clifford Street, London, W.1, on Wednesday, October 8, 1919, when there were present :—Royal Aero Club : Lieut.-Col. F. K. McClean, in the Chair, Lieut.-Col. Alec Ogilvie and Harold E. Perrin, Secretary (Representing Royal Aero Club) ; Society of British Aircraft Constructors : Capt. P. D. Acland, Mr. Hamilton Fulton ; In attendance : Mr. G. Holt Thomas and Charles V. Allen, Secretary (Representing Society of British Aircraft Constructors).

Australian Flight.—It was reported that the alighting ground at Singapore was on the Race Course and from the information received from General Borton, who had surveyed the route, it was considered suitable.

Royal Aero Club Seaplane Competition.—It was decided to recommend that the Competition which had been postponed owing to the Railway Strike, be further postponed till next year.

SPECIAL COMMITTEE MEETING

A Special Meeting of The Committee was held on Wednesday, October 15, 1919, when there were present :—Brig.-Gen. Sir Capel Holden. K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Lieut.-Col. F. K. McClean, Lieut.-Col. J. T. C. Moore-Brabazon, M.P., Lieut.-Col. Alec Ogilvie, Group Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., and the Secretary.

Royal Aero Club Seaplane Competition.—The recommendation of the Joint Standing Committee of the Royal Aero Club and Society of British Aircraft Constructors was received and it was decided to postpone the Competition till next year.

FLYING SERVICES FUND COMMITTEE

A Meeting of the Flying Services Fund Committee was held on Friday, October 17, 1919, when there were present :—Group Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., in the Chair, Mr. Chester Fox, Squadron Leader T. O'B. Hubbard, M.C., R.A.F., and the Secretary.

Grants and Allowances.—The following Grants and Allowances were made :—

(33) An allowance of £2 a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Flying Corps killed on active service.

(89) An allowance of £2 a month for six months to the widow of a Private in the Royal Flying Corps killed on active service.

(119) An allowance of £2 a month for six months to the widow of a Flight-Sergeant in the Royal Air Force who died on active service.

(122) The School Fees up to £10 of the son of the widow of a 2nd Class Air-Mechanic in the Royal Flying Corps killed on active service.

(159) An allowance of £2 a month for six months to the mother of a 2nd Class Air-Mechanic in the Royal Naval Air Service killed on active service.

(168) An allowance of £3 a month for six months to the mother of a Private in the Royal Air Force who died on active service.

(173) An allowance of £2 a month for three months to the widow of a 3rd Class Air-Mechanic in the Royal Air Force who died on active service.

(190) An allowance of £2 a month for six months to the mother of a 2nd Class Air-Mechanic in the Royal Air Force who died on active service.

(254) An allowance of £2 a month for six months to the father of a 1st Aircraftsman in the Royal Air Force who died on active service.

(261) A grant of £14 12*s*. 6*d*., an allowance of £3 a month for six months, and the school fees of the son of the widow of a Corporal in the Royal Air Force killed on active service.

(266) An allowance of £1 a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Air Force who died on active service.

(267) A grant up to £31 10*s*. to a Flight Cadet in the Royal Air Force incapacitated on active service.

(269) An allowance of £2 a month for six months and the school fees of a daughter of the mother of a Sergeant in the Royal Air Force killed on active service.

(270) An allowance of £2 a month for six months to the mother of a Corporal in the Royal Air Force who died on active service.

(271) A grant of £5 and an allowance of £4 a month for six months to the widow of a Sergeant in the Royal Air Force who died on active service.

Australian Flight

Captain Matthews on a Sopwith commenced his flight to Australia, in an attempt to win the Prize of £10,000 offered by the Australian Government, on Tuesday, October 21, 1919. Prior to the start, the machine was marked by the Officials of the Royal Aero Club, and his official starting time was 11.44 a.m., taken by Mr. Stevenson of the Royal Aero Club.

Coupe Deutsch de la Meurthe

The Aero Club de France has provisionally awarded the Coupe Deutsche de la Meurthe to M. Sadi Lecointe who completed the circuit of about 200 kilometres embracing Terrasse de St. Germain, Senlis, Meaux, Melun, Terrasse de St. Germain, on October 15, 1919, at an average speed of 249 kilometres 719 metres an hour. In order that a new Competitor may become the provisional holder of the Cup it is necessary for this speed to be beaten by one-tenth.

Trans-Pacific Flight

The following Rules have been received from the Aero Club of America :—

Mr. Thomas H. Ince, of Culver City, Cal., has offered, through the Aero Club of America, a fifty thousand dollar prize for a flight across the Pacific Ocean, to be awarded to the aviator who shall first complete an aerial voyage across the Pacific Ocean in a heavier-than-air machine, between the months of September, 1919, and February, 1920, inclusive ; contestants must complete the trans-Pacific flight within 288 hours from the time of starting. This flight may be attempted from either side of the ocean under the conditions which have been drawn up and which are as follows :—

No part of the entrance fees are to be received by Thomas H. Ince. All such entrance fees will be applied toward payment of the expenses of the Pacific Aero Club in conducting the contest. Any balance not so expended will be refunded to the contestants *pro rata*.

Starts

The start of contestants may be from land or water, but in the latter case, the contestants must cross the coast line at the beginning and end of the flight. The time will be taken from the moment of leaving the land or crossing the coast line. Each contestant shall advise the Pacific Aero Club of the proposed date and time of his start, as all starts must be made under the supervision of an official or officials of the above-mentioned Club.

Air Mileage

Ninety-five per cent. of the mileage travelled from starting point to finish must be accomplished in the air. Barographs officially sealed, and opened only in the presence of an accredited representative of the Pacific Aero Club shall be attached to each aircraft before starting. The recordings of these barographs shall determine the air mileage actually travelled.

Towing

Towing is not prohibited.

Stoppages

Stops and landings, either on the water or at any point *en route*, may be made by the contestants.

Identification of Aircraft

Only one aircraft may be used for each attempt. It may be repaired *en route*. Each aircraft will be so marked before starting that it can be identified on reaching its destination.

Finish

The finish may be made on land or water. The time will be taken at the moment of crossing the coast line in flight or touching land. Each contestant shall advise the Pacific Aero Club of his proposed destination and alighting place.

General

(1) A contestant by entering thereby agrees that he is bound by the regulations herein contained or to be hereafter issued in connection with this contest.

(2) The interpretation of these regulations or of any to be hereafter issued will rest entirely with the official committee of the Pacific Aero Club.

(3) The contestant shall be solely responsible to the Officials for the due observance of these regulations, and shall be the person with whom the officials will deal in respect thereof or of any question arising out of this contest.

(4) A contestant by entering waives any right of action against the Fédération Aéronautique Internationale, the Aero Club of America, the Pacific Aero Club, or Thomas H. Ince, for any damages sustained by him in consequence of any act or omission on the part of the officials of any of the above-mentioned clubs or Thomas H. Ince, or their representatives or servants or any fellow contestant.

(5) The aircraft used shall at all times be at the risk in all respect of the contestant, who shall be deemed by entry to agree, to waive all claim for injury either to himself, or his passengers, or his aircraft, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the above-mentioned clubs and Thomas H. Ince in respect thereof.

Rules and Regulations for the Thomas H. Ince Trans-Pacific Flight

Thomas H. Ince offers the sum of fifty thousand dollars to the aviator who shall first complete an aerial voyage across the Pacific Ocean, in a heavier-than-air machine, mechanically propelled, of any size and type. Said flight may be attempted from either side of the ocean, but if westward the starting place must be from the Thomas H. Ince Aviation Field at Venice, California, or the Thomas H. Ince Hydro-aeroplane Station at Venice, California, and the finish must be on the mainland of Australia, or the mainland of the Japanese group of islands, or the mainland of the Philippine group of islands or the continent of Asia; if eastward, the starting place must be the mainland of Australia or the mainland of the Japanese group of islands, or the continent of Asia, and the finish must be on the mainland of the United States of America. The course of said flight must be confined to latitudes 49 degrees north and 32 degrees 33 minutes north of the United States of America, and latitudes 41 degrees 35 minutes 20 seconds north and 38 degrees 45 minutes south of the Eastern Pacific.

Auspices

The contest shall be conducted by the Aero Club of America, through its official affiliation and representative the Pacific Aero Club, and shall comply with the rules and regulations of the Fédération Aéronautique Internationale.

Time Limit

The contest shall be confined between the months of September, 1919, and February, 1920, inclusive, and contestants must complete the trans-Pacific flight within two hundred and eighty-eight (288) hours from the time of starting.

Awards

In the event that no contestant shall successfully complete a trans-Pacific flight, for which the sum of fifty thousand ($50,000) dollars is offered, the contestant starting from the Thomas H. Ince Aviation Field at Venice, California, or the Thomas H. Ince Hydroaeroplane Station at Venice, California, who shall have reached the Hawaiian Islands in the shortest length of time, shall be awarded the sun of ten thousand ($10,000) dollars, and in the event that no contestant shall complete a flight to the Hawaiian Islands, the contestant starting from the two above-mentioned places who shall fly the furthest in the direction of the Hawaiian Islands shall be awarded the sum of five thousand ($5,000) dollars.

Qualification of Contestants

The contest is open to persons of any nationality holding an aviator's pilot licence issued by an accredited aero club affiliated with the Fédération Aéronautique Internationale, or to persons who have been so rated by any military or naval establishment.

Entries

The entry form, which must be accompanied by the entrance fee of $500, must be sent to the secretary of the Pacific Aero Club, Monadock Building, San Francisco, California, at least fourteen days before the entrant makes his first attempt. No entrance fee will be required of any military or naval entrant. Foreign entries will make application to the clubs in their respective countries which are affiliated with the Fédération Aéronautique Internationale.

Great Britain to Australia Flight

The following are the entries for the £10,000 Prize offered by the Australian Government for a flight from Great Britain to Australia:—

Pilot and Navigator	Crew	Machine	Engine
Capt. Cedric Ernest Howell, D.S.O., M.C., D.F.C.	Henry Fraser (Mechanic)	Martinsyde	275 h.p. Rolls-Royce Falcon
Capt. George Campbell Matthews	Sergeant Tom Kay (Mechanic)	Sopwith	350 h.p. Rolls-Royce Eagle 8
Capt. Ross Macpherson Smith	Lieut. Keith M. Smith, R.A.F. (2nd Pilot) Sergeant J. M. Bennett Sergeant W. H. Shiers (Mechanic)	Vickers-Vimy	Two 350 h.p. Rolls-Royce Eagle 8
Pilot Lieut. Valdemar Rendle	Lieut. D. R. Williams (2nd Pilot) Capt. G. H. Wilkins (Navigator) Lieut. G. H. Potts (Engineer)	Blackburn Kangeroo	Two 250 h.p. Rolls-Royce Twin Falcon
Lieut. Roger Douglas, M.C., D.C.M., A.F.C.	Lieut. J. S. L. Ross, A.F.C. (Navigator)	Alliance	450 h.p. Napier "Lion"

Presentation to the Club

The following book has been presented to the Club by Major C. C. Turner:—

"The Struggle in the Air, 1914-1918," by Major C. C. Turner. (Published by Edward Arnold.)

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

Midshipmen and the R.A.F.

In view of the number of junior naval officers who will be surplus to the requirements of a post-war Navy, arrangements have been made by the Admiralty with the Air Ministry for a limited number to be transferred to the R.A.F. These officers must have passed through Osborne and Dartmouth, and must be over the age of 18½ years and under the age of 20 on February 1 next. They will be admitted to the R.A.F. College without examination and without being called upon to pay fees, apart from the cost of books and instruments.

Certain medical examinations will have to be passed and those who become cadets at the Air Force College will be required to undergo instruction there for only one year, instead of the two years required of ordinary cadets, and they will receive pay at the rate of 10*s.* a day.

SOME FRIEDRICHSHAFEN "MILESTONES"

(*Concluded from page* 1374)

"The F.F. 43

"This machine, which is shown in Figs. 24 and 25, was a single-seater fighter, very easy on the controls and quite fast and with a good climb. It also started from and alighted on the sea very easily. By way of armament it was fitted with one, sometimes two, fixed machine-guns. A characteristic feature of this type was that the pilot sat with his eyes on a level with the rear spar of the top plane, so that he could easily look either over or under the plane, which was a great advantage for fighting in the air.

"The F.F. 44

(Fig. 26) was an experimental machine, fitted with a 240 h.p. Maybach engine., driving the screw through reduction gearing."

"The F.F. 48

"This machine was designed as a two-seater fighter and was fitted with a 240 h.p. Maybach engine with direct drive (Fig. 27). The machine was very fast, had an extraordinarily good climb, and yet was very seaworthy. In spite of the heavy motor and the great quantity of fuel (sufficient for 5½ hours) the F.F. 48 was very handy. With the rear machine gun it was possible to fire over the top plane and between the propeller tips and the inner pair of interplane struts. The fixed machine gun was built-in to the right of the engine and was worked by the pilot.

"The F.F. 49C

represented a considerable improvement on the type F.F. 39. It is shown in Figs. 28 to 30. The main data relating to it are:—Weight empty and without water, 3,260 lbs.; load, 1,430 lbs.; total weight, 4,690 lbs.; length o.a., 38 ft. 2 in.; span, 55 ft. 6 in.; float volume, 80 cub. ft.; speed, 80-87 m.p.h.; taking-off speed, 50 m.p.h.; climb to 6,600 ft. in 30 minutes; duration, 5½ hours.

"This machine gives a very robust impression and is at first sight even somewhat clumsy. There is nothing "streamliny" or light about it, but everything is heavy and strong. It is clearly seen that in the construction of this machine not only the aerodynamical expert but also the sailor has had a say. The object which the constructor had to attain was to produce an aircraft which, with a 220 h.p. engine and a load of about 1,430 lbs., should have the greatest possible seaworthiness, and an experience extending over more than two years has shown that this object has been attained in a most complete manner.

"By seaworthiness is understood the capabilities of the seaplane to start, land and taxi under certain conditions of wind and sea with full load, and piloted by an average pilot. As, in spite of the fact that the designer chiefly aimed at seaworthiness—the machine had a very good performance—it shows how thoroughly the construction has been thought out. A speed of 87 m.p.h. and a climb of 6,600 ft. in 25 to 30 minutes must be considered exceptionally good for a seaplane; especially is the latter satisfactory in view of the fact that seaplanes are usually flown at fairly low altitudes. In the air the machine is very comfortable and easy to fly. The manœuvrability is extraordinarily good, considering that the machine weighs over 2 tons and has a span of 55 ft. 6 ins.

"As already mentioned the machine had an opportunity of proving itself during the latter part of the war. It might be further pointed out that on several occasions the crews of other seaplanes have been rescued with this type, and that even with the extra load of the rescued crew the machine has started from a fairly rough sea. Or another example: A machine of this type has floated about in a high sea for seven days at the end of which time the crew—which long ago had been given up as lost—were rescued. The FF. 49C was also used as a reconnaissance machine with one movable machine gun and wireless apparatus.

"The F.F. 49B

was used purely as a bomber (Fig. 31). In general dimensions and design, the 49B is similar to the F.F. 49C, but in the 49B the pilot occupies the rear seat, while the observer sits in front with the telescopic bomb sights.

"The F.F. 59B

"As a result of the requirements for reconnaissance machines to be capable of defending themselves against attack, and even under suitable conditions to go over to attack, the F.F. 59C shown in Figs. 32 and 33 was so designed that with the rear machine gun the gunner could fire forward between the first pair of interplane struts and the propeller disc, whilst the fixed machine gun was worked by the pilot. In order to give as large a field of fire as possible to the rear machine gun, the inner front interplane strut was moved outwards slightly farther than the corresponding rear strut, and the wing bracing of the inner bay was entirely omitted.

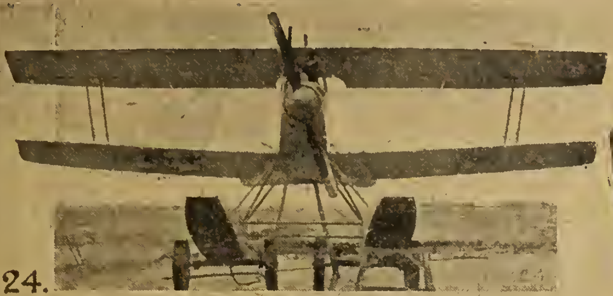
"The F.F. 64

"The success of the 'Wolfchen' as a ship's 'plane to the auxiliary cruiser 'The Wolf,' led to the construction of the F.F. 64 (Figs. 34 and 35). This machine, which had a 160 h.p. Mercedes engines, has been specially designed to be easily launched from the ship. In order to facilitate storage and launching, the wings are made to fold back, the hinges being just above the floats. The machine can also be easily dismantled and erected without its rigidity, reliability and seaworthiness being impaired.

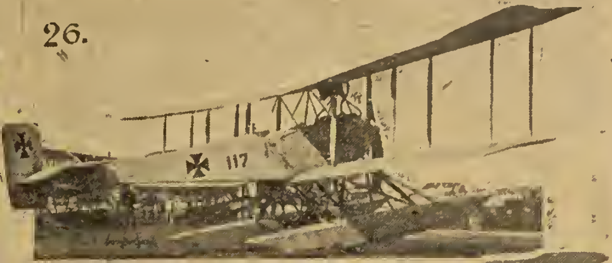
"As a result of the very extensive experience of seaplane construction for War purposes, the Friedrichshafen aircraft works on Lake Constance and its branch factory at Warnemünde are in a position to, and are making every effort to, take up the construction of seaplanes for commercial purposes. As the firm has up till now chiefly devoted its energies to the construction of seaworthy seaplanes, it will be seen that it is in a better position than many other firms to construct seaworthy commercial and sporting seaplanes of all types. Especially suitable for this purpose would be the types which have proved themselves during the war, such as F.F. 49C, 33J(S), 33L, 41A, and 64. The type F.F. 49C is, it will be seen from the particulars given above, especially suitable for commercial work. The useful load of 1,430 lbs. may be divided up in different ways, according to the purpose for which the machine is intended, between crew, fuel, passengers and mail. For instance, with sufficient fuel for 3½ hours over 600 lbs. of useful load could be carried. For passenger carrying it would be easy to provide seating accommodation, either open or closed, enabling the machine to carry two or possibly three passengers in addition to the pilot.

"Seaworthiness means safety. Safety is one of the chief considerations for a commercial aeroplane. Since the seaworthiness of this type has never, in spite of the greatest efforts, been beaten by the machines of any other firm, it would appear that also in post-war competition it will be one of the most suitable types and difficult to beat. Much the same may be said about the lower-powered machines FF. 33J, F.F. 33S and F.F. 64. Especially would the latter machine offer great advantages for commercial work to shipowners for carrying on board as a ship's 'plane. For instance, it would be possible without going into port, or in other words without any appreciable loss of time, to put ashore or to take on board single passengers or mail. Or, before arriving at the port of destination an officer could be sent ashore in the machine with the ship's papers, thus not only saving time but possibly also making a considerable profit on goods carried through being first in. Also the passenger who is in a hurry can be sent on ahead in the machine, thus shortening his time of crossing by as much as 10 hours. On the other hand, the machine can fetch mail from ashore so that the mail can be on board the ship several hours before she reaches port. The machine can be employed to assist in navigation on approaching the coast in bad weather, and it can also be utilised for flying ahead of the ship, spotting for floating mines. In case of accident it may possibly be used for obtaining assistance quickly. Also from the land, the machine can be used with advantage. For instance, a merchant could be flown out to meet the incoming ship, which is carrying an agent, so that all the business could be transacted by the time the ship arrived in port, thus beating the competitors who have remained ashore. For use by salvage companies it would be possible to use the seaplane for taking an engineer to the place of the stranding in the shortest possible time, where he could photograph the stranded ship and even, if the sea is not too rough, alight and go on board the wrecked ship, so that the salvage contract could be completed before a competitor could arrive by steamer in the ordinary way. F.F. 33L is very suitable for practice flying for young pilots, and would make a good sporting machine. It is light and very comfortable to fly and requires little storage space, while being easy to dismantle and erect. All of which are qualities that make it specially suitable as a sporting machine for the private owner.

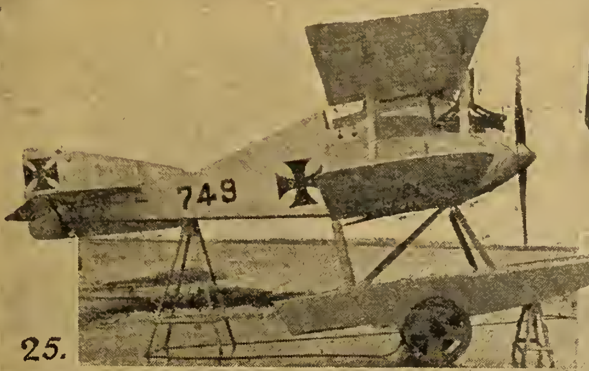
"If it is a question of carrying relatively great loads at lower speeds, a machine similar to the type F.F. 41A or to the type F.F. 53, with two 260 h.p. Mercedes engines, would be suitable."



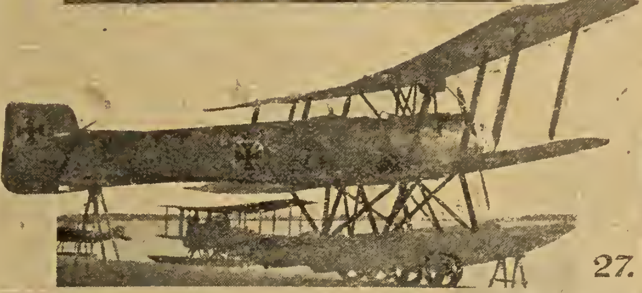
24.



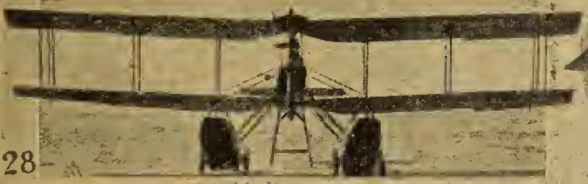
26.



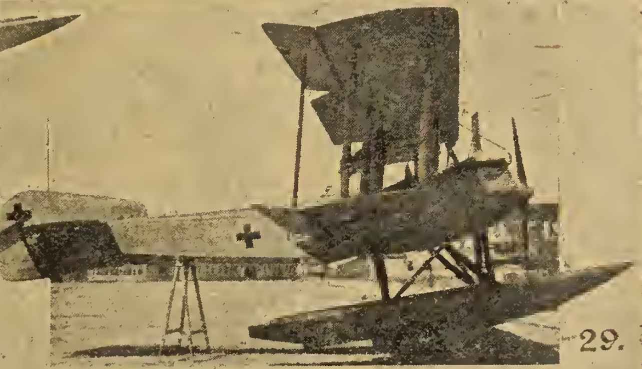
25.



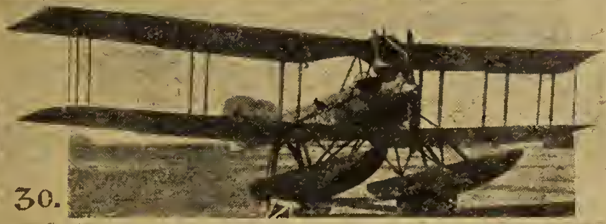
27.



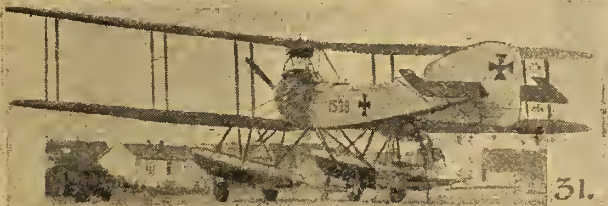
28



29.

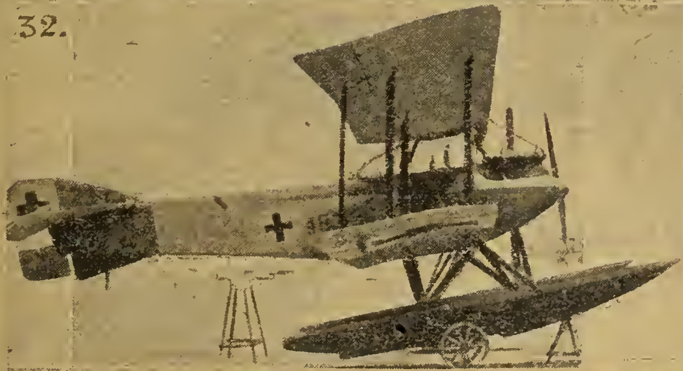


30.

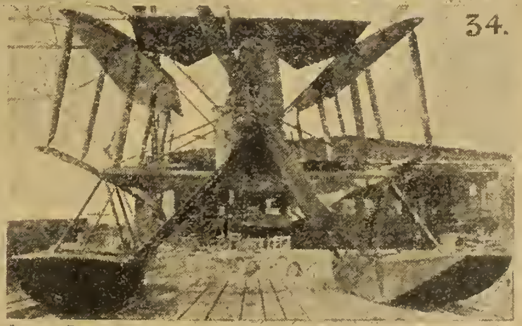


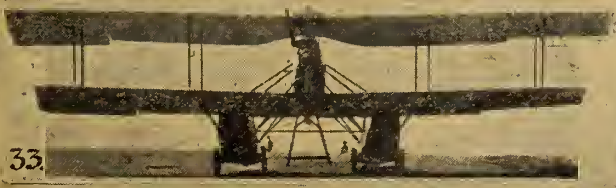
31.

32.

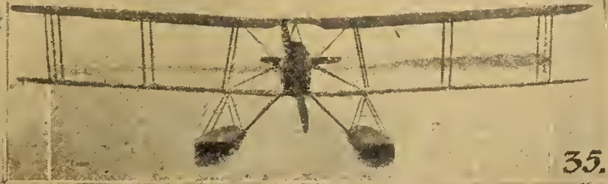


34.





33.



35.

THE FRIEDRICHSHAFEN SEAPLANES : Figs. 24 to 35

THE AUSTRALIAN GOVERNMENT FLIGHT COMPETITION

In spite of the great difficulties attending a flight to Australia at the present time, four machines have been entered for the Australian Government's prize of £10,000 for a flight in 30 days from Britain to Australia, a distance of 11,500 miles, and the pilots have notified their intention to start shortly. The successful completion of the flight will establish a new link in the chain of Empire, which has already been forged by the recent Transatlantic flights and the trips to Egypt and India.

The names of the pilots and crews and details of the machines entered are given on p. 1393.

Captain Matthews Starts

As recorded in the Official Notices of the Royal Aero Club on p. 1392, Capt. G. C. Matthews and Sergt. Kay, both of the Australian Flying Corps, left Hounslow at 11.45 a.m. on Tuesday on the first stage of their 13,000-mile flight to Australia.

The machine—fully described in the last issue of Flight—on which Capt. Matthews is attempting to reach Australia is a Sopwith Wallaby fitted with a single 375 h.p. Rolls-Royce engine.

Among a small number of postal packets taken is a letter from the King to the Governor-General of Australia.

The Air Ministry announces that the following messages have been transmitted to Capt. Matthews :—

From Prince Albert.—May good fortune attend you in your sporting flight.

From Maj.-Gen. Seely (Under-Secretary of State for Air).—I wish you the best of luck in your sporting attempt to fly to Australia.

From Maj.-Gen. Sir F. H. Sykes (Controller-General of Civil Aviation).—Success to your effort.

The route to be followed is :—Paris, Lyons, Rome, Naples, Brindisi, Sicily, Aboukir, Kantara, Damascus, Baghdad, Basra, Karachi, Delhi, Calcutta, Rangoon, Penang, Singapore, Bandoeng, Agamboea, and Port Darwin.

The Arrangements.

With the existing facilities for refuelling and landing in emergency, especially at the eastern end of the route between Indian and Australia, this journey is a most rigorous test of physical and mechanical endurance, as may be judged from the fact that in the case of aeroplanes the last lap of the course, 1,750 miles from Bandoeng (Java) to Port Darwin (North Australia), coming as it does after some 10,000 miles of flying, is in itself comparable in severity with the flight by aeroplane across the Atlantic.

Every assistance possible has been given by the Air Ministry, in conjunction with the Royal Aero Club and the Commonwealth Government, towards lessening the risk to competitors. Among the duties undertaken by the Air Ministry have been arrangements for the supply of fuel and the use of R.A.F. personnel, where available, at stopping places, a survey of the route between Calcutta and Australia, and an investigation of the many problems of meteorology, navigation and wireless and cable communications ; all factors essential to success.

The competition was initiated by the Australian Government in March last, but the flight did not take place earlier partly because the International Air Convention, permitting flying over foreign countries, was not signed until September 10, and partly because no ground organisation (including necessary supplies) existed East of Delhi, and no survey had ever been undertaken. The Air Ministry had previously decided to carry out a survey of this section across Burma, the Malay Peninsula and the Dutch East Indies, and Brig.-Gen. A. E. Borton, D.S.O., and Capt. Ross-Smith had been despatched to carry out the work as speedily as possible.

On his return, Gen. Borton reported that the construction of aerodromes at distances of approximately 400 miles apart over this section was highly desirable, but if this plan was to be carried out before flying was permitted, no flights would take place this year and the favourable weather which prevails generally along the route during November, would have passed.

Therefore, although the competitors have been warned that the route is largely unready they have chosen to make an attempt at once ; recognising and accepting gallantly the risks attending the long flights over this region of rugged volcanic islands, jungle and swamps. But while the ground organisation is still imperfect, arrangements have been made for the race courses at Rangoon and Singapore to be used as landing grounds, and the Netherlands Government has consented willingly to place its aerodrome at Bandoeng (Java) at the disposal of competitors. Even by following this route, however, aeroplanes will have great distances to fly between each landing station, especially between Bandoeng and Port Darwin. In view of this, the Air Ministry has suggested that it would be advisable for competitors to convert their aeroplanes into seaplanes by the substitution of floats for wheels at Calcutta or another suitable point, so that the machines would be able to use the many available harbours and sheltered inlets along the route.

The route which the Air Ministry has advised competitors to follow between England and Australia is summarised hereafter, but the Royal Aero Club does not compel them to adhere to it except that they must stop at Singapore, which is the only control station under the rules of the contest.

The first section which passes over France, Italy, and Malta to the North Coast of Africa and to Egypt at Aboukir, was the route followed by Brig.-Gen. MacEwan and Major Maclaren some months back. The aerodrome at Suda Bay (Crete) is, unfortunately, reported flooded—which prevents that route being taken.

From Aboukir to Karachi the route follows that explored by Gen. Salmond a year ago, by way of Damascus, Baghdad, Basra, and the coasts of Persia and Baluchistan. More than one flight has been made over this section, but it cannot be regarded as fully organised, and special arrangements have had to be made by the Air Ministry for the preparation of landing grounds and the supply of fuel. The landing grounds available are generally good and landing on the desert is usually practicable in emergency, but the possible unfriendliness of the inhabitants, not less than the shortage of water and the absence of means of communication, add to the risks of a forced landing.

On leaving Karachi, the next stage lies across India to Calcutta via Nasirabad, Delhi and Allahabad, and the Indian Government has promised all possible assistance from the Royal Air Force in India. No aerodrome exists in Calcutta, but the competitors will be able to land on the race-course.

Beyond Calcutta competitors are responsible for making their own arrangements for the necessary supplies of fuel, spares, etc., in view of the fact that no British Official aerodromes exist.

Some of the difficulties which competitors may expect on the Calcutta-Australia Section are indicated from the following notes. On the aeroplane route there is a landing ground at Akyab, 280 miles from Calcutta, but it is far from wise for a pilot to attempt to land there unless he has previously inspected the surface. No other landing ground is available for over 500 miles until Rangoon race-course is reached ; here, also the pilot should know the ground.

There is another long stretch of more than 1,300 miles to Singapore where once more the only possible landing ground is the race-course. The authorities have kindly consented to do a certain amount of work which is required to clear these race-courses in order to fit them as landing grounds.

The next possible stopping place for aeroplanes is a Dutch Flying School at Bandoeng (Java), which the Dutch Government have kindly put at the disposal of the competitors.

This competition resembles others in that the hardest task is at the end. Between Bandoeng and Port Darwin, a distance of 1,750 miles, of which 500 miles are over the sea, there are no aerodromes of any description. Under these circumstances the successful accomplishment of this section of the flight alone will mark an epoch in the world of aviation, and will tend to advance still further the high standing of British aircraft firms.

Gen. Borton considers that at least three-quarters of the whole section between Calcutta and Australia, over Burma, Malay and the East Indies, offers but slight chance of a successful emergency landing in an aeroplane, and warns pilots against being deceived from the air ; particularly against attempting a landing on the sea shore or on the paddy fields.

On the other hand, machines equipped with floats, have the advantage of being able to alight in many sheltered harbours between Calcutta and Port Darwin, and may stop at will for refuelling at Akyab, Rangoon, Mergui, Penang, Singapore, Banka, Batavia, Surabaya, Bima and Koepang Bay (Timor), the distance between each being comparatively short, no stage exceeding 500 miles.

Apart from the difficulties outlined, good weather will be an important factor to success, and one of the reasons why competitors have decided not to start until this month is the fact that, taken all round, the weather during the latter part of October and in November is reported to be better than at any other period of the year. Notwithstanding this, competitors may have to contend with adverse conditions on some sections of the route. The Air Ministry will assist pilots to obtain weather reports at different points on the journey.

Air Ministry Route for Competitors

The aerodromes or emergency landing grounds available are as follows: Places printed in SMALL CAPITAL letters are main stopping places; places where fuel and oil are available are marked with an asterisk. The distance in miles from London is shown in each case.

London to Aboukir (Egypt)

Miles.	
	*HOUNSLOW.
	*LYMPNE.
	*MARQUISE.
240	*PARIS (LE BOURGET).
415	Beaune.
603	*LYONS.
755	*MIRAMAS.
844	*ST. RAFAEL (or FREJUS).
1,050	*PISA (ST. GIULIANO).
1,225	*ROME (FORT BARACA).
1,340	*NAPLES (CAPODICHINO).
1,424	*FOGGIA (SOUTH).
1,562	*BRINDISI (or TARANTO).
1,624	SICILY.
1,742	*MALTA.
2,157	Ben Ghazi.
2,475	*Sollum.
2,525	Sidi Barani.
2,595	*MERSA MATRUH.
2,675	El Dabaa.
2,729	El Hamman.
2,755	*EL AMRIAH.
2,827	*ABOUKIR.

(Further information received regarding the flooding of Suda Bay (Crete) on this section of the route indicates that it was available up to October 12th, but it cannot generally be relied upon for use after November 1.)

Aboukir to Karachi.

2,933	*KANTARA.
	Hit.
	Ramdieh.
3,742	*BAGHDAD.
4,047	*BASRA.
3,253	*BUSHIRE.
4,660	*BANDAR ABBAS.
4,933	*CHARBAR.
5,401	KARACHI.

(Damascus and Abu Kemel were originally included, but it is now stated that these two points will not now be available to competitors, who should, therefore, be prepared to carry out their flight without landing at these places. There is a landing ground, however, at Ramdieh (near Jerusalem) which may be used.)

Karachi to Calcutta

5,375	Nasirabad.
6,093	Delhi.
6,325	Cawnpore.
6,375	Fateh Pur.
6,375	*ALLAHABAD.
6,985	CALCUTTA (FORT WILLIAM).

Calcutta to Port Darwin

The routes proposed for aeroplanes and seaplanes are shown separately. (Favourable alighting conditions for seaplanes are to be found at any of the places mentioned. Fuel supplies are known to exist at the places marked with an asterisk. The competitors have arranged with the Shell Marketing Company to provide petrol on this section.)

Miles.	Aeroplanes.
7,688	RANGOON.
9,011	*SINGAPORE.
9,549	*BANDOENG (Java).
11,294	PORT DARWIN.

Miles.	Seaplanes.
7,342	AKYAB (Burmah).
7,688	RANGOON.
8,046	MERGUI.
8,576	*PENANG.
9,011	*SINGAPORE.
9,242	BANKA.
9,549	*BATAVIA.
9,987	SURABAYA.
10,419	BIMA.
10,776	KOEPANG BAY.
11,294	PORT DARWIN.

* * *

Poulet's Flight to Australia

As briefly recorded in our last issue, Poulet was able to make a start from Paris on the morning of October 14, and he succeeded in reaching Frejus. The next morning he set out for Rome, but was forced down by the bad weather at Pisedom, north of Rome, and had to wait until the following day to complete the stage to Rome. He started off on his Caudron, from the Centocelle aerodrome on October 18 for Salonika, but later in the day he arrived at Naples, where he was compelled to land on account of bad weather conditions prevailing.

The Deutsch Cup

IN further trials for the Deutsch Cup on October 14 M. Rozt completed the course of 120 miles round Paris in 55 min., but as he did not improve on Jansen's speed of 200–655 kiloms. per hour by 10 per cent. he did not secure the trophy. M. Romanet also made a trial, but could not complete the course. In his first lap he is said to have averaged 268 kiloms. per hour. On the following day Sadi Lecointe, on a Spad, succeeded in doing the distance in 46 min. 7 sec., averaging 247–719 kiloms. per hour, and he therefore holds the cup for the time being.

British Machines for Chile

CHILE is looking towards Great Britain for her aviation supplies, and her Aerial Forces Department has decided in favour of accepting the offer of a British house to establish works for the construction of aeroplanes in Chile.

A Club for Canadian Flyers

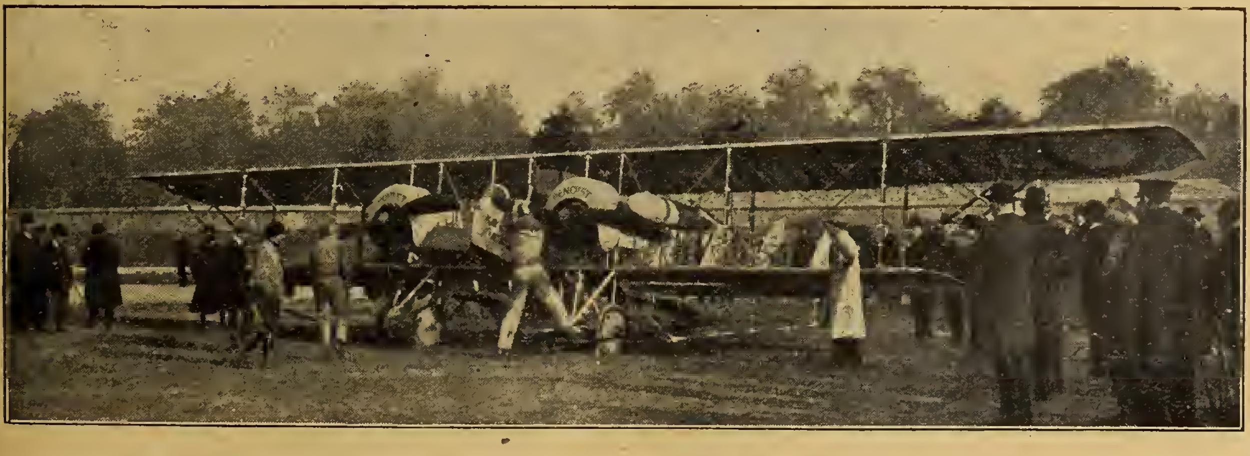
CANADIAN flying officers who have seen oversea service have organised a club, and hope eventually to organise and own an aerodrome, together with a number of machines. It is also proposed that the club should make entries for international flying competitions.

To Link-Up Ireland by Air

A START may shortly be made with the organisation of a regular aerial service between England and Ireland, as permission has been granted to a Blackpool firm to use Merrion Stand, a huge expanse of seashore near Dublin, for landing and taking up passengers in connection with an aerial service which is to link up the principal cities and towns of Ireland.

The New Farman "David"

A NEW small two-seater machine, fitted with a 40 h.p. engine, is now being constructed in the Farman works. Its first trial flight will be a trip from Paris to Casablanca, probably carrying a passenger.



M. Etienne Poulet starting from Paris on October 14 for his attempt to fly to Melbourne. Starting the props. of the twin-engined Caudron

THE ALTITUDE LABORATORY FOR THE TESTING OF AIRCRAFT ENGINES

BY H. C. DIckINSON AND H. G. BOUTELL

(Concluded from page 1380)

The Air Cooling Systems

The air cooling system may be divided into three parts—the refrigerating plant, the cooling system for the carburettor air, and the cooling system for the interior of the altitude chamber.

The refrigerating plant is installed in the left hand portion of the building, as seen in Figs. 1 and 11. The ammonia compressor is a 9 by 9 in., double cylinder, vertical, enclosed machine, with a refrigerating capacity of 25 tons in 24 hours, and was built by the York Manufacturing Co., York, Pa. It is belt-driven from a 50 h.p. electric motor. The plant operates on the direct-expansion system, the ammonia condenser being placed against the outside of the west wall of the building, with the ammonia receiver along the north wall, back of the compressor.

The cooling system for the carburettor air consists of a bank of ammonia coils mounted on top of the altitude chamber. The coils are made up of 2,000 ft. of 1¼-in. pipe, enclosed in a box and insulated with 4 ins. of sawdust. The air is made to pass through this box in a tortuous path, and is then led through an insulated pipe provided with a set of electric heating grids and a regulating valve to the test-chamber through opening 18. From this inlet it passes through the air meter to the carburettor. In this way warm or cold air may be supplied to the intake as required.

The system for cooling the air within the chamber is made up of a bank of 800 ft. of 1¼-in. ammonia coils, placed in the left hand portion of the altitude chamber, as shown in Figs. 1 and 3. Four motor-driven fans are provided to force the air over these coils, while another fan is installed to circulate the air past the engine itself when desired.

By means of the refrigerating plant and cooling system just described, it is possible to reduce the temperature of the air admitted to the carburettor and that within the test-chamber to a point approximating the temperature at any altitude up to about 30,000 to 40,000 ft., depending upon the size of the engine. Owing to the fact that the temperature cannot be readily controlled by means of the refrigerating plant, the air, after cooling and before admission to the carburettor, is passed over a series of electric grids, by means of which the temperature may be again raised and kept at any desired point. The current flowing through these grids is controlled by conveniently placed switches. Some difficulty has been experienced due to the condensation of moisture which occasionally causes a "snow storm" in the air passage to the carburettor. It is hoped that this difficulty will be entirely overcome in the new laboratory, through the elimination of leaks into the refrigerating chamber and the use of what may be termed a "settling chamber," through which the air will pass after being cooled, and in which the air flow will be so sluggish that the snow will be deposited.

The Jacket Circulating Water Cooling System

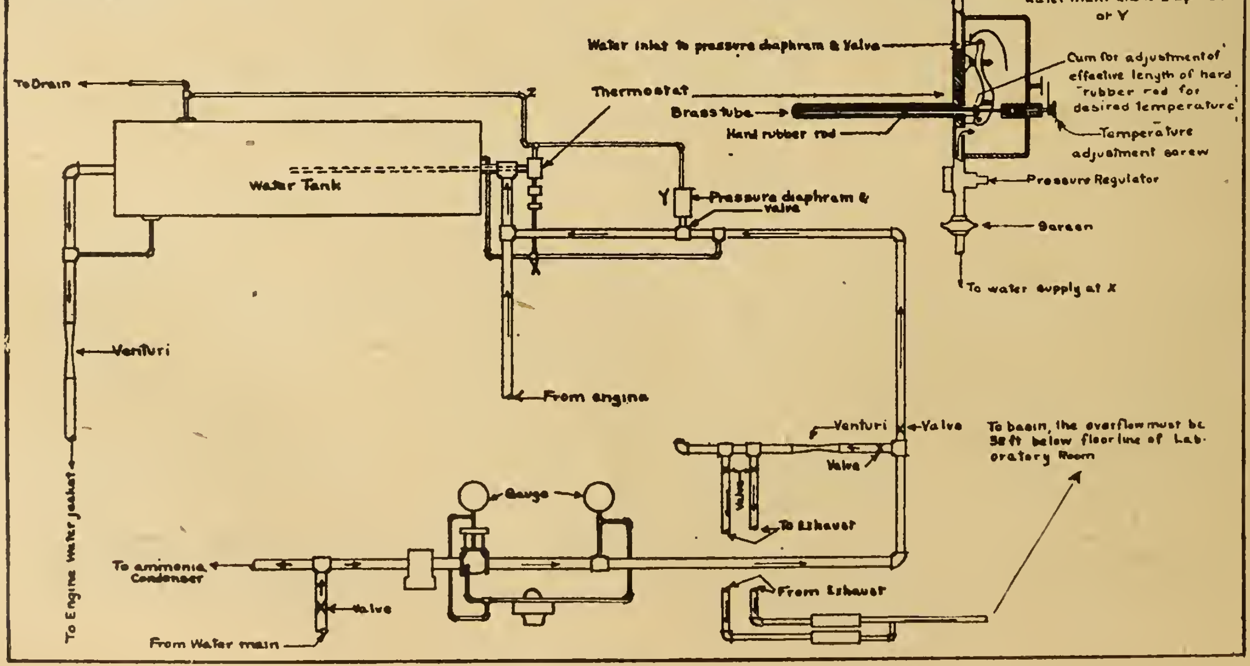
The jacket water cooling system is arranged as follows:—Above the altitude chamber is placed a cylindrical iron tank connected to the inlet and outlet pipes of the engine's circulating system, and with another pipe from the city mains, while an overflow leads to the sewer. A thermostat is placed within the tank, the brass rod of this device controlling a pilot valve which admits or discharges city water from a bellows, which in turn, controls the main valve on the city supply pipe. In case the temperature of the water in the tank rises above a certain point, the expansion of the thermostat rod causes the pilot valve to open, admitting water to the bellows, and thus allowing cold water from the city supply mains to flow into the tank. When the temperature has again fallen, the contraction of the thermostat rod closes the pilot valve and allows the water to escape slowly from the bellows. Two-coil springs then close the main valve, cutting off the supply.

The thermostat is mounted in the fitting through which the water enters the tank from the engine jackets, and also from the city mains. It is, therefore, very sensitive to slight changes in temperature; a very important matter in a laboratory of this sort, since even a comparatively slight variation in the temperature of the circulating water affects the heat distribution in the entire engine. In practice it has been found possible to hold the temperature of the jacket water to a variation of about 5° C.

The Exhaust Cooling System

The exhaust cooling system is shown diagrammatically in Figs. 3 and 5. The exhaust pipes connected to the engine are water-jacketed, the inner pipe extending down about 3 ft. from the exhaust port, while the outer pipe or jacket is continued from the exhaust port to the main exhaust manifold in the form of a flexible tube. In this way the whole connection is flexible. This arrangement is clearly shown in Fig. 9. The water from the annular space mixes with the exhaust gases only at a point a considerable distance from the engine. The water enters the altitude chamber through

FIG. 5.


Valve in drain
To Drain at Z
To valve in water main and to diaphrem or Y
Water inlet to pressure diaphrem & Valve
Cum for adjustment of effective length of hard rubber rod for desired temperature
Thermostat
Brass tube
Hard rubber rod
Temperature adjustment screw
To Drain
Z
Water Tank
Y
Pressure diaphrem & valve
Pressure Regulator
Screen
To water supply at X
Venturi
From engine
Venturi
Valve
Valve
To basin, the overflow must be 3 ft below floor line of Laboratory Room
Gauge
Gauge
Valve
To Exhaust
To ammonia Condenser
Valve
From Exhaust
To Engine water jacket
From Water main

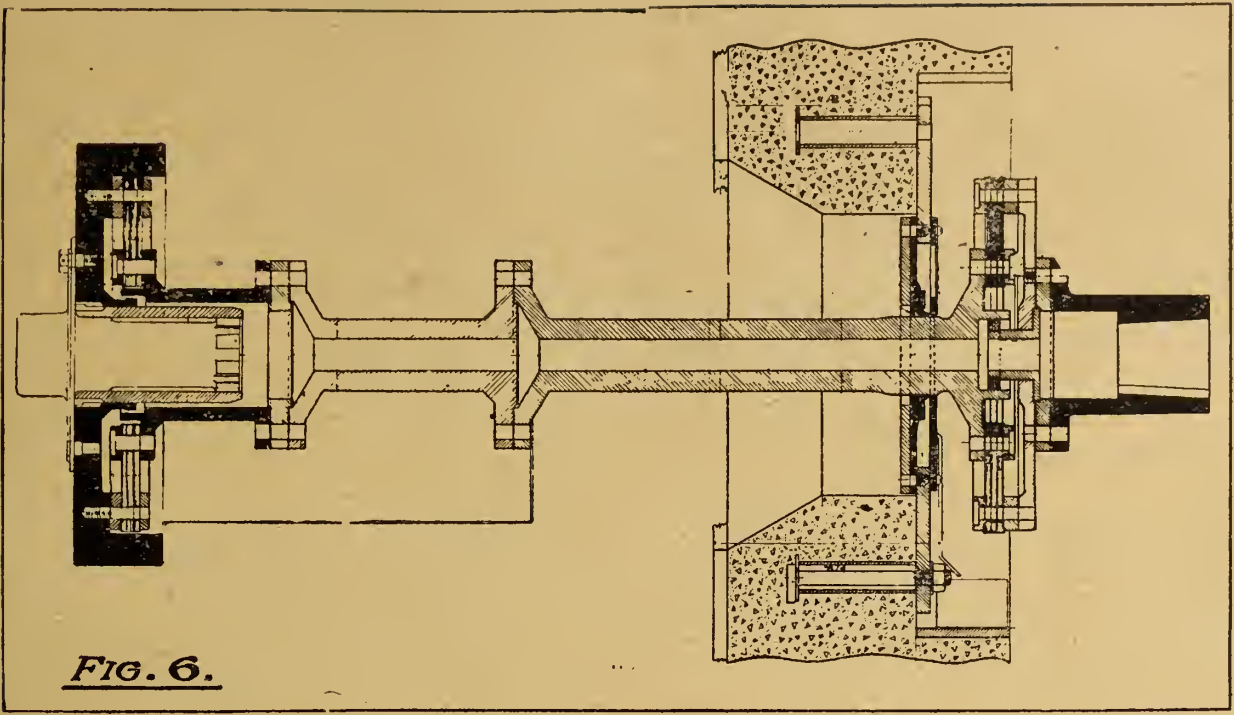


FIG. 6.

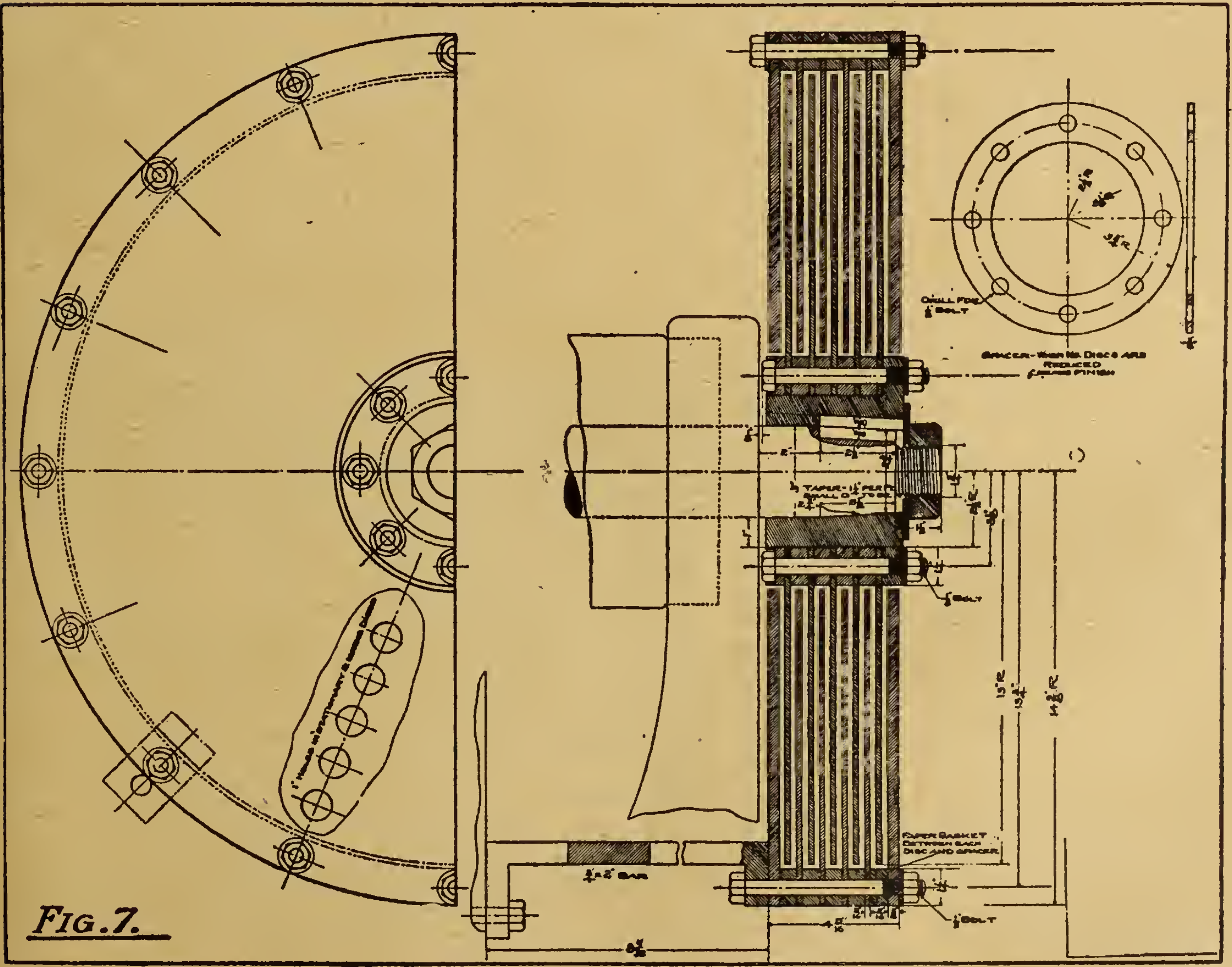

Drill for
Bolt
Spacer—When No. Discs are
Reduced
Finish
Taper—1½" per ft.
Bolt
15" R
14⅞" R
Paper Gasket
Between each
Disc and Spacer
Bolt
Bar

FIG. 7.

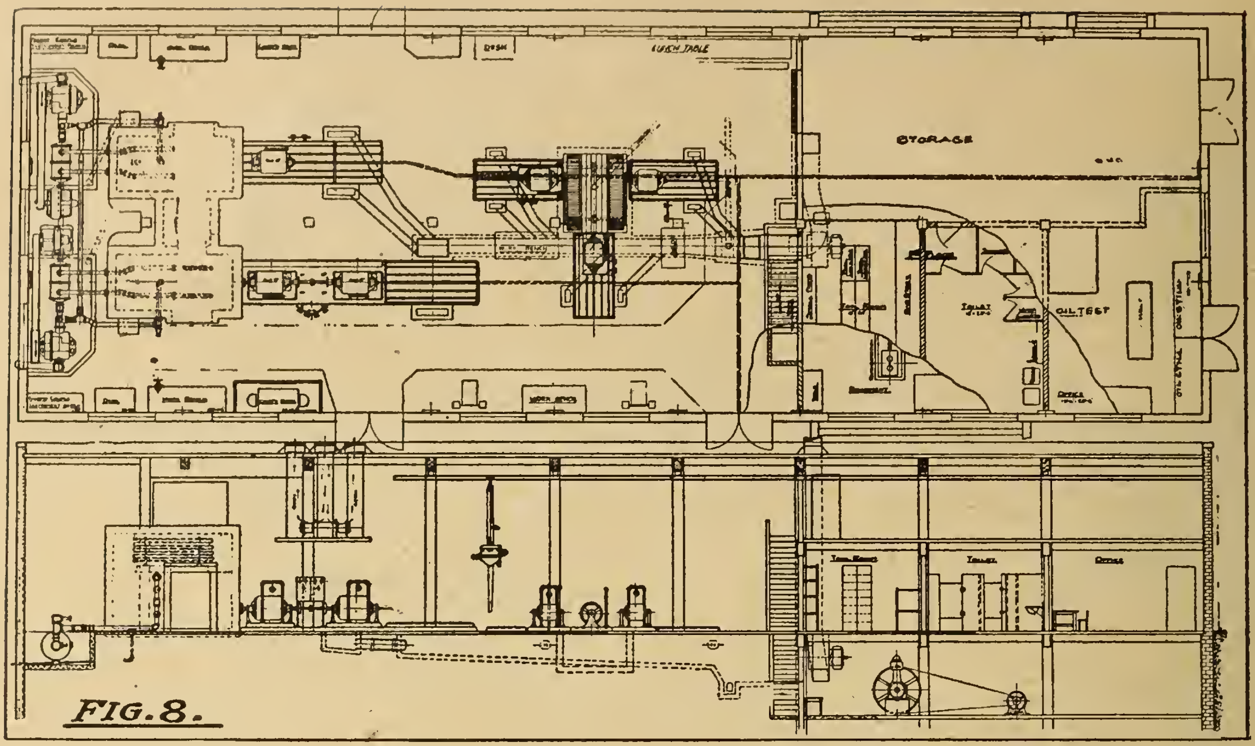


FIG. 8.

opening 14, and is distributed to the different exhaust pipes as shown.

The mixture of exhaust gases and water passes through two 5-in. pipes to the auxiliary exhaust tanks, placed just outside the chamber, as shown in Figs. 1, 3 and 11. Here the water is drained off while the gases pass to the exhauster.

The Exhausting System

The auxiliary exhaust tanks are both connected to a 6-in. main which leads to the centrifugal exhauster. Another 3-in. pipe is led from the main directly to the altitude chamber and serves to withdraw the air from the latter, thus maintaining the barometric pressure on the exhaust and within the chamber approximately equal. By means of a valve communicating with the outside air, placed near the exhauster, the pressures maintained may be easily regulated irrespective of the speed of the pump.

The exhauster is of the Nash "Hydroturbine" type, size No. 7, made by the Nash Engineering Co., South Norwalk, Conn., and has a rated capacity of 1,500 cub. ft. per min. at a 12-in. vacuum, at 300 r.p.m. (Fig. 11). It is belt-driven from a 75 h.p. direct current motor, and discharges to a point outside the building.

The Dynamometer

The connection from the engine to the dynamometer is made through the flexible coupling shown in Fig. 7.

The electric dynamometer is mounted on a concrete foundation at the right of the altitude chamber, as shown in Fig. 1. It was built by the Sprague Works of the General Electric Co., and has a rated capacity of 300 h.p., though it is capable of caring for considerable overloads. The dynamometer consists essentially of a direct current generator, the field ring of which is free to rotate with the armature, except as this rotation is opposed by a connection to a scale beam, which, therefore, measures the torque delivered to the machine. An auxiliary spring balance is also used, interposed between the torque arm of the dynamometer and the scale beam, which serves as a handy means for measuring the approximate torque. Current from the dynamometer is controlled from a switch-board placed near by, and may either be dissipated in grids placed outside the building, or may be returned to the regular power lines of the Bureau. The dynamometer with its scale beam is shown in Fig. 10.

As the plant was originally laid out for the "Liberty" eight aeronautic engine, before the "Liberty 12" was decided upon, the 300 h.p. dynamometer selected for the purpose is not capable of carrying continuously the full power of the latter engine. Hence it was necessary to increase the capacity, which was done by the addition of a specially designed water brake. This brake consists of alternate fixed and rotating perforated steel plates. It is illustrated in Fig. 7.

The rotor is mounted on the shaft of the electric dynamometer, and the stator is mounted on the dynamometer field, so that the two always operate together; yet the water brake, when empty, does not interfere with the operation of the electric dynamometer. The water brake alone can absorb about 400 h.p. at 1,800 r.p.m.

An unique feature of this brake, made possible by the fact that it is integral with the electric dynamometer, which cares for the adjustments of load, is that it can be operated

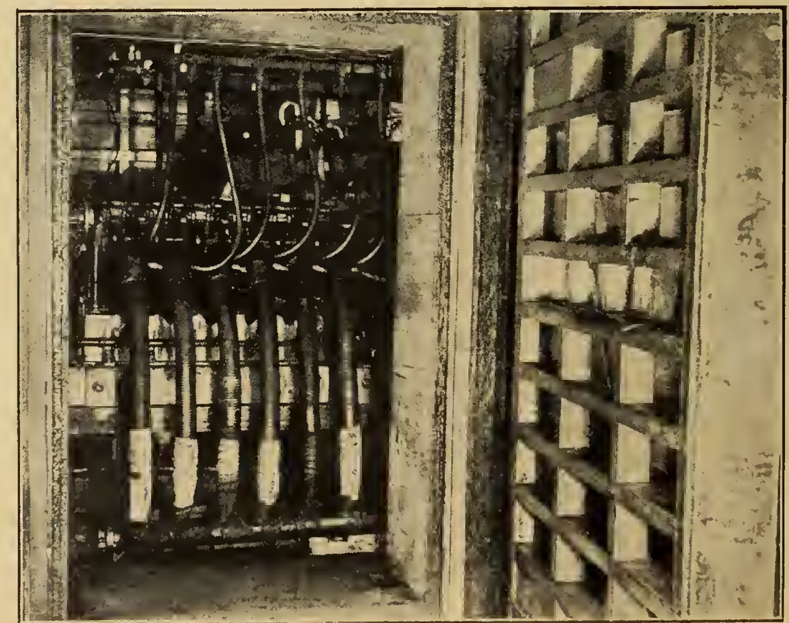


Fig. 9.—Engine in Chamber

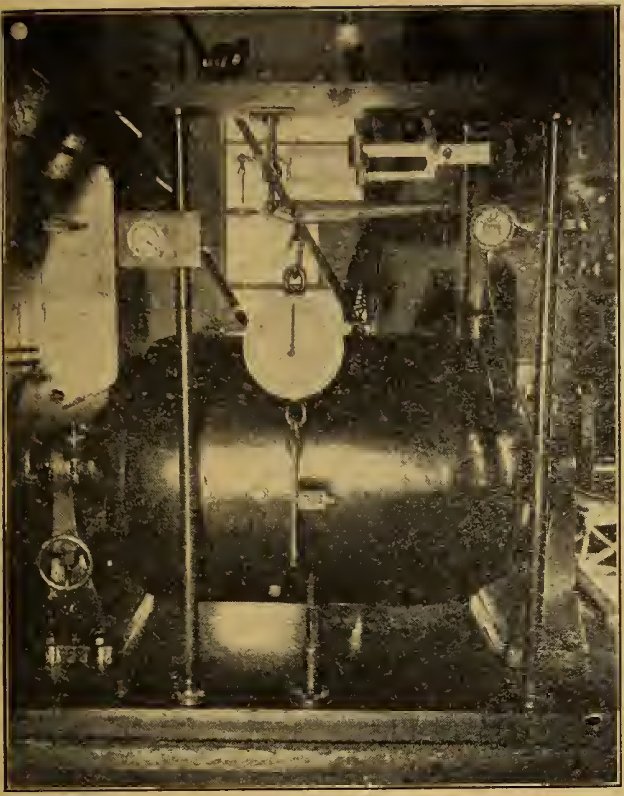


Fig. 10.—Electric dynamometer

at any one of four fixed water levels corresponding to four oblong outlets in the casing. When any one of these outlets is opened, and the rate of water flow is approximately adjusted, a constant water level is maintained, which is reasonably independent of small variations in supply pressure. Operated in this way, the water brake is quite satisfactory, being free from the tendency to "drift" towards higher or lower loads with small changes in water pressure.

The Gauge Boards and Engine Controls

The copper tubes for the manometers and the engine control cables are all carried to two boards, mounted at the front right-hand corner of the altitude chamber as shown in Fig. 13, and so arranged that one man can control the entire plant, and at the same time conveniently see all the measuring instruments. In this way the whole plant is under the observation and direction of the chief operator at all times.

The spark and throttle levers work in graduated quadrants, which indicate the exact positions of the levers on the engine. The number of these control levers may be varied to suit the number of attachments provided with any particular carburettor.

The instruments mounted on the gauge board are as follows:—

(1) Venturi gauge for carburettor inlet air.

(2) Barometer and thermometer.

(3) Manometer for carburettor float-chamber pressure.

(4) Manometer for exhaust back pressure.

(5) Auxiliary barometer.

(6) Manometer showing average pressure in exhaust manifold.

(7) Manometer showing the pressure difference between the entrance to the carburettor air venturi and chamber.

(8) Venturi gauge for jacket water.

(9) Venturi gauge for exhaust cooling water.

(10) Venturi gauge for oil cooling water.

(11) Indicator showing fluctuations of chamber pressure from that desired.

(12) Manometer showing average pressure in inlet manifold above carburettor choke.

(13) Manometer showing difference in pressure between entrance to carburettor and chamber.

(14) Manometer showing carburettor choke pressure.

(15) Manometer indicating the pressure difference between the exhaust port and the chamber.

(16) Venturi gauge on gasoline supply line.

Besides the above, there are the regular gauges and indicators supplied with the particular type of engine under test, which in the case of the "Liberty 12" include:—

1. Vapour thermometer giving jacket inlet water temperature.

2. Vapour thermometer giving jacket outlet water temperature.

3. Vapour thermometer giving oil inlet temperature.

4. Vapour thermometer giving oil outlet temperature.

5. Oil pressure gauge.

6. Combined starting switch and ammeter for Delco ignition system.

A revolution counter, provided with a magnetic, as well as a hand clutch, is attached to the dynamometer shaft.

Measurement of Air Flow to Carburettor

Two means have been used to measure the amount of air flowing to the carburettor: a Thomas meter, and a venturi tube.

The Thomas meter used was specially built for the altitude laboratory, and consisted of a wooden box 6 ins. square on the inside and 16 ins. long, which contained a heating grid between two sets of thermocouples. The principle of operation was simply that a given energy put into the heating grid would cause a rise in temperature (measured by the thermocouples) inversely proportional to the mass flow of air.

The heating unit was merely a length of resistance wire strung back and forth across the middle of the box. In practice an E.M.F. of 60 volts was impressed on it, giving current of 2.9 ampères. The thermal element consisted of 20 copper-constantan couples in series, four junctions being encased in each of five streamlined struts placed in each end of the box. The four couples were equally spaced down the length of the strut, so that the result of all the couples gave an average for the temperature rise over the whole cross-section.

This meter was eventually destroyed in a small fire in the altitude chamber, and was then replaced by a large 6-in. venturi with a 3-in. throat. The venturi, however, was calibrated against a second Thomas meter specially supplied by the Cutler Hammer Co. This meter used resistance thermometers in place of the thermocouples, and measured the watts input for a constant temperature rise. The connections from the venturi meter are carried to the manometer board.

Temperature Measurements

The following temperature measurements are made by means of thermocouples:—

(1) Temperature rise oil cooling water.

(2) Carburettor air at entrance to venturi meter.

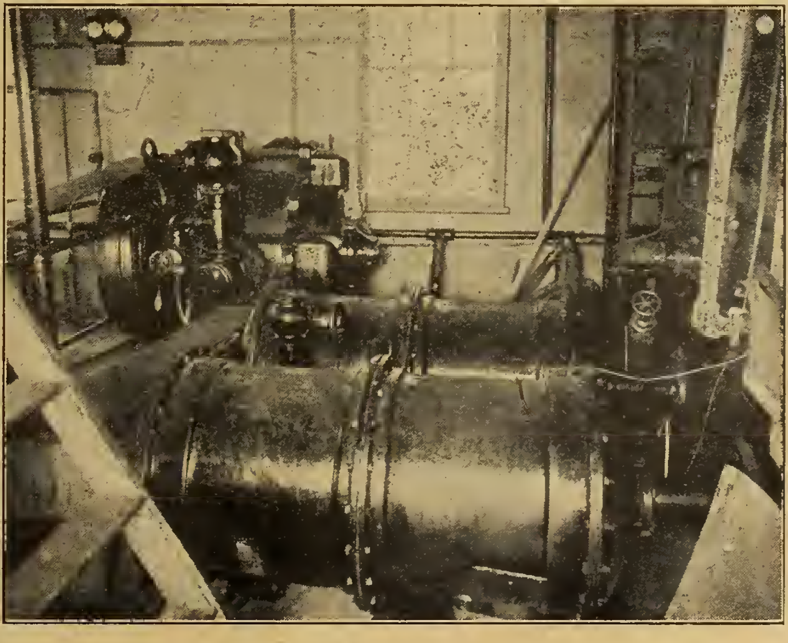


Fig. 11.—Exhaust tanks and vacuum pump

(3) Rise in jacket water temperature.
(4) Jacket water outlet.
(5) Exhaust cooling water inlet.
(6) Rise in exhaust water temperature.
(7) Chamber temperature.
(8) Oil temperature at engine inlet.
(9) Oil temperature at engine outlet.
(10) Carburettor air, taken at the air horn.
(11) Inlet manifold temperature.
(12) Gasoline temperature.

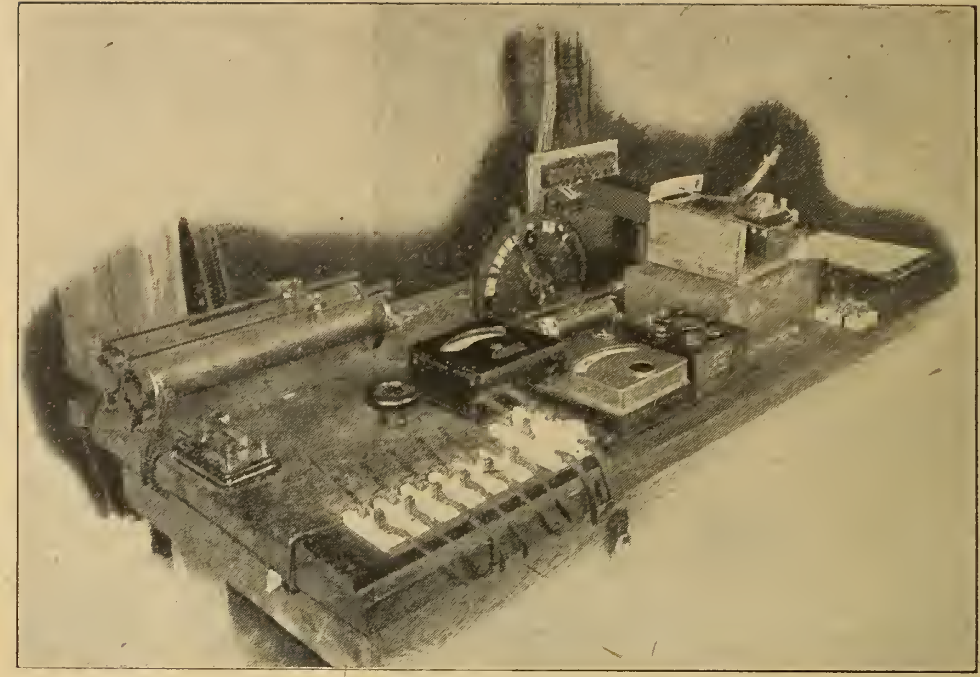


Fig. 12.—Thermocouple and air temperature central switches

The leads from the thermocouples pass through opening 5 (see Fig. 2) in the side wall of the altitude chamber to a table on which are mounted the necessary switches and potentiometer, as shown in Fig. 12. The galvanometer is swung in a special cradle mounted on a solid concrete pier to eliminate so far as possible the effects of vibration. Considerable difficulty was experienced in the early operation of the plant owing to the lack of a proper support for the galvanometer. The vibrations from the engines are transmitted through the ground, so that even the concrete pier was not sufficiently steady, but the present arrangement has done away with this trouble to a large extent.

The thermocouples are all copper-constantan couples, the junctions being made by twisting the ends of the wires together and soldering with silver solder. The present couples are: an ice junction common to three junctions placed in the oil pipes, an ice junction common to seven junctions used about the carburettor and as spares, an ice junction and a junction suspended in the chamber to measure the room temperature, an ice junction and one junction inserted in the carburettor air line above the venturi, an ice junction and two junctions placed in the outlet and inlet jacket water pipes, and outside the chamber, a circuit of three junctions, one in the water main, and two in the exhaust tanks.

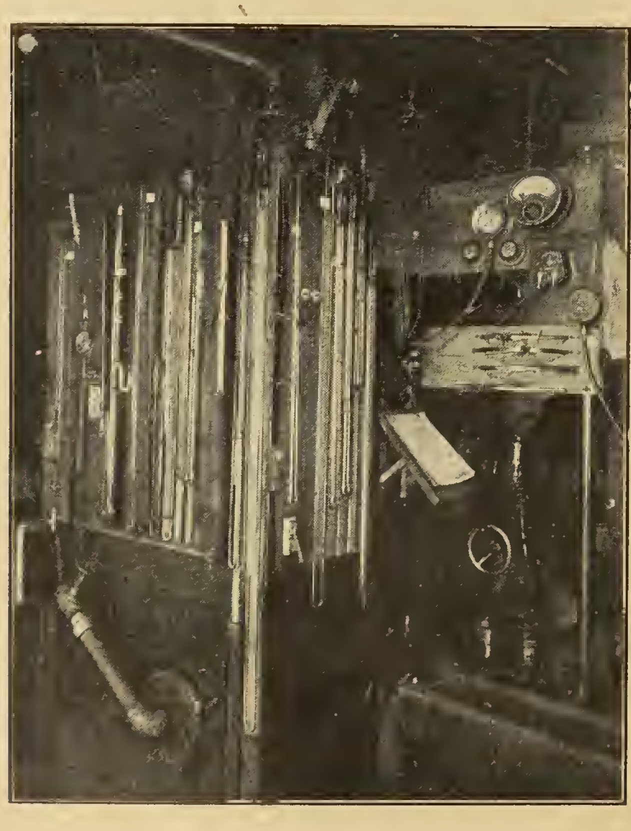


Fig. 13.—Manometer board

All couple wires are wrapped with tape for insulation and to prevent rubbing and to give them body. They are connected with rosin-soldered joints to copper leads passing through the wall of the chamber and brought out to a dial switch with all copper contacts. Before being fastened to the switch, each couple has a small coil of manganin wire connected in series and adjusted to give it an equal resistance to all other couples. The switch has a rotating arm which carries two copper spring contacts which bear in turn upon the copper contacts to which the couples are attached.

From the arm the circuit is completed through a carefully-made manganin resistance of 0·029 ohms, a manganin dial resistance box adjustable in steps of 0·1 ohm to 1,000 ohms, a galvanometer and a key. The 0·029 ohm resistance forms part of a potentiometer circuit consisting of a dry cell, a milliammeter, a double-throw switch and a slide wire rheostat. Another branch circuit is controlled by the closing of a double-pole switch, which serves to connect a carefully balanced pair of resistance coils of approximately 85 ohms each, and these together with the dry cell, galvanometer, resistance box, and thermal element, form a Wheatstone bridge.

The potentiometer affords a means of measuring the sensitivity of the galvanometer as follows: Across two terminals of the dial switch a coil is connected having the same resistance as the thermal elements, but without their thermo-electric property. The arm is placed on these terminals, and the sensitivity is then found by establishing a definite current through the potentiometer (50 milamps) and observing the galvanometer deflection. This has been found subject to variation on account of the heavy machinery in its neighbourhood, but can always be brought back to its original value by an adjustment of the resistance box.

The Wheatstone bridge serves to compare the resistance of the different couples up to the point of attachment to the dial switch, and is sensitive to 0·1 ohm, this being amply sensitive for the purpose.

Thus, from this set up, the E.M.F. of any thermocouple may be measured by the current it establishes through the galvanometer; and with the bridge and potentiometer the conditions of measurement can be made equal for all couples and held constant at all times.

Fuel Weighing Device

The fuel used by the engine may be measured in either of two ways: by means of an accurately calibrated tank, or by two tanks mounted on platform scales. The first method gives the volume, and the second the weight of fuel used. When using the weighing tanks, a test may be run continuously, one tank being filled while the other is emptying, or two fuels may be compared, as follows: One tank is filled with the fuel to be tested, and the second with a standard comparison fuel. The engine is run first on the standard fuel, and is then changed over to the test fuel, after which a third run is made on the standard fuel. In this way the least possible variation in engine condition is involved.

Storage of fuel is provided in underground tanks, while the measuring tanks are mounted on a platform placed above and in front of the altitude chamber. The fuel is pumped to these, and then flows by gravity to the carburettor. Fuel in the engines tested is kept at the pressure of the chamber by connection through flexible copper tubes.

Miscellaneous Equipment

Suitable pipe connections are provided for obtaining samples of the exhaust gases from the engine, these samples being then analysed in an Orsat apparatus.

A compressed air system for feeding oil to the engine sump and a means for cooling the oil during a test have been installed.

The laboratory is well supplied with tools and the necessary work benches, so that all ordinary small repairs to both the engines and plant may be made without outside assistance.

A device for damping-out fluctuation in the city water pressure supplied to the plant forms part of the auxiliary equipment.

General Log of Operation

Work on the Altitude Laboratory, as previously stated, was begun in August, 1917, and the plant was ready for the preliminary installation of an engine for test purposes in November of that year. The first engine to be mounted in the chamber was a "Liberty 8," one of the first series of five engines built for experimental purposes. Although this engine was set up in the test-chamber in November, there remained many minor items of experimental equipment to be completed and "turned up" before tests could be begun.

Among these were the development of flexible water-cooled exhaust connections, the completion of air and water piping, the adjustment of the jacket water thermostat and venturi meter, the installation of pressure manometers, gasoline weighing attachments, and temperature measuring devices. The securing of air-tightness of the doors and other connections to the chamber, and a multitude of other minor matters, too numerous to mention, all took considerable time.

On December 26, 1917, the first test run was made with the "Liberty 8" engine for the comparison of two grades of fuel, and for data on the contamination and deterioration of lubricating oil.

On January 4, 1918, the first test at reduced pressure was made, the lowest pressure obtained being 44 cm. below atmosphere, corresponding to an altitude of about 25,000 ft.

In all, seven tests were run with this first experimental engine, representing about fifteen hours' actual running time. The records of these first tests show that many stops for various causes, most of which were chargeable to difficulties with the engine. This was to be expected, since the eight-cylinder model had not at that time reached a stage of perfection to warrant its use for research purposes. In fact, at that time this model had been temporarily abandoned in favour of the twelve-cylinder engine, which was then being perfected.

On January 19, a connecting-rod gave way during test No. 8, and it was decided to abandon the "Liberty 8," then obsolete, and continue work with an Hispano-Suiza engine until the "Liberty 12" was in shape for research on altitude effects.

On January 25, the first experimental run was made with the Hispano-Suiza engine. This test included the first complete set of observations under conditions corresponding to a series of altitudes up to 30,000 ft.

In the year which has elapsed between January 25, 1918, and January 31, 1919, about 150 complete altitude "flights" have been made, comprising only a little less than 1,000 hours of actual engine operation.

Observations have been made with the following models of aircraft engines:—

"Liberty 8" ..		Hispano-Suiza ..	300 h.p.
Hispano-Suiza ..	150 h.p.	"Liberty 12" ..	400 h.p.
Hispano-Suiza ..	180 h.p.		

Of these models, several different engines of the 150 h.p. Hispano-Suiza, 180 h.p. Hispano-Suiza, and "Liberty 12" types have been included.

As mentioned previously, the operation of the "Liberty 12" required the addition of a water brake to the dynamometer, and a number of other modifications in the equipment. These changes were made, and the first series of runs with the "Liberty 12" was begun on October 10, 1918.

General Nature of Research Undertaken

The problem first presented by the National Advisory Committee for solution by the use of the altitude laboratory, was that of the performance of different grades of gasoline at high altitudes in typical aircraft engines. The lubrication Division of the Signal Corps requested also the preservation of samples of the lubricating oil to determine the effect of fuel composition and of altitude on the deterioration of such oils. A staff of two or three men were detailed by the Lubrication Division to assist in securing the desired data.

As different grades of fuel affect engine power and performances only to a very slight extent, the satisfactory solution of this problem required the highest possible accuracy in obtaining complete data on engine performance, as previously outlined. Thus, a practice was established by which all the measurements of power, speed, fuel consumption, barometric pressure, air and water flow, temperature, and pressure, provided for by the apparatus, are customarily made, no matter what is the immediate purpose of the test in hand. The result is, in addition to the data directly desired, an accumulation of valuable supplementary data on engine performance, much of which has not yet been analysed.

Observations have been made to determine specifically the following relations:—

(1) Horse-power–altitude relation for engines at normal speed.

(2) Horse-power–speed relation at a range of altitudes up to 20,000 ft.

(3) Horse-power–compression ratio for normal speed, using compression ratios of 4·7, 5·3 and 6·2 to 1 at a range of altitudes up to 30,000 ft.

(4) Horse-power–inlet air temperature at a range of speeds and altitudes.

(5) Effect of variation of intake pressure on horse-power at a range of altitudes, to simulate the effect of supercharging equipment.

(6) Effect of exhaust back pressure on horse-power, over a limited range of pressures.

(7) Mechanical losses at various speeds, altitudes, and engine temperatures.

(8) Metering characteristics of a number of different types of carburettors, with and without altitude compensation or control, for the full range of speeds and altitudes.

(9) Optimum mixture ratios for maximum power over the range of speeds and altitudes, with several different carburettors.

(10) The performance of a number of automatic and hand-operated altitude compensation devices for different carburettors.

(11) The total heat distribution for all speeds and air densities at full throttle.

(12) The performance of special fuels: "Hector," a combination of cyclo-hexane and benzole; "Alco-gas," a com bination of alcohol, benzole, gasoline, and ether, at a compression ratio of 7·2 to 1.

Other relations have been investigated from time to time. Moreover, the detailed records taken for each test include much information bearing on other characteristics of engine performance, such as, for instance, the behaviour of spark plugs and ignition systems under conditions of low air pressure and temperature.

APPENDIX

The New Dynamometer and Altitude Laboratory

As previously stated, the Altitude Laboratory will soon be housed in a permanent building, which is being erected near the present temporary structure. A floor plan and side elevation of this building are given in Fig. 8. As will be seen from these drawings, the building has a rectangular floor plan, measuring 50 by 150 ft., and is constructed of brick and concrete in a thoroughly substantial manner.

The altitude chambers, of which there are two, are built at the west end of the building. A central passage-way connects the two chambers, with separate doors into the chambers and into the main laboratory. The chambers are identical as to their interior arrangements. The cooling coils are mounted in the upper portion of the chambers, and the exhaust is carried to settling tanks in a pit alongside the west wall of the building. The vacuum pumps, with their electric motors, are placed near these tanks, as shown. In testing a single large engine at high altitudes, the doors between the two chambers may be left open, which permits the use of the two vacuum pumps and banks of cooling coils, thus greatly increasing the capacity of the plant.

In connection with one of the chambers, two 300 h.p. electric dynamometers and with the other one 400 h.p. dynamometer will be used. The necessary switchboards and the grids for dissipating the electrical energy are clearly shown in the elvation. The foundations of the dynamometers are provided with extension bedplates at the ends opposite the chambers. on which to mount engines for test purposes when it is not necessary to conduct the test at other than ground conditions. When running in this way, the couplings between the altitude chambers and the dynamometers can be easily disconnected.

A space is provided in the centre of the floor plan for the installation of either a drum or tractor type dynamometer, on which to test motor vehicles and transmission assemblies. The power delivered to the drums or caterpillars may be transmitted by chains to the two electric dynamometers shown in the drawings. Like the ones for the Altitude Laboratory, they are arranged with extension bedplates, so that they may be used to test separate engines when required.

A third dynamometer with a capacity of 50 h.p. is arranged for coupling to any type of small engine or to the drive shaft of a rear axle assembly for test purposes.

The exhaust gases from the different engines, except those in the altitude chambers, will pass to an underground duct, from which they will be withdrawn by an exhaust fan discharging through a pipe in the roof.

For about one-third of its length at the east end the building is divided into a basement, main and mezzanine floors. In the basement is placed the refrigerating plant for the Altitude Laboratory, with space left for other machinery. The north side of this portion of the main floor is occupied by the machine shop, designed to care for all the ordinary repairs to the plant and engines. On the south side are located the office, toilet and wash room, and the tool and store room. The mezzanine floor is divided into two laboratory rooms, which may be used for any of the lighter testing apparatus.

The plant will be equipped with travelling chain-hoists for the convenient handling of engines, and other apparatus, and with the necessary work benches, etc.

It is planned to have the laboratory in running order this summer.

◆ ◆ ◆ ◆

HONOURS

The following announcements appeared in a supplement to the *London Gazette* on October 17 :—

The King has been pleased to approve of the award of the following medals to the undermentioned men :—

Meritorious Service Medal.

C.P.O. Mech., 2nd Gde., A Beacham, R.N.A.S., O.N. F 512 ; P.O. Mech. S. G. Cann, R.N.A.S., O.N. F 4231 ; C.P.O. Mech. 3rd Gde., T. Clarke, R.N.A.S., O.N. F 1627 ; Ldg. Mech. D. Cochrane, R.N.A.S., O.N. F 4435 ; C.P.O. Mech., 3rd Gde., A. T. Corbin, R.N.A.S., O.N. F 1630 ; C.P.O. Mech., 3rd Gde., P. Garner, R.N.A.S., O.N. F 535 ; C.P.O. Mech., 3rd Gde., G. H. Gyton, R.N.A.S., O.N. F 1004 ; P.O. Mech. R. A. Heath, R.N.A.S., O.N. F 2821 ; C.P.O. Mech., 3rd Gde., H. Hulse, R.N.A.S., O.N. F 493 ; C.P.O. Mech., 3rd Gde., H. Moliver, R.N.A.S., O.N. F 1870 ; P.O. Mech. S. Parsons, R.N.A.S., O.N. F 863 ; P.O. Mech. H. L. Rolt, R.N.A.S., O.N. F 5678 ; P.O. Mech. D. D. Slater, R.N.A.S., O.N. F 9501 ; P.O. (C.) H. C. Smith, R.N.A.S., O.N. F 20242 ; C.P.O. Mech., 3rd Gde., A. W. H. Tracy, R.N.A.S., O.N. F 6694 ; C.P.O. Mech., 3rd Gde., C. Underwood, R.N.A.S., O.N. F 1591.

The following man has been brought to the notice of the Admiralty for valuable services in the prosecution of the War :—C.P.O. Mech. R. Harper, R.N.A.S., O.N. 344641 (Po.).

◆ ◆ ◆ ◆

CIVILIAN FLYING IN INDIA

The authoritative announcement which is this week made that the Government of India have now announced their policy on the important question of civil aviation heralds a distinct movement in official attitude towards public service aviation. It is, it is stated, based on two guiding principles. The first is that a large organisation, with a few well-placed maintenance centres, is economically more sound than several small organisations involving many maintenance services. The second is that an air transport organisation should not be dependent on any particular aircraft construction company.

In accordance with these principles, the Government of India consider that civil aviation will best be developed in India by the grant of a monopoly for a term of years for the carrying of mails by air, throughout India and Burma, to a single air transport company, which should be independent of any particular aircraft construction company. The monopoly would be limited to the carriage of mails, and the postal rates would be fixed by Government. The company would have a free hand in fixing rates for the carriage of other goods and passengers in open competition with any other companies which might be established for such traffic.

It is recognised, however, that a mail monopoly company, with a well-organised system of maintenance centres, would probably be able to shut out competition for other traffic unless it abused its position. The terms of the monopoly would require careful consideration and discussion, and firms or groups of firms have been invited, through the chambers of commerce, to communicate to the Commerce and Industry Department, as a basis for discussion, the conditions which would be agreeable to them.

The Government have been advised that maintenance centres at seven places—Bombay, Calcutta, Madras, Karachi, Delhi, Nagpur and Rangoon—would be sufficient for the service of all probable routes in India and Burma.

◆ ◆ ◆ ◆

THE AVRO BLACKPOOL-MANCHESTER SERVICE

The daily return air service between Blackpool, Southport and Manchester, carried out during the summer by Messrs. A. V. Roe and Co., Ltd., has now come to an end. Of the 222 flights scheduled, 194 were carried out, the other 28 being prevented by weather conditions. The number of miles flown was 8,730.

The service was started on May 24, three and a half weeks after civil flying was legalised in Great Britain. It was the first daily service by air to be instituted in this country and to be mentioned in railway guides. It was in every way a pioneer undertaking, for when it was commenced the general public still had the impression that flying was a dangerous undertaking only indulged in by extremely venturesome spirits. Outside the R.A.F. there were no records of a daily air service to guide the Avro company in organising such an undertaking. Yet the service ran for 18½ weeks with no interruption except through bad weather on 14 days. We are informed that there were no mishaps of any sort, not even a simple forced landing.

Before long the pilots grew so familiar with the route that they could find their way through weather which would have baffled a stranger.

Punctually at noon each day at least one Avro left the sands at South Shore, Blackpool, and headed for Southport, which was reached at 12.15 p.m. At 12.45 the machine would descend at Alexandra Park, Manchester. The return flight started from this aerodrome at 2 p.m. The fare was five guineas for a single, nine for a return ticket.

By degrees the service became popular, and before long it was paying its way. No passengers ever suggested that good value had not been received for his or her money—and the shrewd people of Lancashire are authorities on what constitutes good value. On the contrary, one and all were delighted, and many expressed the opinion that aerial transport had come to stay, as being the quickest and most enjoyable method of getting from town to town.

Whatever the Post Office may think, the people of Lancashire have no doubts as to the reliability of an air service carried out by Avro aeroplanes, backed by sound organisation and good pilots.

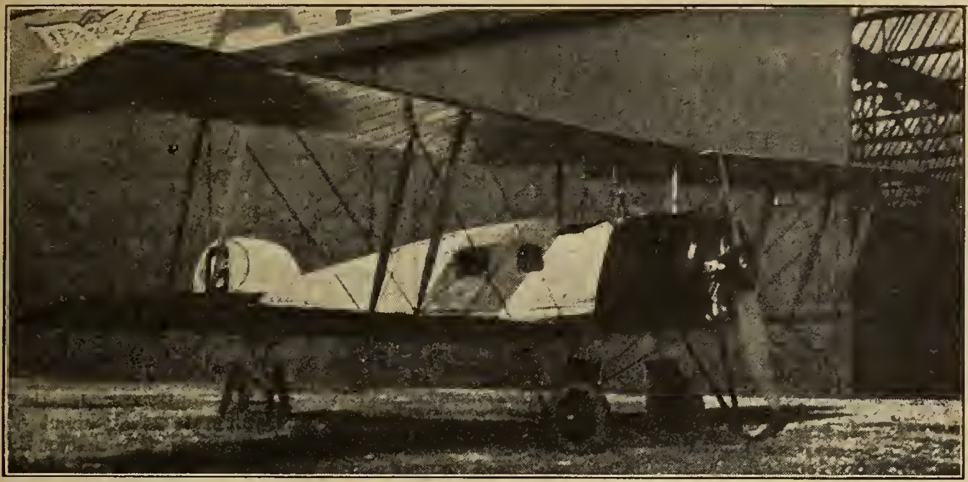
AIRISMS FROM THE FOUR WINDS

The Nation's Outlook. To all whom it may concern.

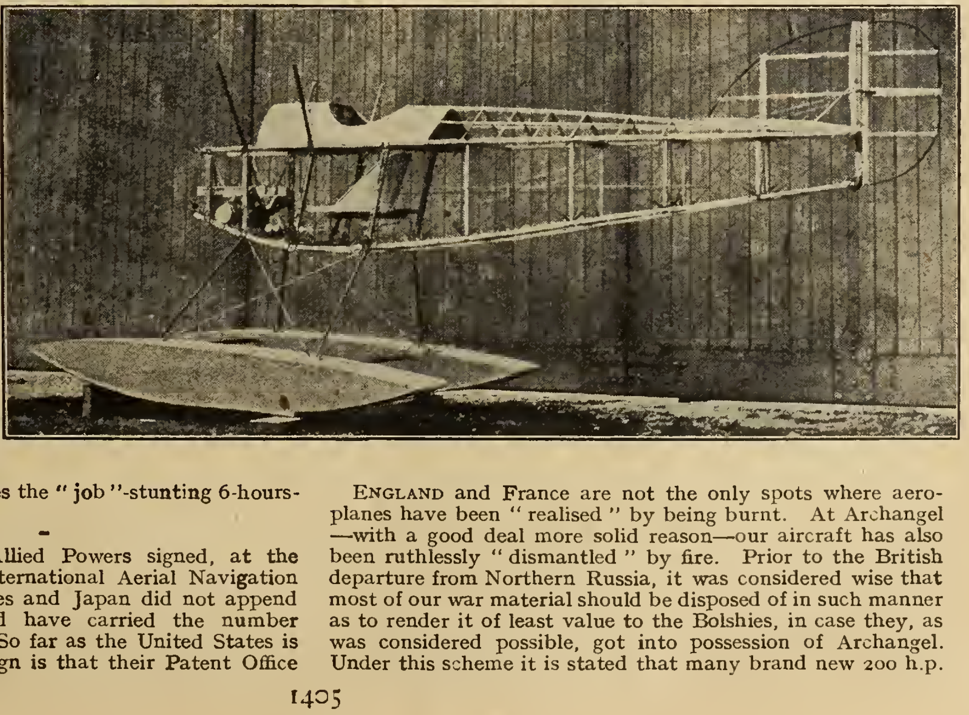
"Work or Sink; then there will be nothing to wrangle about."—Mr. Lloyd George.

* * *

"This country will be saved by the brains and energy of the individual, and not by enactments which curtail production and only lead to sloth instead of encouraging ambition and enterprise. In the present day we hear a deal about starvation. Is a standard wage going to stave it off? There is no surer way of hastening it. We must find our own level, we must go through the Mire of Despond before we can attain Mr. Lloyd George's Garden of Eden. The essentials are individual ambition and determination, a consuming desire to achieve, and not merely a desire for higher wages; payment in relation to efficiency, and not by an arbitrary standard. . . . Let the Government allow each individual to work out his own ambition and betterment instead of trying to do it for him; let the inefficients go to the wall, and there, with their backs against it, make good."—Mr. Malcolm Arbuthnot.



New Avro Types: Our photograph shows the new Avro limousine, 150 h.p. B.R.I. engine. The passengers are seated inside the enclosed cabin, which is entered through triangular-shape doors in the sides. Through the Triplex windows a good view is obtained, while the noise from the engine does not penetrate to the cabin to any great extent



New Avro Types: The annexed photograph shows the *fuselage* of an Avro Baby, fitted with floats. This machine, which was fully described in "Flight" of June 26, 1919, flies extraordinarily well as a land machine, and although the extra weight of the floats may reduce the speed and climb somewhat, the Baby should still have quite a good performance as a seaplane.

On the top of all now comes the "job"-stunting 6-hours-a-day lunatic.

* * *

On October 13, thirteen Allied Powers signed, at the French Foreign Office, the International Aerial Navigation Convention. The United States and Japan did not append their signatures, which would have carried the number beyond the ominous *thirteen*. So far as the United States is concerned, their objection to sign is that their Patent Office claims that the Convention fails to protect certain American rights—or should it be "Wrights"? But as there is still a period of six months in which the United States can signify its approval, there is no need to worry about the ultimate result. In the meantime the Convention is in abeyance until such time as the rules are brought into force by decree.

* * *

In South America, aviation is regarded seriously. Brazil is the latest to lay the foundation of an air force. Col. Mangin, Chief of the French Aviation Mission to Brazil, has orders to buy for the Brazilian Army all the material required for the formation of an aerial bombing and observation squadron.

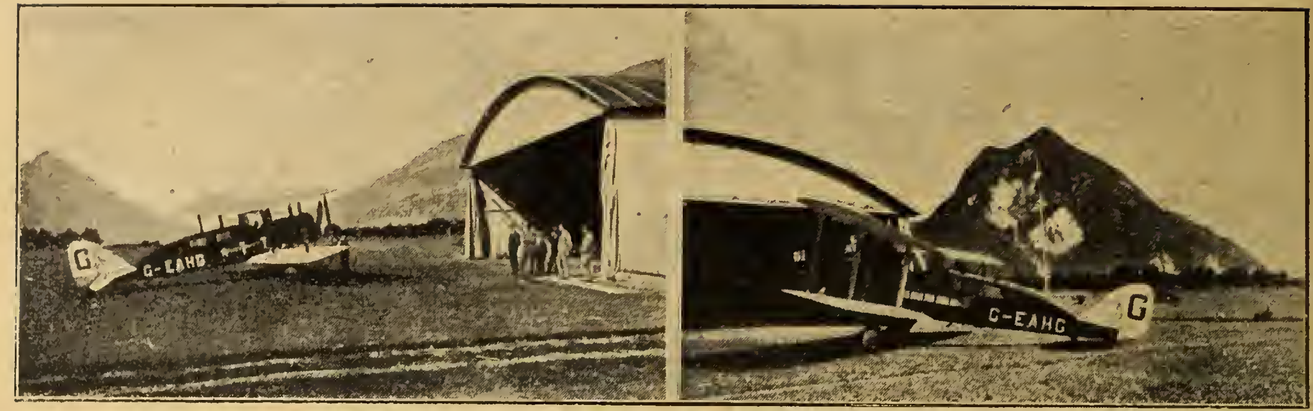
* * *

And Chile is also coming into line, through European help.

* * *

An aerial "taxi" service in Thousand Islands, Canada, is the latest scheme for next summer. The proposal to establish this service is put forward by Capt. Baskerville, formerly Flight-Commander of the 117th Squadron, R.A.F.

England and France are not the only spots where aeroplanes have been "realised" by being burnt. At Archangel—with a good deal more solid reason—our aircraft has also been ruthlessly "dismantled" by fire. Prior to the British departure from Northern Russia, it was considered wise that most of our war material should be disposed of in such manner as to render it of least value to the Bolshies, in case they, as was considered possible, got into possession of Archangel. Under this scheme it is stated that many brand new 200 h.p.



MAJ. STUART-WORTLEY'S D.H 4a AT INTERLAKEN, SWITZERLAND: Maj. Stuart-Wortley took this machine over with a view to giving demonstration flights

aero engines were thrown into the river, aeroplanes were crashed (a plesaant job for somebody) and 150 new propellers were burned in one impressive bonfire. The aeroplane ship *Pegasus*, crowded to its utmost capacity, carried bombs as ballast.

- - -

In the W.O. statement of thanks just issued, following the successful evacuation of the British troops from North Russia, a new note of official sarcasm is struck. And we are glad to note it. It is refreshing to know that those papers, whether from Bolshie-Hun leanings, or as a stunt for increased circulation purposes and damn the Nation's interests, which have so persistently attacked our co-operation, by Navy, Army and R.A.F., with the best elements in Russia, have been badly left. Fortunately it would appear as if our help had been maintained sufficiently long for the true Russian patriots to finish the fight on their own, to the regeneration of their own country and, it is to be hoped, the final peace of the world. The official note is worth reproducing, so here it is:—

"The military authorities are much indebted to a certain section of the Press, who by their repeated asseverations as to the doubtful sincerity of the Government in their policy of evacuation and suggestions of intended offensive operations far into the interior of Russia, succeeded in mystifying the Bolshevists as to our real intentions even more than the British public. This atmosphere of uncertainty, which could never have been created so effectively by any Censorship, was exactly what was required to cover an operation of this kind."

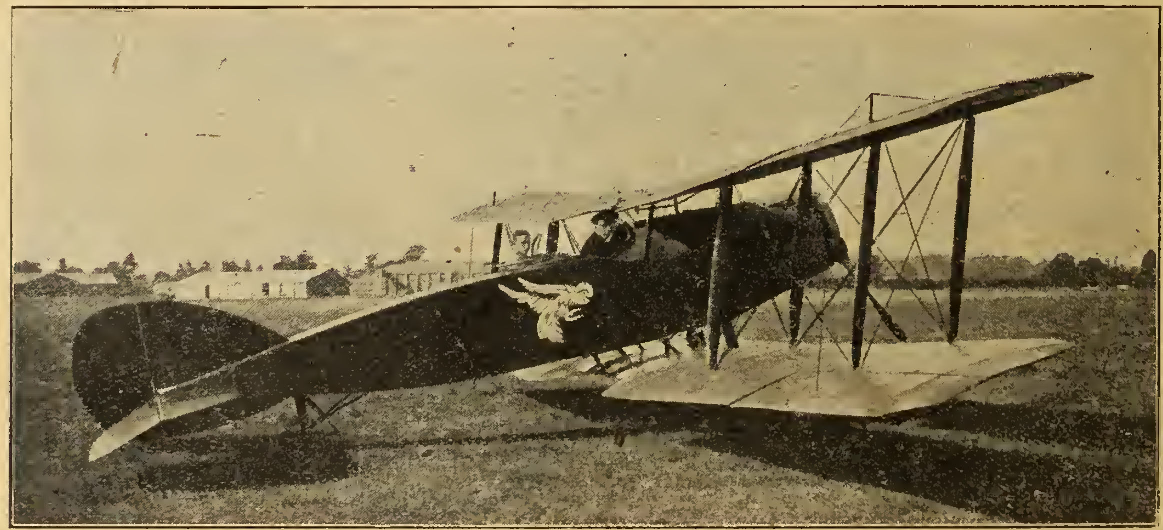
- - -

Apropos our reference last week to the Allies Council sitting up and taking notice of Germany's transgression in regard to the air clauses of the Peace terms, the *Evening Standard* carries the point a step further and confirms that notice is being taken in official circles of Germany's possible efforts to evade the Peace terms with regard to Article 201 of the Treaty, by which the Germans are forbidden to make or import aircraft of any description during six months after the Treaty comes into force.

The Supreme Council at Paris has had under consideration recently the question raised by Germany's development of services of commercial aeroplanes. While the matter is not considered one for alarm or sensational outcry, it is felt that Germany's action in this connection is to be closely watched.

With regard to aerial post services, for example, there is no guarantee that such services may not be diverted from their original purpose.

Observation is also being kept on Germany's sale of aeroplane material not only to Sweden but to other countries. There is no doubt that, in her present straitened circumstances the country is selling everything on which she can raise money, but the Supreme Council forbade Germany as far back as August last to sell any of its air material.



"STILL GOING STRONG": The short life of an aeroplane is a weapon much beloved by those who refuse to believe in the possibilities of commercial aviation. As a matter of fact, with reasonable care, the life of a well-built machine is much longer than is generally thought. By way of an example, we publish above a photograph of a Bristol Fighter which has been in continuous commission on the fighting front and in Holland for over two years without, we are assured, the expenditure of a single penny on renewals or repairs. Recently this machine paid a visit to this country, piloted by the famous Dutch pilot, Versteegh, who was accompanied by another Dutch officer. While in this country the machine paid several flying visits to places in various parts of the country, including its old home and birthplace at Filton, Bristol.

There is no reason to believe at present that such flagrant attempts to evade the Treaty are being made with regard to Zeppelins.

* * *

Apparently our brethren across the Tweed do not relish taking lying down the proposed closing of East Fortune Aerodrome. At a meeting of the East Lothian County Council in Haddington last week, Sir Arch. Buchan Hepburn, Bart., the chairman, entered a vigorous protest against its removal. He referred to the vital manner in which the Council would be affected by the roads, which had been specially altered to meet the construction of the aerodrome. It meant the upsetting of all their plans. It was of supreme importance that the aerodrome should remain for the protection of the Forth and the East of Scotland generally. The expense of building must have cost millions. He could see no economy in removing the aerodrome to Yorkshire. It was left to the chairman and the clerk to take the most effective method of protesting against the removal.

* * *

In the meantime the matter is regarded "vara" seriously as a "flouting of Scottish interests" and so on. Provost Ross especially has waxed wrath in his declaiming of the Government action. So that Westminster had best take notice in due time lest worse befall them than the mere receiving of resolutions of disapproval. For the Provost hoped that "the time was not far distant when Scotland would have more control of Scottish affairs, and when these would be settled in Edinburgh, without going to London."

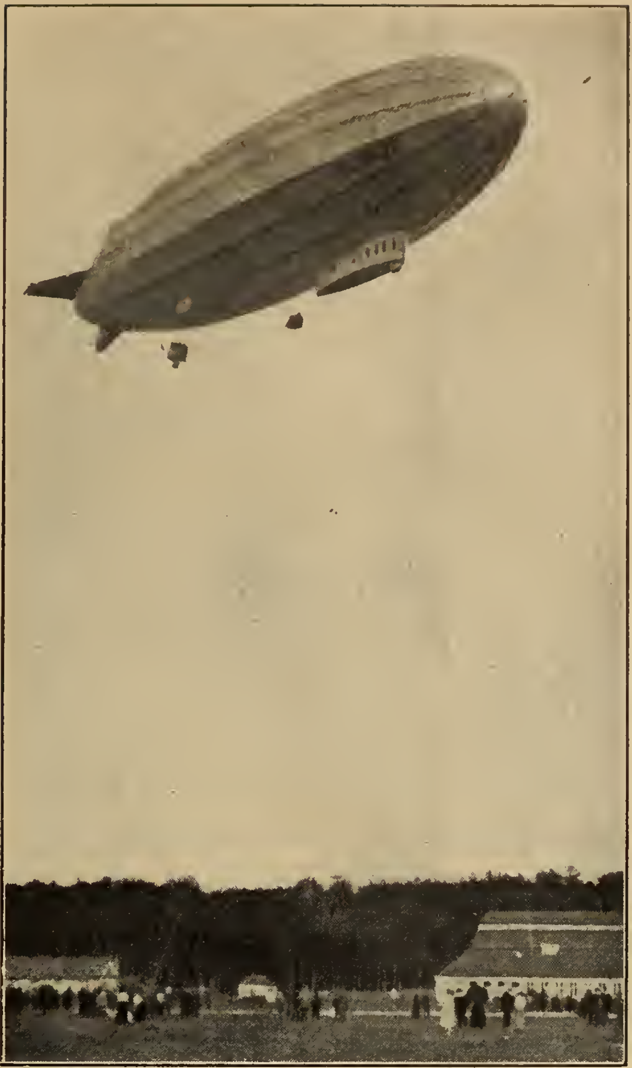
* * *

As copies of this protest have been sent to the Prime Minister, the Secretary for Scotland *and* Mr. John D. Hope, M.P., no excuse, in carrying out their campaign of economy, can avail that they had no cognisance of the trouble brewing. But what might be interesting to know, under all these conditions, is whether the Nation found the cash for this little venture or the local ratepayers.

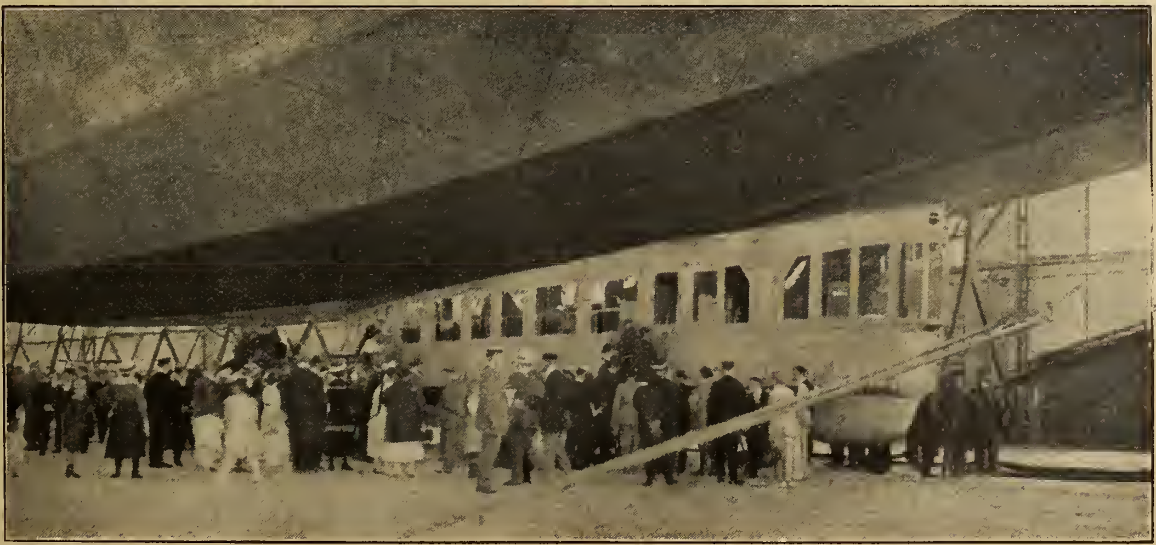
* * *

> *THE AVRO.*
> is faster than trains.
>
> 30,000 passengers carried since
> 1st May from
> 30 stations in Great Britain.
>
> The AVRO will take you anywhere
> It is the
> TAXI of the AIR.

The above advertisement now appearing in the press daily should give even the most sceptical in regard to the future of aviation, to think furiously.



THE "BODENSEE": A description of this airship was published in "Flight" of September 25, 1919. The navigator's cabin and passenger cabin are in the front gondola



THE HAMBURG-AMERICAN LINE AIRSHIP THE "BODENSEE": View of the forward cabin. This airship is running an air service between Berlin and Friedrichshafen on Lake Constance

THE ROYAL AIR FORCE

London Gazette, October 10

The following officers have been granted short service commissions in the ranks stated, with effect from Oct. 10. They will retain their seniority in the substantive rank last held by them prior to the grant of the short service commission :—

Squadron Leader.—R. C. Lane (T.).

Flight Lieutenants.—J. H. D. M. Campbell (S.O.) ; H. Cooch, A.M.I.E.E. (T.) ; P. E. L. Gethin, A.F.C. (A.) ; E. L. Johnston, A.F.C. (Airship) ; C. O. F. Modin, D.S.C. (A.) ; A. J. Osborn (S.O.) ; G. W. Robarts, M.C. (A.) ; N. V. Wrigley (T.).

Flying Officers.—R. M. Grundy (Ad.) ; H. Hoad (T.) ; A. E. de M. Jarvis, D.F.C. (A.) ; A. A. Jones (T.) ; H. P.-G. Leigh (T.) (with effect from Oct. 6) ; F. W. Martyn (T.) ; H. L. Rough, D.F.C. (A.) ; E. R. Webb (Ad.).

Note.—It is intended that officers employed as Stores Officers or on "Q" duties shall belong to the new Stores Branch when formed. Officers appearing in this *Gazette* who are at present so employed will be transferred to this branch on its formation, and will accept these short service commissions on that condition. They will then come on to rates of pay of that branch, but will meantime be permitted to draw the higher rates laid down in the new scheme for officers on the General List. Any officer posted to the Stores Branch on its formation will then have the option of declining his short service commission.

The notification appearing in *Gazette* of Sept. 12 appointing the following officers to short service commissions is cancelled :—Flight Lieut. H. J. Edgar (A. and S.) ; Flight Lieut. A. E. Siddons-Wilson (T.) ; Flying Officer J. H. Dale (T.) ; Flying Officer H. B. Day (Ad.) ; Flying Officer A. G. Jarvis (A.) ; Flying Officer R. V. Kann (A.) ; Flying Officer G. A. Lingham, D.F.C. (A.) ; Flying Officer W. G. Pudney (A.) ; Flying Officer A. E. Sweeting (A.).

The notification appearing in *Gazette* of Sept. 16 appointing the following officer to a short service commission is cancelled :—Flight Lieut. C. W. McCann (T.).

The second Christian name of Flight Lieut. Charles Geoffrey Murray, O.B.E. (S.O.), is as now described, and not Godfrey, as stated in *Gazette* Sept. 12.

The second Christian name of Flying Officer James Duff Hewett (A.) is as now described, and not Dorr, as stated in *Gazette* Sept. 16.

Flying Officer A. C. Lobley is granted a short service commission with effect from Aug. 16, not Sept. 12 as stated in *Gazette* of the latter date.

The following temporary appointments are made at the Air Ministry :—

Staff Officers, 3rd Class.—(P.) Flight Lieut. J. B. Cole-Hamilton ; Sept. 26. (T.) Flying Officer C. A. Longhurst ; Sept. 30.

Staff Officer, 2nd Class.—(Q.) Sqdn. Leader F. H. Moody, M.C. ; Sept. 1.

Staff Officer, 3rd Class.—(P.) Flight Lieut. D. P. Massy ; Sept. 1.

Flying Branch

Lieut.-Col. H. A. Williamson, C.M.G., A.F.C., to be Lieut.-Col. (A. and S.) on relinquishing appointment of Group Comdr. ; April 25.

Capt. C. J. W. Darwin, D.S.O., to be Capt. (A.), from (T.) ; July 5.

Flight Lieut. A. McR. Moffatt to be Flight Lieut. (A.), from (S.O.) ; Sept. 13.

Second Lieutenants to be Lieutenants :—A. C. Clinton ; Oct. 26, 1918 (substituted for notification in *Gazette* July 2, 1918). S. Toby ; Dec. 27, 1918. (Hon. Capt.) G. E. Lange ; Jan. 1. L. G. Destruhe ; June 6. R. A. Wade ; June 16. F. Van-Praagh ; July 10. S. L. Walters ; July 24.

P.F.O. A. J. Mantle, D.F.C. (late R.N.A.S.), is granted a temporary commission as Sec. Lieut. (O.) ; July 18, 1918.

The following relinquish their commns. on ceasing to be employed :—Lieut. A. T. Essex (Sec. Lieut., British W. Indies R.) ; July 29. Lieut. (Hon. Maj.) G. T. J. Barry (Maj., S. Wales Bord.) ; Sept. 11. Lieut. G. W. Kempster (Lieut., Middx. R.) ; Sept. 15. Maj. W. Pennefather (Lieut.-Comdr., R.N.) ; Oct. 9.

(Then follow the names of 99 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—A. W. Hammond, M.C. (caused by wounds) ; Sept. 6. B. L. Blofeld (Lieut., R. West Kent R.) (contracted on active service) ; Sept. 26. A. McDunlop (contracted on active service) ; Sept. 30.

G. H. Jacob ; Oct. 4 (substituted for notification in *Gazette* Sept. 2).

Lieut. R. A. Way (Lieut., Wilts R.) resigns his commission ; Oct. 11.

Sec. Lieut. C. C. Worboys relinquishes his commission on account of ill-health contracted on active service, and is permitted to retain his rank ; Oct. 8.

Lieut. J. C. Sherwin is dismissed the service by sentence of a General Court-Martial ; Sept. 12.

Sec. Lieut. L. E. G. Judge, M.C., to take rank and precedence as if his appointment as Sec. Lieut. bore date Dec. 24, 1918.

The Christian names of Sec. Lieut. Edward Raymond Beesley are as now described, and not "Ernest Richard," as stated in *Gazette* June 4, 1918.

The notification in *Gazette* April 4 concerning Lieut. J. H. Solomon is cancelled.

The notification in *Gazette* June 6 concerning Sec. Lieut. E. W. A. Smith is cancelled.

Administrative Branch

Sec. Lieut. A. F. Harris to be Sec. Lieut., from (O.) ; July 29.

Pilot Officer D. S. G. Burton to be Pilot Officer, from (T.) ; Sept. 29.

Sec. Lieut. W. Farquharson to be Sec. Lieut., from Unemployed List ; Sept. 24 (precedence next below H. H. Williams).

The following relinquish their commissions on ceasing to be employed :—Sec. Lieut. R. F. Nicholls ; Oct. 13, 1918. Sec. Lieut. G. Hull (Sec. Lieut., R.I. Rif.) ; Aug. 19. Lieut.-Col. (actg. Col.) A. W. G. McFall (Lieut.-Col., retd., Militia) ; Sept. 18. Capt. G. F. Earle (Capt., Rif. Bde.) ; Sept. 29.

(Then follow the names of 12 officers who are transfd. to the Unemployed List under various dates.)

Lieut. (Hon. Capt.) H. O. D. Wilkins (Capt., Bedf. R.) resigns his commission ; Oct. 11.

Sec. Lieut. J. H. Young relinquishes his commission on account of ill-health, and is permitted to retain his rank ; Sept. 23.

Sec. Lieut. H. S. Neville relinquishes his commission on account of ill-health, and is permitted to retain his rank ; Sept. 30.

The notifications in *Gazette* of Sept. 23 concerning Flight Lieut. G. M. Broadhurn and Flying Officer J. A. H. Savage are cancelled.

Technical Branch

Capt. (actg. Maj.) C. J. W. Darwin, D.S.O., retains actg. rank of Maj. whilst employed as Maj., Grade (A.), from (Ad.), from Feb. 8 to April 30.

Capt. C. J. W. Darwin, D.S.O., is graded for purposes of pay and allowances as Maj. whilst employed as Maj., Grade (A.), from May 1 to July 4.

Capt. F. Workman, M.C., to be Capt., Grade (A.), from (A.) ; May 9, 1918 (substituted for notification in *Gazette* of Aug. 5).

Sec. Lieut. S. Jupp is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (A.).; Oct. 9, 1918 (substituted for notification in *Gazette* of May 1).

Pilot Officer (Hon. Flying Officer) C. Bishop to be actg. Flight Lieut. (without pay and allowances of that rank) whilst employed as Flight Lieut., Grade (B.).

Sec. Lieut. E. A. Moran-Smith to be Lieut. ; Sept. 14, 1918 (substituted for notification in *Gazette* of April 11).

Pilot Officer G. H. J. Stein relinquishes the grading for pay and allowances as Flying Officer on ceasing to be employed as Flying Officer, Grade (A.) ; Sept. 19.

Sec. Lieut. J. S. McLeod to be Sec. Lieut., Grade (B.), from (Ad.) ; June 15.

Lieut. (Hon. Maj.) C. W. Rowe, M.B.E. (Maj., Huntingdonshire Cyclist Bn.), relinquishes his commn. on ceasing to be employed ; Nov. 7, 1918.

Sqdn. Leader H. R. Northover, O.B.E., M.C. (Maj., Canadian Ordnance Corps), relinquishes his commn. on ceasing to be employed ; June 30.

Sec. Lieut. (Hon. Lieut.) J. L. Bicknell (Lieut., Gloucester R.) relinquishes his commn. on ceasing to be employed ; Oct. 3.

(Then follow the names of 16 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank :—H. R. Stewart ; Sept. 30. A. A. Westcott ; Oct. 4.

Medical Branch

Lieutenants to be Captains :—J. P. Hosford ; July 5 (substituted for notification in *Gazette* Aug. 19, wherein this officer's surname was described as "Horsford") ; G. W. J. Bousfield (substituted for notification in *Gazette* Aug. 19, wherein this officer's surname was described as "Bonsfield") ; A. St. J. Hennessy (substituted for notification in *Gazette* Aug. 19, wherein this officer's surname was described as "Hennessey") ; July 29.

Maj. H. F. Horne relinquishes his commn. on ceasing to be employed, and is granted rank of Lieut.-Col. ; July 2.

Two officers transfd. to the Unemployed List.

The surname of Capt. K. B. Aikman is as now described, and not "Aickman," as stated in *Gazette* Aug. 19.

The notification in *Gazette* July 11 concerning Maj. H. F. Horne is cancelled.

Memoranda

Temp. Hon. Lieut. (Hon. Capt.) W. S. Kellar relinquishes his commn. on ceasing to be employed ; Aug. 20.

London Gazette, October 14.

The following temporary appointments are made :—

Air Commodore.—Air Commodore R. M. Groves, C.B., D.S.O., A.F.C., from Director ; Sept. 8.

Staff Officer (*1st Class*).—(Air).—Wing Comdr. K. G. Brooke, C.M.G., from S.O. 1 at the Air Ministry ; Oct. 8.

Staff Officers (*2nd Class*).—(P.).—Sqdn. Ldr. A. G. R. Garrod, D.F.C., M.C. ; Oct. 6. (Air).—Sqdn. Ldr. R. M. Field ; Oct. 7.

Flying Branch

Lieut. A. A. Leitch is graded for purposes of pay and allowances as Capt. whilst employed as Capt. (A.) ; May 27.

The following Flying Officers relinquish the grading for pay and allowances as Flight Lieuts. on ceasing to be employed as Flight Lieuts. (A.) :—H. G. W. Dehenham ; Aug. 28. C. T. Black ; Sept. 5.

The following Flying Officers (actg. Flight Lieuts.) relinquish actg. rank of Flight Lieut. on ceasing to be employed as Flight Lieuts. (A.) :—A. D. K. Perkins ; Sept. 5. N. C. Buckton ; Sept. 10.

Sec. Lieuts. to be Lieuts. :—J. Duncanson ; April 2, 1918. J. H. L. Newby ; July 12, 1918. J. S. Maguire ; Sept. 26, 1918. R. J. Hook ; Nov. 30, 1918. C. A. Stubbings ; Dec. 27, 1918. W. Barlow ; Jan. 1. C. S. Goode ; July 7. F. G. A. Terrill ; July 21.

Pilot Officers to be Flying Officers :—J. S. Hunt ; Sept. 3. W. H. Dunton, A. T. Robson ; Oct. 1.

Sec. Lieut. L. J. W. Ingram (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (O.) ; June 23, 1918.

The following relinquish their commns. on ceasing to be employed :—Lieut. J. H. Solomon ; March 7. Maj. G. Allen (Capt., Conn. Ragrs.) ; Aug. 11. Lieut. R. S. Mackenzie (Lieut., Can. Cav.) ; Sept. 21. Lieut. C. A. Bridgland, D.F.C. (E. Surr. R.) ; Sept. 26. Sec. Lieut. C. P. Stromeyer (Lieut., R.G.A.) ; Oct. 7.

(Then follow the names of 211 officers who are transfd. to the Unemployed List under various dates.)

Maj. A. K. Robertson relinquishes his commn, on account of ill-health, and is permitted to retain his rank ; Oct. 2.

Lieut. R. C. Steele relinquishes his commn. on account of ill-health, and is granted rank of Capt. ; Oct. 7.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—J. A. Harkin ; May 20. (substituted for notification in *Gazette* of Feb. 25). P. H. Baker (caused through wounds) ; Oct. 2. W. S. Anderson (contracted on active service), R. M. J. Bate (contracted on active service), U. Finch (contracted on active service), C. Gilham (caused by wounds) ; Oct. 2. T. S. Byrn (contracted on active service), J. B. Corcoran (contracted on active service), H. W. Smith (caused by wounds) ; Oct. 7. W. Adamson (contracted on active service), W. C. Johnston (caused by wounds), R. G. Lye (caused by wounds) ; Oct. 8.

Sec. Lieut. (Hon. Lieut.) E. G. Pernet relinquishes his commn, on account of ill-health caused by wounds, and is permitted to retain the rank of Lieut. ; Oct. 7.

J. F. Stallard (Lieut., D. of Corn. L.I.) resigns his commn. ; Oct 15.

The following Sec. Lieuts. relinquish their commns, on account of ill-health, and are permitted to retain their rank :—R. H. B. Greenyer (caused by wounds) ; Oct. 2. G. F. Smith ; Oct. 3.

Sec. Lieut. M. A. Watts is ante-dated in his appointment as Sec. Lieut. (A.) ; June 5, 1918.

The Christian names of Sec. Lieut. Leslie Hagger Kemp are as now described and not Leslie Kemp, as stated in *Gazette* of Sept. 13, 1918.

The notification in *Gazette* of Sept. 16 concerning P.F.O. L. H. Kemp is cancelled.

The notification in *Gazette* of Nov. 29, 1918, concerning Sec. Lieut. R. Boyle is cancelled.

The notification in *Gazette* of April 1 concerning Sec. Lieut. R. Lane is cancelled.

The notification in *Gazette* of May 13 concerning Lieut. L. Patterson, M.C., is cancelled.

The notification in *Gazette* of July 29 concerning Sec. Lieut. G. V. Straker is cancelled. Notification in *Gazette* of July 18 stands.

The notification in *Gazette* of July 8 and Aug. 22 concerning Sec. Lieut. M. A. Watts is cancelled.

The notification in *Gazette* of Sept. 9 concerning Flying Officer E. V. J., Fenelon is cancelled.

The notification in *Gazette* of Sept. 16 concerning Lieut. A. E. N. Ashford is cancelled.

Administrative Branch

Capt. (Hon. Maj.) A. F. Morris is graded for purposes of pay and allowances as Maj. whilst employed as Maj.; July 12.

Flight Lieut. C. S. McNab to be Flight Lieut., from (S.O.); Sept. 20.

Flying Officer S. G. K. Rapley relinquishes his grading for pay and allowances as Flight Lieut. on ceasing to be employed as Flight Lieut.; Sept. 13.

Lieut. (Hon. Capt.) H. G. Whyte to be Lieut. (Hon. Capt.), from unemployed list; Aug. 9, with precedence next below Lieut. E. King.

Flying Officer J. V. Ould to be Flying Officer, from (A.); Sept. 18.

The following Flying Officers (S.O.) to be Flying Officers :—C. E. Crowne, J. H. Evans; Sept. 20.

Sec. Lieuts. to be Lieuts. :—T. C. Noble; April 2, 1918. F. J. Deane; April 21. D. D. Carcary; Aug. 7.

Sec. Lieut. R. P. Briscoe is graded for purposes of pay and allowances as Lieut. whilst employed as Lieut.; May 1.

Pilot Officer O. V. Lee to be Pilot Officer, from (A. and S.); Sept. 8.

Pilot Officer H. C. McKinley to be Pilot Officer, from (O.); Sept. 26.

Sec. Lieut. R. R. W. Millward (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut.; June 11, 1918.

The following relinquish their commns, on ceasing to be employed :—Lieut. A. V. Faulks; June 16. Capt. J. B. Morgan; Aug. 9. Maj. C. V. Beresford (Maj., Worc. R.); Sept. 1. Lieut. R. R. Money (Lieut., E. Yorks R.); Sept. 20. Capt. F. Tuttle, D.C.M. (Qrmr. and Capt., R. Berks. R.); Sept. 25.

Sec. Lieut. S. D. Harrower (Sec. Lieut., Bedfordshire R.); Sept. 27.

Capt. D. C. L. Speed, O.B.E. (Capt., King's Royal Rifle Corps); Sept. 27.

(Then follow the names of 39 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank :—W. B. W. Clarke (contracted on active service), H. H. Wade (caused by wounds); Oct. 2.

The following Sec. Lieuts. relinquish their commns, on account of ill-health, and are permitted to retain their rank :—J. Skinner; Sept. 28. L. G. Davies; Oct. 3. J. W. Rimmer; Oct. 4 (contracted on active service). C. A. Seymour; Oct. 9.

The notification in the *Gazette* of Oct. 7 concerning Sec. Lieut. J. Skinner is cancelled.

The notification in the *Gazette* of Aug. 22 concerning Lieut. (Hon. Capt.) H. G. White is cancelled.

The notification in the *Gazette* of Dec. 24, 1918, concerning Sec. Lieut. R. Boyle is cancelled.

Technical Branch.

Sec. Lieut. (actg. Capt.) J. W. Tattersall to be actg. Maj. whilst employed as Maj., Grade (A.); June 10.

Capt. (Hon. Maj.) H. R. P. Reynolds is graded for purposes of pay and allowances as Maj. whilst employed as Maj., Grade (A.); from (Ad.); from Dec. 7, 1918, to June 5.

Capt. E. Rivers-Smith, M.B.E., is graded for purposes of pay and allowances as Maj. whilst employed as Maj., Grade (B.); May 14.

Flight Lieut. W. E. L. Seward, M.C., relinquishes the grading for purposes of pay and allowances as Sqdn. Ldr. on ceasing to be employed as Sqdn. Ldr., Grade (A.); Aug. 20.

To be actg. Capts. whilst employed as Capts., Grade (A.) :—Lieut. S. J. Gardiner, Sec. Lieut. P. S. Riach; June 10.

Lieut. L. R. Staddon is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (A.); April 1.

Lieut. P. A. Wright is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (B.), from (Ad.); May 14.

Flying Officer A. W. H. Phillips relinquishes the grading for purposes of pay and allowances as Flight Lieut. on ceasing to be employed as Flight Lieut., Grade (A.); Sept. 17.

Flying Officer E. S. Cohen to be Flying Officer, Grade (B.), from Grade (A.), and relinquishes the grading for pay and allowances as Flight Lieut. on ceasing to be employed as Flight Lieut, Grade (A.); Sept. 8.

Flying Officer (actg. Flight Lieut.) H. G. Wood relinquishes the actg. rank of Flight Lieut. on ceasing to be employed as Flight Lieut., Grade (B.); Sept. 18.

Lieut. F. H. Isitt to be Lieut., Grade (B.), from (Ad.); June 10.

Lieut. E. W. Lawrence is graded for pay and allowances as Lieut. whilst employed as Lieut., Grade (B.); Nov. 12.

Pilot Officer R. McG. Freemantle relinquishes the grading for pay and allowances as Flying Officer, Grade (A.); Sept. 17.

Sec. Lieut. (Hon. Lieut.) W. L. Head to be Lieut., without pay and allowances of that rank; Nov. 24, 1918.

Pilot Officer W. H. Lowther to be Flying Officer, without pay and allowances of that rank; Aug. 5.

Pilot Officer N. F. S. Heeht to be Pilot Officer, Grade (A.), from (Ad.); Sept. 8.

Pilot Officer C. P. Brown to be Pilot Officer, Grade (B.), from (Ad.); Sept. 8.

Pilot Officer W. T. T. Glassbrook to be Pilot Officer, Grade (B.), from Grade (A.); Oct. 8.

The following relinquish their commns, on ceasing to be employed :—Capt. R. C. Gill (Capt., R.G.A.); Aug. 27. Lieut. E. F. L. Taylor (Devon R.); Aug. 31.

(Then follow the names of 38 officers who are transfd. to the Unemployed List under various dates.)

Lieut. H. W. Durtnell relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; Oct. 8.

Sec. Lieut. W. A. Murphy relinquishes his commn, on account of ill-health contracted on active service, and is permitted to retain his rank; Oct. 8.

Medical Branch.

Lieut. D. Pennington is transfd. to the Unemployed List; Sept. 27.

Dental Branch.

The following are granted temp. commns. as Lieuts. :—G. H. Warner; May 20, 1918 (substituted for notification in *Gazette*, May 21, 1918, in which he is shown under "Medical" Branch). C. Murray-Shirreff; June 6, 1918 (substituted for notification in *Gazette*, June 7, 1918, in which he is shown under "Medical" Branch). C. M. John; July 18, 1918 (substituted for notification in *Gazette*, July 26, 1918, in which he is shown under "Medical" Branch). W. Inman; Oct. 25, 1918 (substituted for notification in *Gazette*, Oct. 29, 1918, in which he is shown under "Medical" Branch).

Chaplains' Branch.

The following are transfd. to the Unemployed List :—The Rev. P. G. Levy; May 31. the Rev. J. M. Wood-Smith, M.A.; Sept. 22.

Memoranda.

Pilot Officers to be Flying Officers :—F. A. Holmes; Aug. 27. E. A. Cogswell; Oct. 1.

(Then follow the names of 25 Overseas Cadets granted temp. commns. as Sec. Lieuts.)

The following relinquish their commns, on ceasing to be employed :—Capt. J. Williams (Qrmr. and Capt., D. of Corn. L.I.); Oct. 1. Maj. H. M. M. Robertson, O.B.E., M.C. (Maj., R.R.A.); Oct. 6.

Temp. Hon. Lieut. H. Yates relinquishes his commn, on ceasing to be employed; Oct. 7.

(Three officers transfd. to the Unemployed List.)

Personals

Roll of Honour

It was announced by the War Office on October 16 that the following officers, who were previously reported missing, are now reported killed :—

Sec. Lieut. T. W. Abbott, R.F.C.
Sec. Lieut. K. B. Cooksey, R.W. Kent R., attd. R.F.C.
Sec. Lieut. C. P. Williams, R.F.C.

Deaths

Lieut. EUSTACE JOHN RALLI, who died at the R.A.F. Auxiliary Hospital, Swanage, on October 13, at the age of 21, as the result of injuries sustained on May 8, 1918, while night flying on the defence of London, was the only son of Capt. and Mrs. Stephen Pandeli Ralli, of 43, Great Cumberland Place, W.

Married

Capt. ATHOL D. COLLINS, Worcestershire Regiment and R.A.F., eldest surviving son of D. George Collins, C.C., Shirley Park, Croydon, was married on October 20 at St. James's, Paddington, to AGNES ANNIE RUSSELL, only daughter of Mrs. Russell, Downham, Norfolk.

Capt. NORMAN McLEOD (late A.O.D. and R.A.F.), eldest surviving son of Mr. and Mrs. J. Y. KENNEDY, of 16, Freeland Road, Ealing, was married on October 16 at St. John's Church, Windermere, to WINIFRED HARDWICK, youngest daughter of the Rev. and Mrs. JOHN MILES MOSS, of Helm, Windermere and Winthwaite, Sidmouth.

To be Married

The engagement is announced between Lieut. ESMOND SELBY ADES, R.A.F., second son of Mr. and Mrs. Ades, of South End House, Croydon, and MARJORY AILSA, only daughter of Mr. and Mrs. WALTER McINTOSH, The Poplars, Ryde Vale Road, Balham.

The engagement is announced between RICHARD JOHN MULLINGS, eldest surviving son of the late John Mullings, of Cirencester, and MURIEL, widow of Capt. H. ERIC DIXON, R.A.F., and younger daughter of Col. F. K. S. METFORD, of Fox Elms, Robinswood Hill, Gloucester.

A marriage has been arranged, and will take place on November 19, at St. George's, Hanover Square, between Flight-Lieut. W. W. WAKEFIELD, R.A.F., eldest son of Roger William Wakefield, M.D., and Mrs. Wakefield, of Winder, Cark-in-Cartmel, and ROWENA DORIS, daughter of LLEWELYN LEWIS, M.D., and Mrs. Lewis, Maesyrhaf, Neath.

The engagement is announced between Sqdn.-Leader A. T. WHITELOCK, R.A.F., son of Mr. T. R. Whitelock, Barnsley, Yorkshire, and FRANCES MARY, daughter of the late EDWARD BRYNING, J.P., Kirkham, Lancashire.

Items

MAJ. G. H. SCOTT, A.F.C., R.A.F., the commander of the R 34 during her voyage across the Atlantic and back, has been demobilised, and is leaving England for a two months' lecturing tour in the United States.

The Carnarvon Town Council, at the last meeting, unanimously resolved to offer the freedom of the ancient borough of Carnarvon to Wing-Comdr. LIONEL W. BRABAZON REES, V.C., O.B.E., M.C., A.F.C., R.A.F., and to present him with a sword of honour for his distinguished services during the War.

SIDE-WINDS

WE learn that Messrs. Handley Page, Ltd., have just been appointed sole agents for the Triplex safety glass in India, Australia, New Zealand, South Africa, and all enquiries with regard to business in the above-mentioned countries should be sent to them.

- - -

IT will no doubt be welcome news to many visitors to Bournemouth that the Supermarine Aviation Works have decided to carry on with the flying boat trips at Bournemouth during the autumn and winter on suitable and fine days. As the weather is generally good it is anticipated that there will be few blank days during what would ordinarily be termed "the off season." Demonstration and ordinary passenger flights will also continue to be given from the slipway at Woolston near Southampton during the winter months.

- - -

ON one of the regular weekly trips between London and Holland, Mr. C. Turner recently piloted the British Aerial Transport Co.'s saloon machine from Hounslow to Amsterdam in under three hours.

- - -

MESSRS. VICKERS, LTD., announce that as from the 1st inst. the prices of their special alloy "Duralumin" have been reduced. As a guide to present prices it may be stated that on the 15th inst. the basis prices of their various manufactures were as follows :—Sheet and strip, 4*s.* per lb. ; extruded rod and sections, 2*s.* 11*d.* per lb. ; solid drawn tube, 5*s.* 6*d.* per lb. ; wire, 4*s.* 8*d.* per lb. ; rivets, 5*s.* 11*d.* per lb. ; rolled and drawn angles and channels, 7*s.* 6*d.* per lb. Detailed price list of extras for these various sections will be forwarded on application to Messrs. Vickers, Ltd., Vickers House, Broadway, Westminster, S.W.1.

- - -

ELECTRIC fans for all purposes are shown in a catalogue which is to hand from the Sun Electrical Co., Ltd., of 118-120, Charing Cross Road, W.C.2. Desk and wall fans are supplied in a wide range of sizes and types, including fixed base, swivel and trunnion, oscillating and convertible wall brackets. Ceiling fans are made in two patterns—for fitting close to the ceiling or on a down rod—and for either continuous or alternating current. Another speciality of this firm is a small power electric motor, the range of models being from 1/30 h.p. up to ¼ h.p. Anyone interested can obtain a copy of the list by applying to the company at the above address.

- - -

A LITTLE booklet to hand from the General Electric Co., Ltd., gives details and prices of the various types of Osram lamps made for automobile and aeronautical work, but which are equally suitable for many other purposes. The filaments are tough and durable and specially supported in each lamp so as to make them vibration-proof. In the headlight lamps the filaments are so arranged that practically a "point source" of light is procured, enabling a parallel beam to be obtained from properly designed reflectors. Users of electric lamps on cars, etc., should make a point of sending for this useful little booklet.

Loading up the B.A.T. commercial aeroplane at Hounslow for its recent emergency flight to Amsterdam, when it carried over 600 lbs. of freightage, including a consignment of Emaillite, urgently wanted by the Dutch Government, and ordered through Messrs. Tashe, the Emaillite representatives in Holland. Note the Customs officer in attendance to seal up the doors

Brown Brothers, Ltd.

THE directors of Brown Brothers, Ltd., are now offering for subscription 75,000 6½ per cent. cumulative preference shares of £1 each at par and 75,000 ordinary shares of £1 each at £1 1*s.* 6*d.* per share. Applications may be made for preference shares alone, but any application for ordinary shares must be accompanied by an application for an equal number of preference shares. The company was formed 23 years ago to carry on and develop the business of Brown Brothers, wholesale motor and cycle accessory manufacturers, and recently the company purchased the whole of the shares of James Thomson and Son (Motor Factors), Ltd. The combined profits of the two businesses after charging depreciation and excess profits duty, but before deducting income tax, for 1918 were £53,867. The amount required to meet the dividend on the preference shares already issued and now to be issued is £11,375.

The Chinese Aeroplane Loan

IT is announced that the subscriptions to the Chinese Aeroplane Loan were such that shareholders in Vickers will receive about 60 per cent. of the amounts for which they applied and that ordinary applicants will receive about 30 per cent.

* * * *

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations :—cyl.=cylinder; I.C.=internal combustion; m.=motors.

APPLIED FOR IN 1915

Published October 23, 1919

14,375. FAIREY AVIATION CO. and C. R. FAIREY. Aeroplanes.

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published October 23, 1919

15,322. F. G. CARRIE. Gyroscopic compass. (132,816.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published October 23, 1919

5,165. C. J. H. MACKENZIE-KENNEDY and F. M. T. REILLY. Holding and releasing gear for use in aircraft. (132,824.)
8,185. G. E. BRADSHAW and A.B.C. MOTORS, LTD. I.C. engines. (132,827.)
9,079. W. A. UTTZ. Parachute equipped aeroplane. (116,498.)
12,329. F. G. CARRIE. Gyroscopic compass. (132,839.)
15,322. W. D. ODDY. Propeller. (132,849.)
15,487. J. DEWAR. Hangars, etc. (132,863.)
15,594. J. S. WHITE AND CO. and T. C. LETCHER. Landing chassis. (132,877.)
15,595. J. S. WHITE AND CO. and T. C. LETCHER. Aeroplane floats. (132,878.)
15,685. H. R. RICARDO. Propeller mountings. (132,886.)
16,221. E. R. CALTHROP, A. E. BOWEN and P. W. SCHOLAR. Parachute landing devices. (132,901.)
19,823. E. C. HORSLEY. Method of stabilising gyroscopes. (132,944.)
20,624. W. G. TARRANT. Light spars, beams, etc., for aircraft. (132,951.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xxxix, xl, xli, and xlii).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates* :—

UNITED KINGDOM	s.	d.	ABROAD*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, *Great Queen Street, Kingsway, W.C.* 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 566 (No. 44, Vol. XI.) OCTOBER 30, 1919 [Weekly. Price 6d. Post Free, 7d.

Flight
The Aircraft Engineer and Airships
Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY W.C. 2.
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad .. .. .. 33*s.* 0*d.**
These rates are subject to any alteration found necessary under abnormal conditions
****European subscriptions must be remitted in British currency.***

CONTENTS

Editorial Comment PAGE
The Navy and the R.A.F. .. 1411
The Organisation of the Naval Wing .. 1411
The London-Cairo Air Route .. 1412
Startling Charges of Waste and Incompetence .. 1412
Why Not a Public Enquiry? .. 1414
Flight—and the Men: L. Bairstow, F.R.S., C.B.E. .. 1413
The Camera and the 'Plane .. 1415
The Boulton Paul Commercial Machine .. 1416
Airships .. 1423
Personals .. 1437
The Saundear Carburettor .. 1428
The Static Head Turn Indicator for Aeroplanes .. 1429
Airisms .. 1433
The Royal Air Force .. 1426
Company Doings .. 1438

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Nov. ...	Entrance Examination for R.A.F. College.
Nov. 7-15 ...	Olympia Motor Car Show.
Dec. 3 ...	"The Air Force." Lecture by Air-Commodore H. R. Brooke-Popham before R.U.S.I.
Dec. 19 to ... Jan. 4, 1920.	Paris Aero Show.
July, 1920	S.B.A.C. International Aero Exhibition at Olympia

EDITORIAL COMMENT

The Navy and the R.A.F.

AFTER all the rumours that have been current about the naval wing of the R.A.F. reverting to the administrative control of the Admiralty, it is reassuring to know that nothing of the sort is to happen—at least, in the immediate future. Indeed, from the terms of an official communication recently published it seems to be reasonably clear that it is not even in contemplation in official circles. By the terms of the announcement in question, it is laid down that all air units working with the Navy, including airships under naval control, will, in future, be centralised under the command of an R.A.F. officer, with the title of Air Officer Commanding the Coastal Area, whose headquarters will be at Thurloe Place, Kensington. The duties of this officer will include the command of all air units in the United Kingdom working with the Navy, with the exception of *personnel* embarked in ships of the Fleet. He will act as adviser to the Admiralty in the first instance on all questions relating to aerial naval policy (the Chief of the Air Staff acting as chief adviser); and he will also act as adviser to the naval commanders-in-chief at the various home stations. He is to be directly responsible to the Air Ministry for the conduct of training, but will keep in close touch with the Admiralty to ensure that the views of My Lords receive at all times adequate consideration, and he will also be responsible to the Air Ministry on all questions of supply and maintenance of air units working with the Navy in home waters.

This arrangement forms a very effective *liaison* between the R.A.F. and the Admiralty, and seems to be, in theory, as nearly ideal as it is possible for such arrangements to be. It ensures that air units working with the Navy shall remain integrally and administratively under the sole authority of the Air Ministry, while the necessary latitude of executive command for operations is reserved to commanding officers of ships or squadrons with which air units are working. It is an arrangement on all fours with that advocated in these pages when the recent discussion arose as to the ultimate fate of the naval wing of the R.A.F.

◆ ◆ ◆

The Organisation of the Naval Wing

The communication under notice goes on to lay it down that the "coastal area" is to be organised into administrative groups, as follows:—Operational Units in home naval commands, 10th Group and 29th Group. So far as concerns Operational Units in home naval commands, these will continue, as heretofore, to work under the orders of the respective naval commanders-in-chief—and thus under the Admiralty—for all operational purposes. As regards other purposes, they will be under the Air Officer Commanding the Coastal Area. Each commander-in-chief will have the senior combatant air officer in his command as his local adviser, but on more important questions of policy he will refer to the Air Officer Commanding the Coastal Area. The 29th Group will consist of the aircraft embarked on board His Majesty's ships and their necessary shore bases and establishments, the organisation of the latter being based on existing practice. The group commander will have under his command certain bases for supplying the Fleet. The 10th Group will consist of the R.A.F. establishments maintained for the training of the Royal Air Force and Naval *personnel* required by R.A.F. units co-operating with the Navy at home and abroad.

This announcement is definite enough to set at rest, once and for all, the plentiful crop of rumours which has been rife as to intrigues within the Admiralty to regain complete administrative control of the Air Service and to put matters back to where they were prior to 1918. Undoubtedly, efforts have been made in certain quarters to get matters restored to the unhappy state which existed before the creation of the R.A.F. as a separate and distinct Service. Evidently they have met with scant success, and it is devoutly to be hoped that we have now heard the last of them. There remains nothing to be done but to congratulate the authorities of the Admiralty and the Air Ministry on the happy issue of the discussions which have led up to so excellent a *modus vivendi.*

* * *

The London–Cairo Air Route

The statements as to the tragic record of the air route from London to Cairo made by Lieut.-Col. Henderson are so serious that the only ground for satisfaction in connection with them is that Gen. Seely has stated that an enquiry had been ordered before Col. Henderson's statement was published. Briefly, the allegations are that in the last few months eleven airmen have lost their lives while flying Air Ministry machines from England to Egypt, either through failure of their engines while over the Mediterranean or through crashing when landing on unsuitable aerodromes. It is further stated that machines have been despatched on the journey in deplorable condition, after standing for weeks or months in the open at British aerodromes where they have been delivered too late for use in the War.

It is quite clear that these are statements which must be probed to the bottom. Obviously, we cannot commit ourselves to any opinion as to the merits of the statements, particularly as the official assurance has been given that a full enquiry has been ordered. All we can say at the moment is that if enquiry demonstrates that the allegations are true, then the officials or persons responsible should hang for their sins. Whether true or not, there is no getting away from the fact that eleven valuable lives have been lost on this route. Flying has become ordinarily so safe that it might have been thought the Air Ministry would have taken alarm long before the toll of casualties had mounted as it has done, and would have been at some little trouble to find out whether the route was a suitable one, or whether there was anything the matter with the machines before starting on the journey, or if the fatalities were due to the errors of the pilots themselves. But little seems to have been done until the eve of public disclosure, which we cannot help suspecting was foreseen by the Ministry, which then, and only then, bestirred itself to anticipate publicity. As we say, it is not for us to prejudge the results of the forthcoming enquiry, but it is certain the Air Ministry is badly at fault in having taken no measures to discover why the London–Cairo route was piling up such a tale of casualties. It seems to be necessary to remind the Ministry that we are not now at war, and that the public is no longer satisfied to accept a long list of killed and wounded aviators as the inevitable price to be paid for victory. In time of war we expect these things, and have to take them without question, since human life as such temporarily ceases to have value except to the individuals intimately concerned with each casualty. It is different in time of peace, and the public, as well as the individuals, demand that there shall be no avoidable waste of life in its service, and will hold to a strict account departments and officials who by their neglect of obvious precautions, are the cause of it. In this case, although it is too early to impute specific blame to anyone, it certainly would appear that the enquiry now to be held is woefully belated. Had it been inaugurated three months ago it would have been very different.

* * *

Startling Charges of Waste and Incompetence

In a series of recently-published articles in the *Morning Post,* a correspondent, who contents himself with the *nom de plume* of "Argonaut," makes a whole volume of sweeping charges of waste and incompetence against the Air Ministry. He alleges that deliveries by contractors of new machines in quantities equal to or even above war consumption were continued well into the summer of this year, and were accompanied by the destruction of new machines, in addition to the scrapping of machines in current use at the time of the Armistice. The method of destruction, it is alleged, was to drench the machine with petrol—as much as 30 to 50 gallons being used to burn it. This sort of thing is said to have gone on daily in the occupied zone, not far from Cologne.

He also purports to give facts about the "scandal" of engine deliveries since the Armistice, and alleges that many hundreds of thousands of pounds have been thrown away by the sheer inept folly of the Air Ministry. Again, he talks about deliveries of spare parts for obsolete engines in many thousands, long after the engines for which they were designed had passed out of service. As a matter of fact, there is not a single item which escapes his censorship, and we must say that he makes out a strong *primâ facie* case for the enquiry he demands. But it seems to us that he weakens his own case by studiously refraining from saying where and when all these things occurred, except that he does in his first article say that the machines alleged to have been destroyed in the Cologne area were of the DeH. IX. type. Further than that, the charges are of a very general nature, and are such as anyone with a little inside knowledge, fortified with a good deal of the gossip which has been so rife all through the War period and since, might have brought. We do not say they are not true. Unfortunately, there is only too much reason to think that they rest on a very solid basis of fact, but that does not help very much towards bringing to book those responsible, unless the accuser can fortify his allegations with specific dates and names. Already "Argonaut" has been practically challenged by the Air Ministry to produce his proofs. Immediately on the publication of the first article, the Air Ministry, in an interview between one of its officials and a newspaper representative, said: "The statements are certainly untrue so far as the information of the

Flight—And the Men

"Flight" Copyright.

L. BAIRSTOW, F.R.S., C.B.E., Expert Adviser in Aerodynamics to the Air Ministry, late Superintendent of Aerodynamics Department, N.P.L.

Ministry goes up to a certain date; but the Ministry has at once instituted enquiries, and without delay, will publish the facts. In the view of the Air Ministry, statements of this character would be much more convincing if they were more definite. Where did these things take place? On what date did they occur? The Ministry would welcome this information, if it exists."

◆ ◆ ◆

Why Not a Public Enquiry?

The *dementi* is, to say truth, not very much more convincing than the general charges to which it refers. It will be observed that there is an important qualification in the words:—"Up to a certain date." These may mean anything, but it is open to the construction that the official who was interviewed was hedging—according to Parliamentary custom, as defined by Lord Weir—with the truth, and that it merely means that nothing of the sort alleged took place before a certain date. We do not say that this is so, but the inference is there to be drawn. There have been so many enquiries and commissions already into various aspects of the War that everyone is getting rather tired of them, particularly as they none of them seem to lead anywhere. All that happens, as a rule, is that a great deal of time is wasted and everyone concerned is adjudged to have done quite well—and the Report ends with a pious hope that these things will never occur again! Still, there have been so many allegations of millions literally thrown away with both hands by the Air Ministry that it does appear desirable to sift things to the bottom, and to discover whether all this waste was inevitable or not. Unfortunately, all the enquiry in the world will not retrieve the losses of the overburdened taxpayer, but such a Commission of Enquiry as that demanded by the *Morning Post* correspondent should certainly expose many weak points and pitfalls in organisation which might, as a result, be avoided in the future. That it would lead to any unpleasant results to officers or officials guilty of turpitude or incompetence is not to be imagined for a moment—that is seldom the result of these enquiries—and if that is the sole object that "Argonaut" has in mind, we fear he is wasting time and trouble in agitating for it.

◆ ◆ ◆ ◆

R.A.F. and the Navy

In connection with the changes which are being made in the home organisation of the R.A.F. units working with the Royal Navy, to which reference is made on p. 1,411, we understand that the first Air Officer Commanding the Coastal Area will be Air Commodore Arthur V. Vyvyan, C.B., D.S.O., who, for the past six months has been in command of R.A.F. units in the Mediterranean.

Honours

The following announcement appeared in a supplement to the *London Gazette* of October 23:—

The King has been pleased to give orders for the following appointment for valuable services rendered in connection with the defence of Kut-al-Amarah. Dated June 3, 1919:—

D.S.O.

Capt. S. C. W. Smith, E. Surr. R., Spec Res. and R.A.F.

England-Australia Flight

Maj.-Gen. Sir F. H. Sykes, G.B.E., K.C.B., C.M.G., Controller-General of Civil Aviation, has received the following message from the Prime Minister of Australia, for transmission to Capt. Matthews, the pilot of the Sopwith Wallaby machine, which left England on Oct. 21 as a competitor in the Australian Commonwealth Government's prize flight.

The message reads:—

"Wish you and Serg. Kay every success in your great adventure. While every one of your fellow-citizens hope that an Australian aviator may be the first to fly from Europe to Australia, and so achieve what will be easily the world's record in aerial navigation, I want you to take no unnecessary risks. Plug on day after day doing your best, but do nothing foolhardy. If you cannot make Australia in thirty days never mind. The main thing is that an Australian should get here first. If you do that you need not worry. Good luck.

(Signed) "Hughes, Prime Minister."

The machine reached Cologne on the afternoon of Oct. 22.

British Aeroplane for King Alfonso

The formal handing-over of a British aeroplane presented to King Alfonso took place on October 24 at the Cuatro-vientos (Four Winds) Aerodrome, among those present being Sir A. H. Hardinge, the British Ambassador, and Lady Hardinge, who named the machine.

The Coupe Schneider

At the meeting of the Fédération Aéronautique Internationale in Brussels on October 24 the matter of the Schneider Cup came in for consideration, and it was decided that, although the trophy itself should not be awarded to Janello, in recognition of his fine performance the Aero Club of Italy should be asked to organise next year's race in Italy.

New Regulations for Records

At the meeting of the F.A.I. at Brussels several changes were made in the regulations governing aviation records. Height records are to be termed in future altitude records, and the altitude is to be counted from sea level without reference to the altitude of the starting point. In future new records must improve on the previous figure by at least 100 metres instead of the minimum of 150 metres as previously.

Maximum speed records in future must be made over a course of one kilometre, to be flown in opposite directions and at a minimum height of 50 metres. It was decided to do away with hour records and passenger records, the place of the latter being taken by records of useful load transported. A new class of records—machines without motors—is to be recognised.

The question of women's records was raised, but it was decided not to officially recognise them unless they are an advance on masculine performances.

Aviation in French Colonies

For the purpose of meeting the expenses of military aviation, and also the exceptional expenses of civil aviation in French Colonies, the Chamber of Deputies and the Senate have sanctioned a credit of 3,100,000 frs., which has been placed at the disposal of the Minister of the Colonies. The colonies are to establish a military aviation service, and they will have to contribute to the cost at a rate to be decided each year.

Bombing Indian Tribesmen

A delayed message from Simla dated October 17, states that our aeroplanes caught 200 tribesmen in the open in Tochi and effectively bombed and machine-gunned them.

Aerial Services in Australia

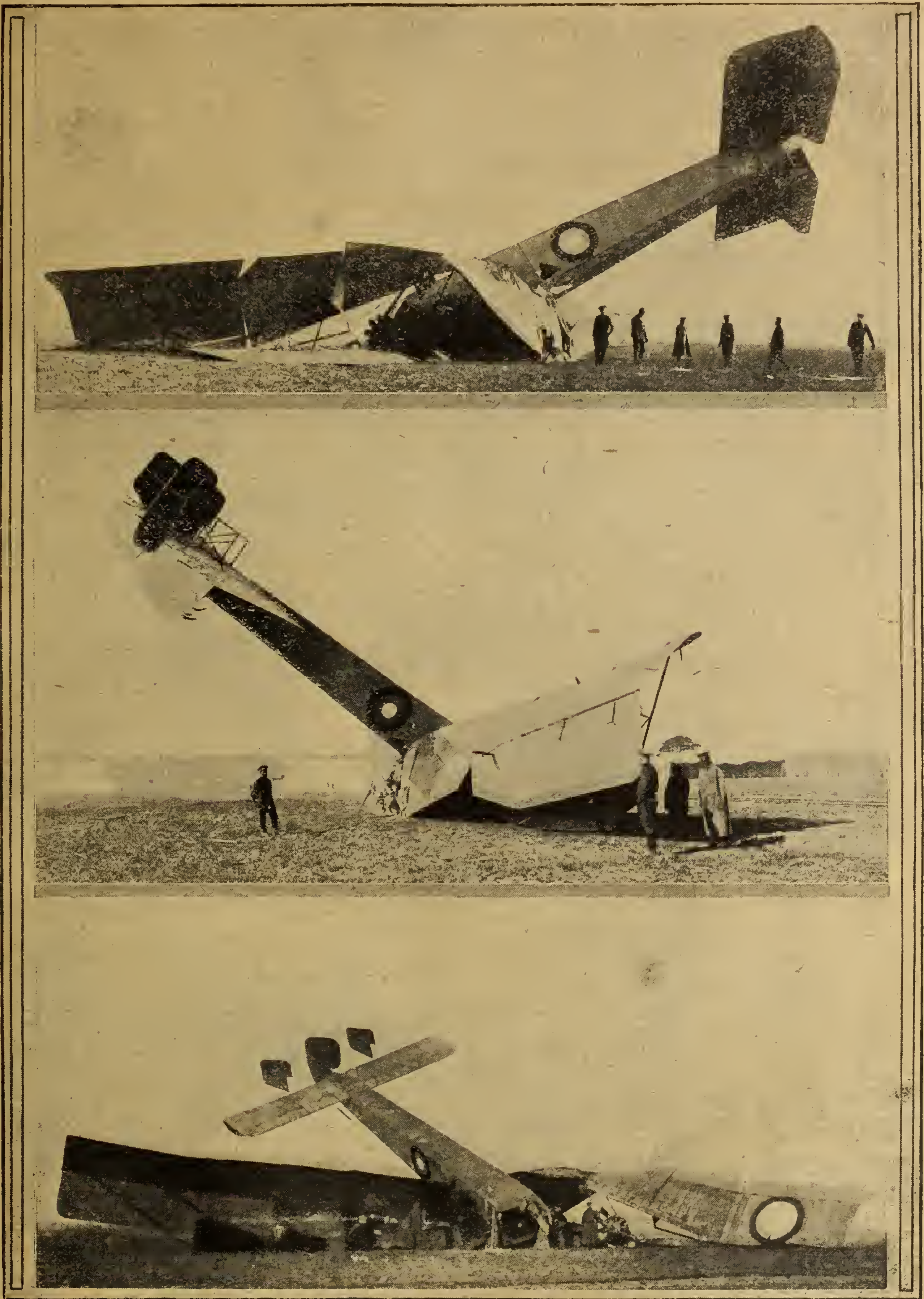
Word comes from Melbourne, under date October 22, that a scheme is being organised with a view to starting aerial passenger services linking up important places in the different States, in July of next year.

A Trans-American Air Mail

From a communication sent by the United States Post Office authorities to the American Flying Club, it appears that it is intended to establish a trans-continental air mail route. A Bill has been introduced in Congress giving power to appropriate money for this purpose. It is added that the determination to establish an air mail between New York and San Francisco was arrived at as a consequence of the results of the recent Army transcontinental air race.

The U.S. Transcontinental Race

It appears that, after all, Lieut. Maynard was not the winner of the race across the United States. A message from Washington on October 22 stated that Capt. Donaldson made the 5,700 miles trip from New York to San Francisco and back in 57 hours 33 mins. 57 secs. flying time, as against Lieut. Maynard's 67 hours 3 mins. 40 secs. A later message says that the lowest actual flying time was that of Lieut. Pearson from San Francisco to New York and back in 48 hours 37 mins. 16 secs.

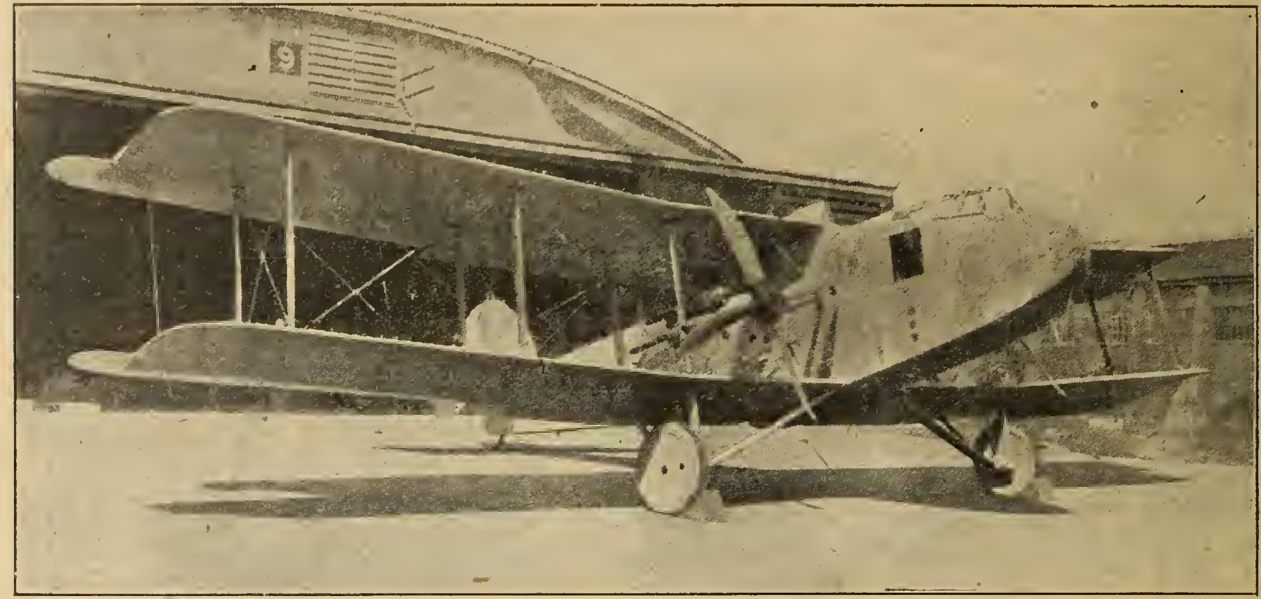


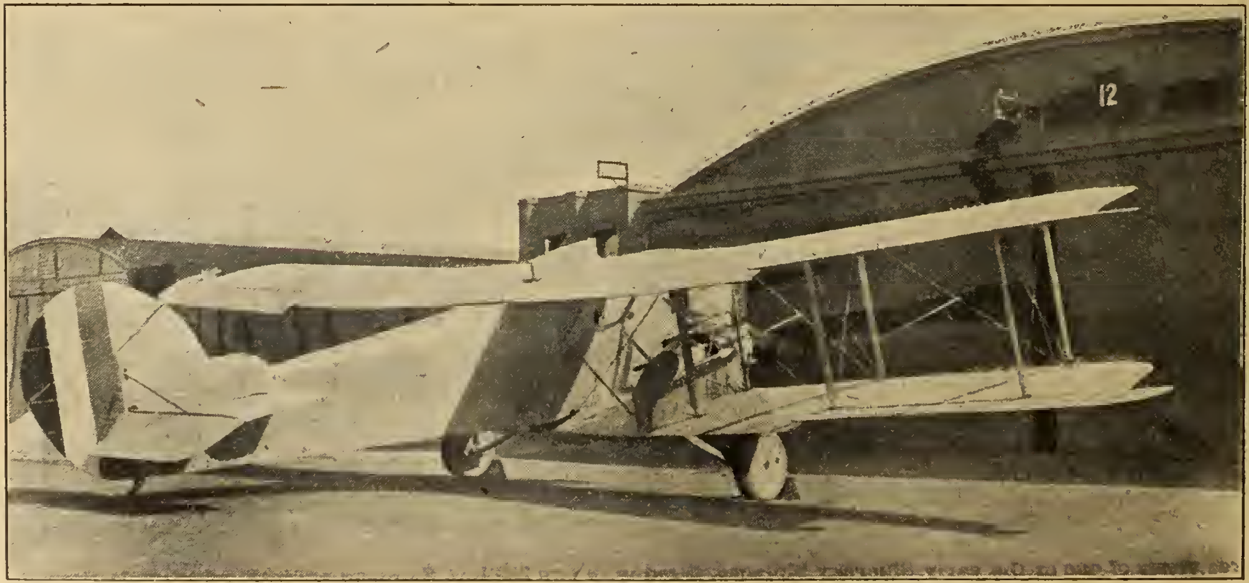
Three views of one of the early Sikorsky biplanes, fitted with two 250 h.p. Salmson engines, which side-slipped from about 20 metres during the retreat from Warsaw

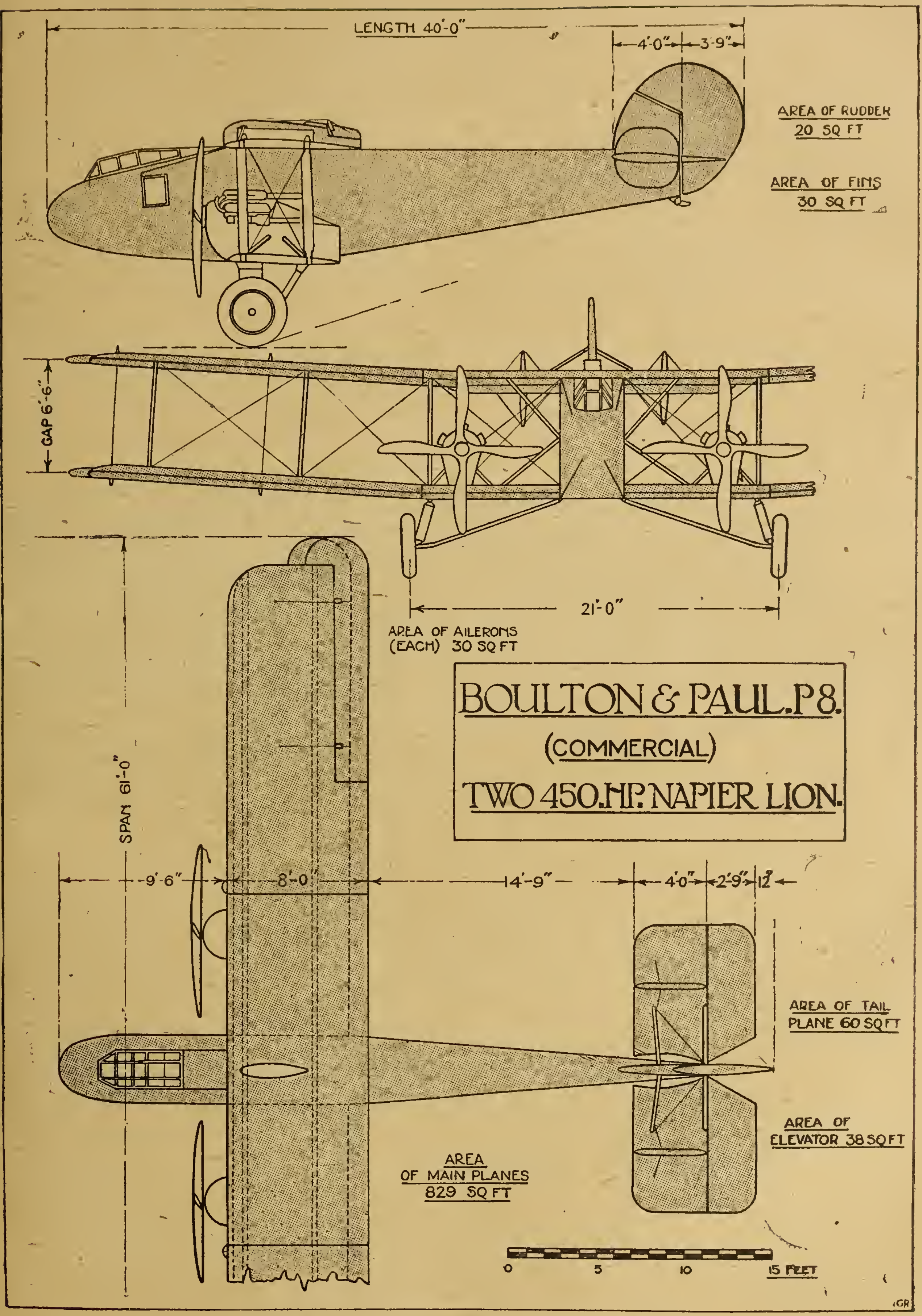
THE BOULTON & PAUL COMMERCIAL MACHINE:

Two 450 h.p. Napier Lion Engines

Generally speaking, the Boulton & Paul Commercial biplane may be said to be similar to the machine built by this firm for the Transatlantic flight. The deep *fuselage* extends right up to the top plane, thus giving ample accommodation inside for passengers or/and goods. Since, however, the main fuel tanks are mounted inside the body, the cargo or passenger space is divided into two separate compartments, one in front of the tanks and one aft of them. As at present fitted up, the machine is not provided with its full complement of seats, etc., as it is intended to obtain a certain amount of experience with her in the air before finally deciding upon the arrangement of seats. Also the arrangement will be largely dependent upon whether the machine is to be used for passenger flying, for carrying mails, or for a combination of the two. It will, therefore, be understood that this part of the design is still left open, so to speak, and is subject to alterations as requirements demand. Obviously there is a wide choice according to the use to which the machine will be put. For instance, by fitting relatively small tanks and installing a large number of seats, the P.8, as this machine is called on the B. & P. series list, will be able to carry a large load for a relatively short distance. On the other hand, the tank capacity may be increased and mails substituted for some of the passengers. Or, again, all passengers and mails may be left out, the whole


THE BOULTON & PAUL P.8 COMMERCIAL MACHINE: Three-quarter front view


THE BOULTON & PAUL P.8 COMMERCIAL MACHINE: Three-quarter rear view



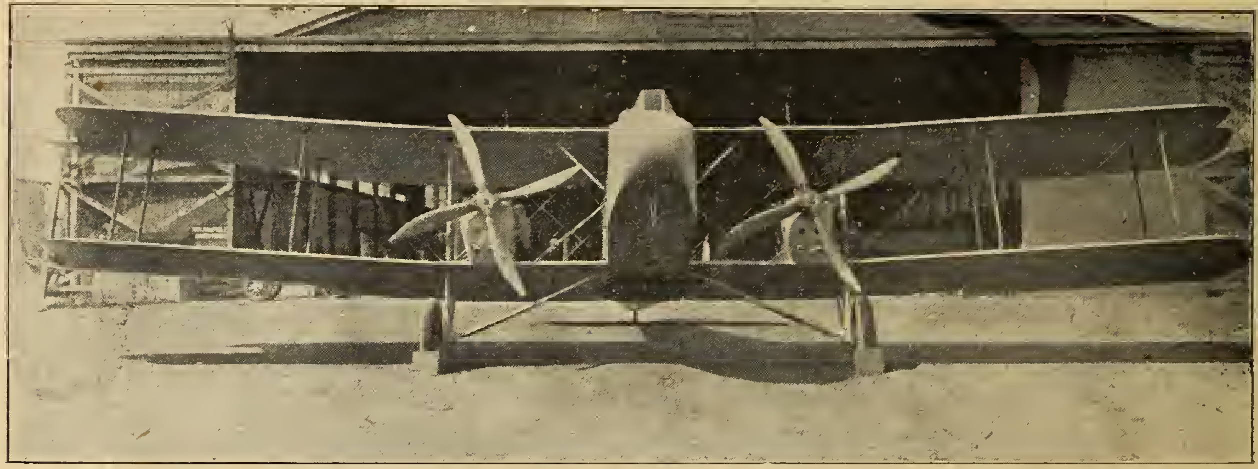
THE B. & P. P8 : Plan, side and front elevation to scale.

carrying capacity being taken up by fuel, in which case the machine would have a very long radius of action.

Constructionally, there are no great innovations to be found in the P8, most of the constructional details being of more or less standard type. It might be pointed out, however, that very extensive use has been made of tubular rivets in place of threaded bolts. This method of securing parts has been found very economical, both as regards strength for weight and in the actual use, the tubular rivets being quick to make once the proper tools for their manufacture have been installed, while replacements take little, if any, longer than would the replacement of a bolt. These tubular rivets are employed for securing the metal fittings to the *fuselage longerons*, and in many other places in the body and undercarriage. They make a very neat job, as there are no boltheads or nuts projecting, but only a thin bell mouth where the ends are flanged out. Apart from the use of these rivets, the *fuselage* is of standard construction, with *longerons* and struts of wood, the structure being cross-braced with standard tie rods. In the front part this simple arrangement is varied occasionally as local requirements demand, but, fundamentally, the *fuselage* structure is of the simple girder type. One feature of the *fuselage* design should be pointed out. The upper *longerons* do not run along the top corners of the body, but are placed some distance down the side. As a matter of fact, the top *longerons* run straight, in side elevation, thus forming a good datum line for rigging and trueing-up purposes. From this it will be seen that only the lower part of the *fuselage* is braced, the upper portion being merely a fairing made up of formers and longitudinal stringers. This can be clearly seen in one of the accompanying photographs, which shows the rear portion of the body, looking aft from the rear cabin.

As already pointed out, the main fuel tanks are mounted in the body, and as they are placed over the centre of pressure of the wings, so as not to alter the trim when the fuel is consumed, they divide the available space into two separate compartments. When fitted out as a passenger carrier, both front and rear cabins may be fitted with seats. Owing to the deep body and the possibility of placing the petrol tank high in the body, there is no need for any gravity tank, the main upper petrol tank performing this function. If more tanks are fitted for long duration work, some of them near the floor of the body, it will probably become necessary to provide means for transferring the fuel from these into the top tank, but at present the petrol system is simplicity itself, with gravity feed direct from the main tank.

In the fore part of the body, in front of the fore cabin, is the pilot's cockpit, the wind screen for which is so arranged that if desired the pilot can have his head projecting into the open without being in a direct draught, while if desired, he can close a small skylight and be totally enclosed, as are the passengers. From this position he retains quite a good view in practically all directions except straight back, and as the machine is very fast—about 150 m.p.h.—he need not worry overmuch about machines overtaking him. Lateral control is by means of a wheel, and a fore and aft movement of the wheel operates the elevator. Rudder control is normally by foot bar, but by a very ingenious arrangement it is possible during a long flight to lock the *ailerons* and elevator in position and steer the machine by the wheel. One of our sketches shows the control column and wheel. The change-over from foot bar to wheel steering is done with one movement. The wheel is so held that the *ailerons* and elevators are neutral and, with the wheel and column in this position, the locking lever shown near the bottom of the sketch is pulled. This locks the lateral and longitudinal control surfaces while at the same time disengaging the foot bar and connecting the rudder cables to the wheel. As the machine is expected to be very stable, this should be a considerable advantage on a very long journey. The controls are instantly returned to the normal by pulling the locking lever in the opposite direction, an operation requiring a fraction of a second only. For use when one engine is pulling slightly more than the other, there is an arrangement, also shown in the sketch, for taking the load thus imposed off the pilot's feet. This consists of a small wheel mounted on the right-hand side of the control column, near the top. Pressing the wheel inwards causes it to engage with the rudder control cables, and turning the wheel then puts one rudder cable under tension, the amount depending upon the number of turns given to the wheel. In this manner the pilot does not have to be pressing constantly with his right or left foot, according to which engine pulls the harder, and the springs incorporated

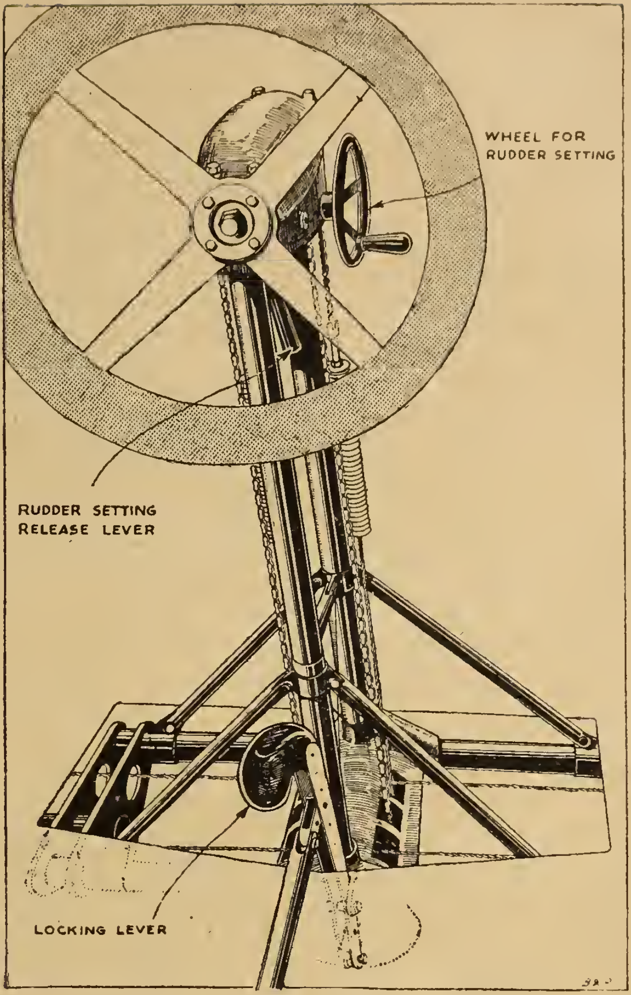


THE B. & P. P8: Front view.

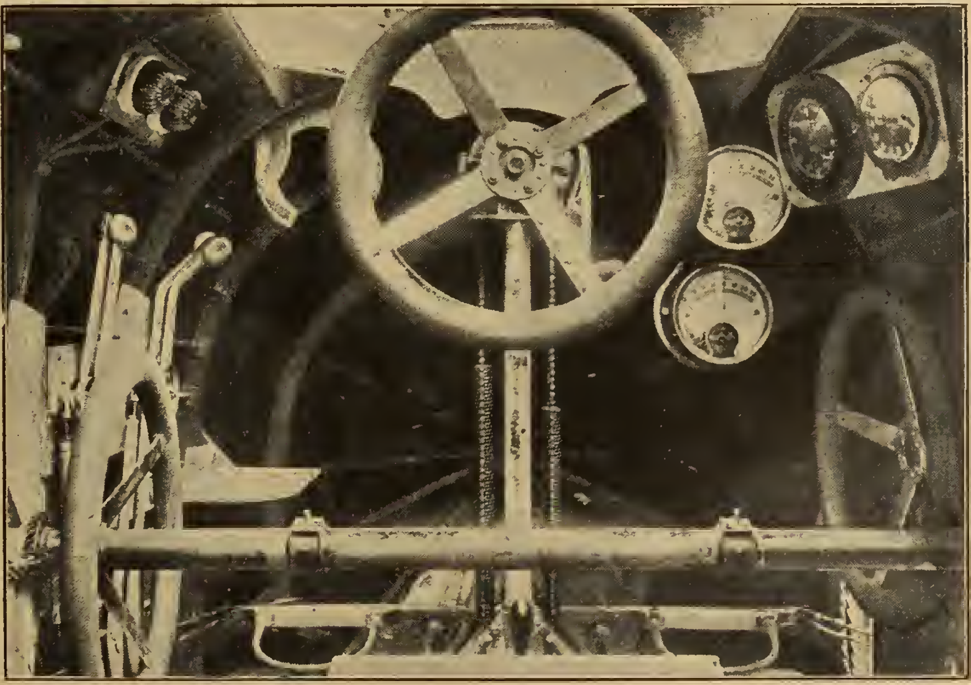
with the control cables ensure that for steering the rudder is as easy to move as if it were central. In case of total failure of one engine, the turning effort made possible by this arrangement would be insufficient, and provision has been made for this contingency by pivoted fins above and below the tail plane, operated by a wheel on the starboard wall of the pilot's cockpit. The usual tail plane trimming gear is provided, also actuated by a hand-operated wheel.

One of the accompanying sketches shows the engine controls. These consist of two sets of duplicate levers. The rear set is for ordinary engine control, the right-hand lever being the throttle for the starboard engine, the left-hand one for the port engine. The front pair is for altitude control. From the way the levers are mounted, it will be seen that both engines may be throttled together or separately, by moving the two levers together or singly.

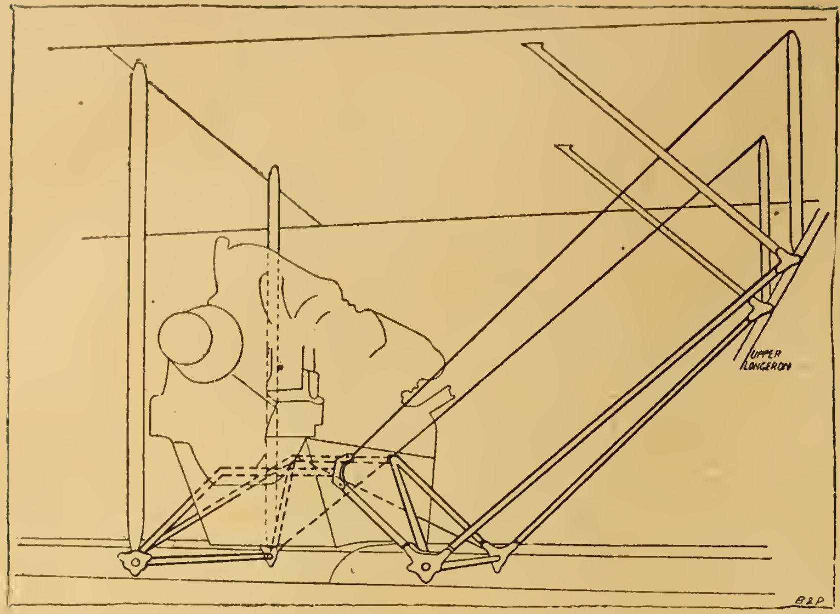
As will be seen from the general arrangement drawings and photographs of the machine, the engines are enclosed in neat aluminium casings, giving a very low resistance. This has been made possible by fitting the radiator in the *fuselage*. To vary the cooling the radiator is mounted on two vertical worms which can be rotated from the pilot's seat by means of a wheel *via* chains and cables. A header tank is placed in the top plane, connected to the radiator by means of a flexible rubber pipe. This pipe is arranged in a series of zig-zags so as to allow of the raising and lowering of the radiator without getting kinks in the tube. Although the single radiator is not partitioned off, the water system of either engine can be cut off during flight. The manner in which this is accomplished will be understood from reference to the diagram of the water system. The water pumps on the engines draw the water from the bottom of the radiator, force it through the water jackets and hence up to a small tank in the top plane. From this it runs down a pipe to the side of the radiator. Here the water is not allowed to mix at once with that already in the radiator, but has to flow over the top of a small partition near the side of the radiator. The pipes leading from the radiator to the engine, and the return pipes from engines to radiator, are provided with cut-off valves, placed under the bottom of the

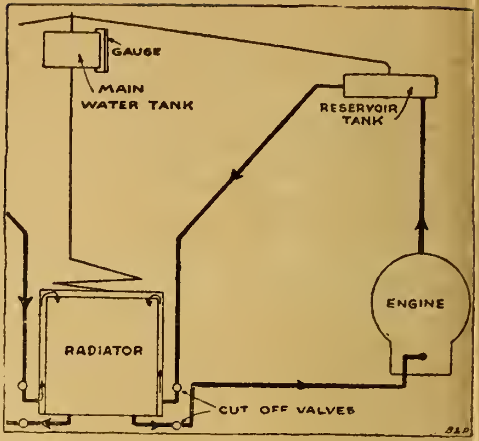


THE B. & P. P.8: Sketch of the controls.



The B. & P. P.8: View of the controls. The levers on the left are engine controls, while the large wheel just in front of them is for raising and lowering the radiator. The central wheel is the control wheel, which, by a very ingenious device, can be turned into an ordinary steering wheel, the *aileron* and elevator controls then being locked in position. The wheel on the right is for trimming the tail plane.





The B. & P. P.8: Above, diagram of the water system. On left, diagram of engine mounting structure, which is so designed that there are no offset moments.

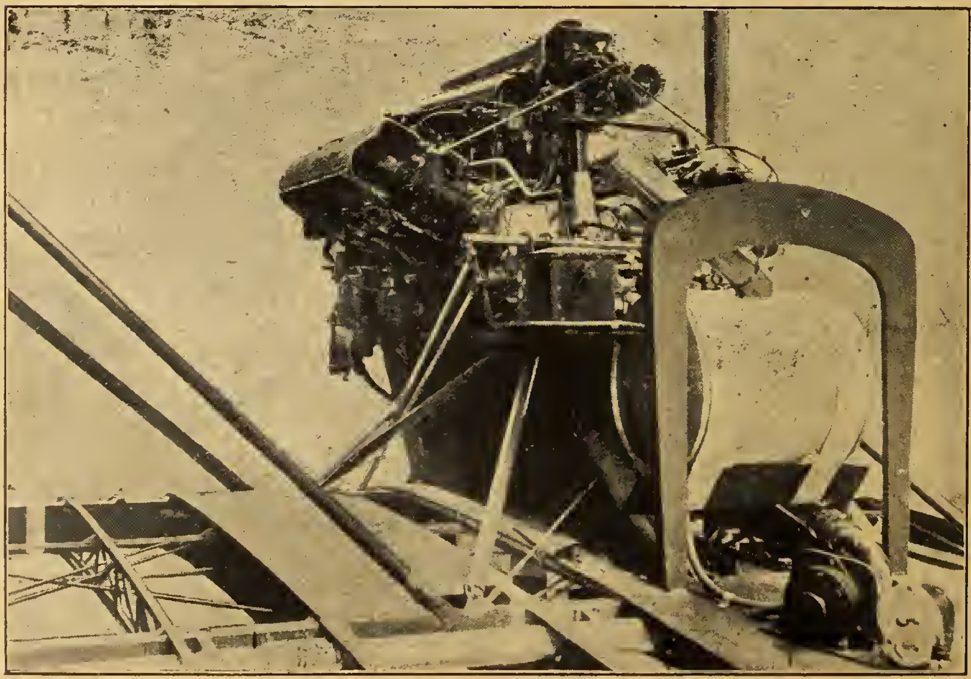
fuselage and connected to controls in the pilot's cockpit. The actual cut-off valves are shown in one of the accompanying photographs.

The main planes, of which the top one has a chord of 8 ft., while the bottom plane chord is 6 ft. 6 ins., are of standard construction. The spar fittings are very substantial, as may be gathered from two of our sketches, which show the front and rear fittings at the points where occur the attachments of front and rear chassis struts, inter-plane struts, diagonal engine bed struts, etc. All the struts, it will be seen, are pin jointed. Balanced *ailerons* are fitted to both top and bottom planes.

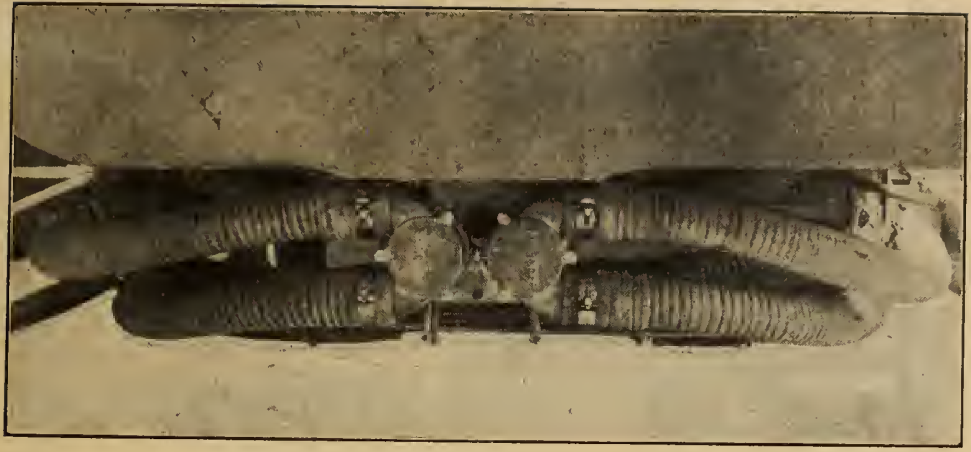
The 450 h.p. Napier Lion engines are mounted on the bottom planes, the engine beds being of light although very strong design. The vertical supports of the engine bearers are in the form of a framework of wood, covered with three-ply. From the engine bearers diagonal tubes run outwards and downwards, providing a perfect system of triangulation, which is extended inwards by tubes running from the bottom plane spars to the upper *longerons* of the *fuselage.* The whole engine mounting has been very well thought out, care being taken to ensure that there are no offset moments. The consequence is that there is a marked absence of vibration under all conditions.

One of our photographs shows the starboard engine in three-quarter rear view. It will be seen that the oil tank is mounted behind the engine. Mounted on the trailing portion of the bottom plane, behind the oil tank, is a hand-operated starting magneto for starting the engine when the machine is on the ground. The engine housing is in the form of sheet aluminium, and may be seen in the photographs of the complete machine.

The undercarriage is in the form of two simple "Vees" of wood, hinged laterally to the bottom

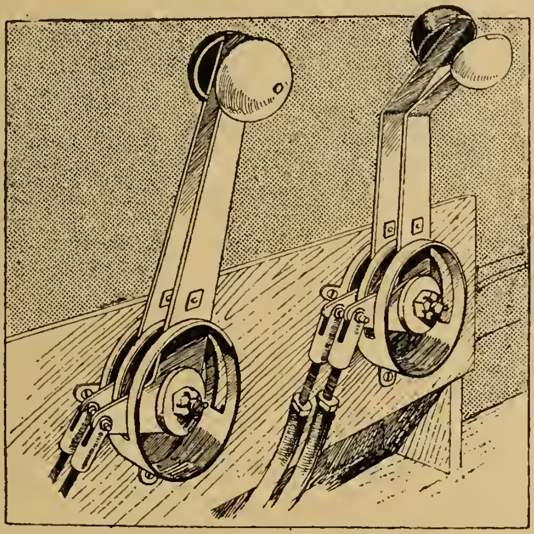


The B. & P. P.8: View from behind of the starboard engine and its mounting.



The B. & P.P.8: View of the cut-off valves, mounted underneath the bottom of the *fuselage*, by means of which the water system of either engine can be cut off.

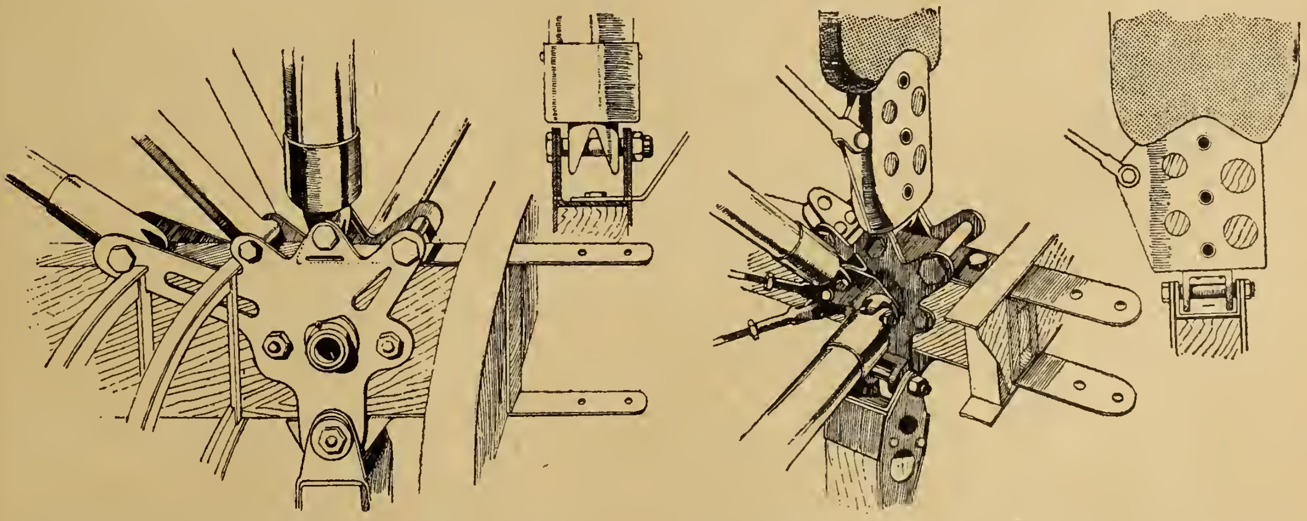
wing spars. The two axles are of the bent type, hinged at their inner ends to the bottom *longerons* of the *fuselage*, and carrying at their outer ends the Palmer Cord wheels. Springing is partly by shock absorbers of rubber and partly pneumatic, the cylinder being shown in one of the photographs.



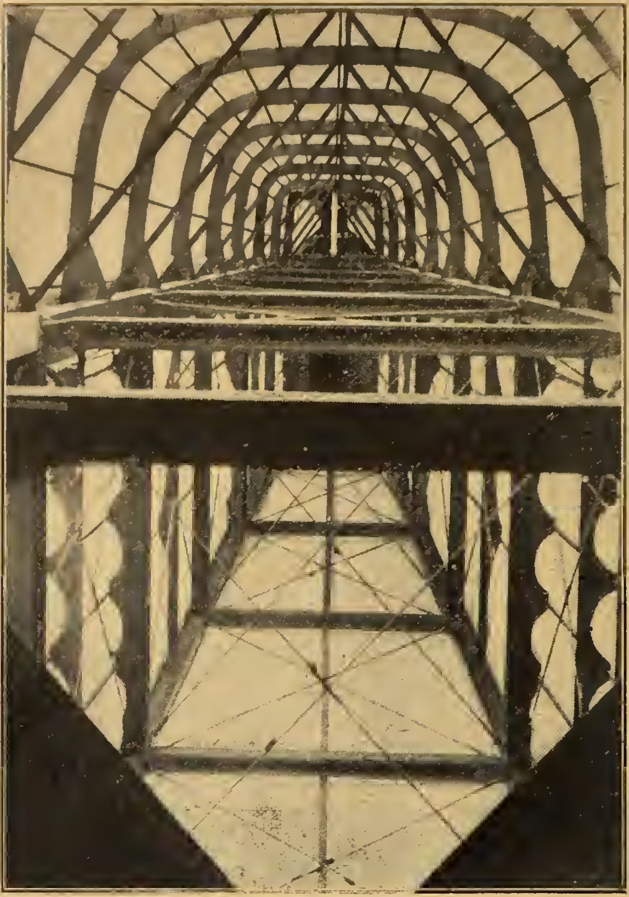
THE B. & P. P.8: Sketch of the engine controls. One set of these is for normal control, the other for altitude control.

The control surfaces are of standard type, the rudder being balanced. The tail plane, as already mentioned, is of the variable incidence type for purposes of trimming the machine, and the only respect in which the tail differs from usual practice is in the fitting of two pivoted fins, above and below the tail plane, which serve to balance the turning moment set up when one engine is out of commission.

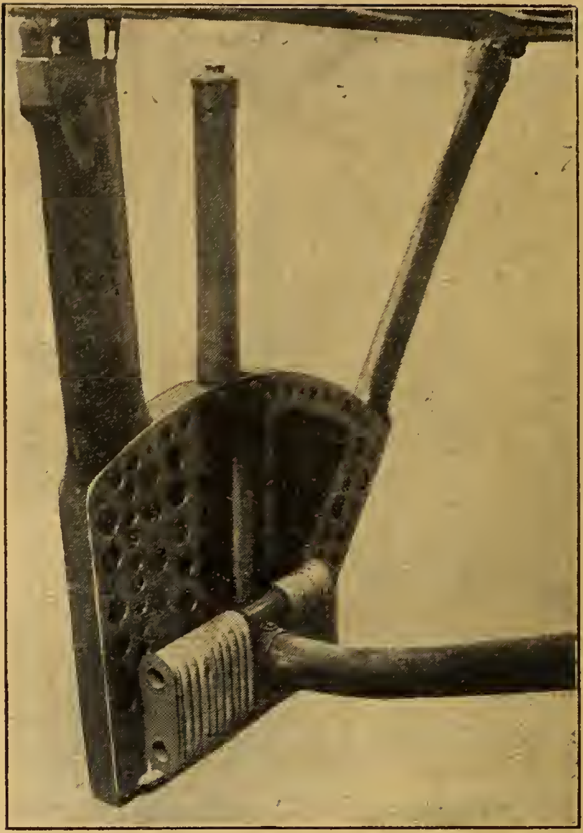
The aerodynamical features of the P.8 have been thoroughly tested in the wind tunnel of Messrs. Boulton & Paul's experimental department, especial care being taken to ensure good stability, as this is a very important point in a commercial machine designed for long-distance flights. Special apparatus have been designed to facilitate the determination of rotary derivatives, and a great amount of stability work is being done by the B. & P. wind tunnel staff. When, therefore, this firm places a machine on the market it may be taken for granted that every effort has been made to ensure that she is absolutely "right," having that degree of stability which relieves the pilot of the greater part of his work on a long flight, without having the excessive stability that may cause a machine to "take charge" at a time when manœuvrability is required.



THE B. & P. P.8: Combined spar and chassis fittings. On left, fitting on the front spar, and, on the right, the fitting on the rear spar.



THE B. & P. P.8: View inside the *fuselage*, looking aft.



THE B. & P. P.8: View of one of the undercarriage Vees with rubber and air shock-absorbing device.

The main particulars of performance, etc., are as follows:—

Weight, empty	4,000 lbs.
,, loaded	7,000 ,,
Speed at 10,000 ft.	149 m.p.h.
,, 15,000 ft.	142 ,,
Climb to 10,000 ft.	8 mins.
Climb to 15,000 ft.	15 mins.
Ceiling	25,000 ft.
Load/sq. ft.	8·4 lbs.
Load/h.p.	7·7 ,,

At the time of writing the Boulton & Paul P.8 has just been finished, and her preliminary trials are due to take place any time. After them the machine will probably be heard of shortly, but of the exact nature of the flight we are not permitted to speak at present.

◆ ◆

Germany and Czecho Slovakia Air Services

ALL the aerial post and passenger traffic between Germany and Czecho-Slovakia has been taken over by the Saxonian Airship Co., of Dresden. The airship service will run thrice weekly.

The Barcelona Race

THE race which was to have been held at Barcelona on October 5 actually took place on the 12th. There were seven entries, including an Ansaldo (250 h.p. Spa); an Espagna (180 h.p. Hispano); an Alfaro (180 h.p. Hispano); a Vendome (60 h.p. Rhone); a Caudron type (80 h.p. Rhone); and two Morane-Saulnier parasols (80 h.p. Rhones). The two last mentioned were piloted by Fronval and Bourgeois respectively, and they were the only competitors to finish the course of 100 kiloms., which they did in the order stated. Two days later the two Frenchmen flew over to Madrid, where they were presented to the military aviation authorities.

The Coupe Deutsch

ON October 22 Lieut. de Romanet, on his Nieuport (300 h.p. Hispano-Suiza), in a trial for the Deutsch Cup, completed the circuit round Paris at an average speed of 268.631 kiloms. per hour, but as this did not improve upon Sadi Lecointe's performance by 10 per cent., it did not entitle him to the Cup. The next day, therefore, he made another attempt, and succeeded in averaging 285.600 kiloms. per hour (177 miles per hour), which, when it is officially accepted by the Aero Club of France, will give him first place in the competition.

A Swiss Height Record

ON October 24 the military pilot Progin, at Thoune, on a D.H. 5 (200 h.p. Winterthour), beat the Swiss height record, attaining an altitude of 8,200 metres. He then had trouble with his oxygen apparatus, lost consciousness and momentarily lost control of the machine, which fell to 7,000 metres. He then revived and brought the machine down safely after being in the air for two hours.

The Gordon Bennett Balloon Race

THE F.A.I. has decided that the next Gordon Bennett race for free balloons shall be held in the United States in 1920.

After the New York–Toronto Race

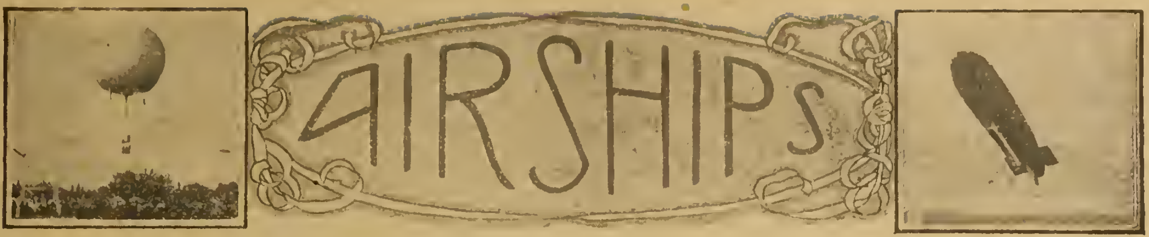
THE attention of the F.A.I. having been directed to the recent race between New York and Toronto, which was won by Lieut. Maynard, all the competitors have been disqualified, as it appears that the event was not run under F.A.I. rules.

Italy Honours Belgian Pilots

A PLEASANT little interlude during the banquet which followed the meeting of the F.A.I. in Brussels was the presentation of medals and diplomas by the Aero Club of Italy to the leading Belgian pilots, Coppens and Oliaslagers.

A New Looping Record

FROM Madrid comes word that the French pilot, Fronval, presumably on a Morane parasol, has succeeded in looping the loop 624 times in a flight of 2 hours 49 mins. 9 secs., at the Four Winds Aerodrome, thus beating the previous "record" of 455 loops in one flight made by the American flyer, Nail.



AIRSHIP ENGINEERING PROGRESS IN THE UNITED STATES*

By J. C. HUNSAKER, Eng. D., Commander, Construction Corps, U.S. Navy

Lighter-than-Air engineering is a very recent development in the United States, and was not really taken up seriously until December of 1916, when the possibility of the United States becoming involved in submarine warfare began to be feared. The Navy Department had always had a mild interest in airships or dirigibles, and placed a contract in 1915 with a firm which had got hold of a German engineer, a German mechanic, and an Austrian airship pilot. This contract called for a training ship of very moderate performance, but it was not delivered until two years later, and was so much over-weight and otherwise so unreliable that after a few short flights it was broken up as useless. This experience was discouraging, as it was hoped from experience with this ship to get some idea of where the Navy ought to use airships.

However, reports began to drift in of the use by the British Navy of small airships for anti-submarine work, coast patrol and dropping depth bombs. In December, 1916, the Department asked the Bureau of Construction and Repair to design an airship for coast patrol and training work. The characteristics were: Speed, 45 m.p.h.; endurance, 12 hours at 35 m.p.h.; radio for 150 miles; crew of three; provision for alighting on the water.

At this time, barring the concern with the German talent, which had built the first rather unfortunate ship, there was no experience in modern airship construction in the country to draw on either for design or for knowledge of the special materials needed.

As the United States still preserved diplomatic relations with Germany, no detailed information from abroad could be secured legitimately.

Development of B-Class

To meet the problem, a design was started which was later designated Type B. The only engines available having any fair claim to reliability were the 100 b.h.p. Curtiss eight-cylinder and the 100 b.h.p. Hall-Scott four-cylinder types. Calculations based on the speed required from this horse-power available and the load to be carried fixed the envelope volume, which was to be a minimum consistent with the characteristics demanded.

Lacking experience, dependence had to be placed on theoretical and experimental investigations. The literature of the art was assembled from the Library of Congress and the Smithsonian Institution, and a deliberate attempt made to read it all. It looked a very imposing collection, but boiled down there appeared to be little or no practical information. The theory of ballooning was very complete, but it appeared that the theory of airship design had been developed under governmental control in France and Germany, and the greater part had been kept confidential. For details of construction we had the benefit of an inspection of airships made in 1913 in France, England and Germany, and a good deal of information had been collected in spite of the restrictions. However, such information was now four years old.

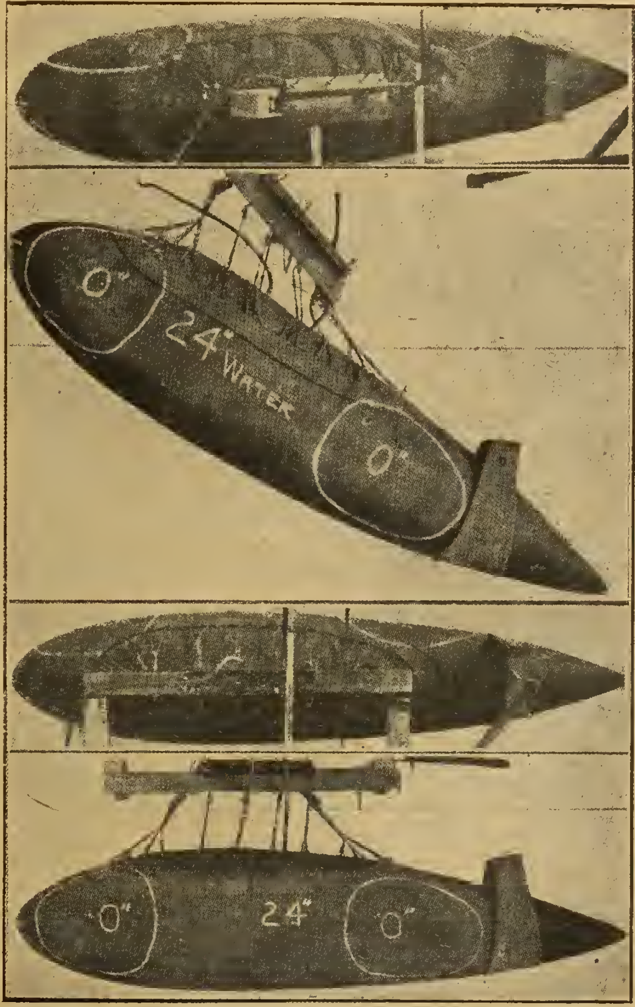
To determine a form of envelope of low resistance, a series of models was run in the bureau's wind tunnel and the best selected. The sizes of fin and control surfaces were also determined from wind tunnel tests. We had no practical design rules to follow, and it appeared that a speed of 45 m.p.h. for a small airship was so high that difficulties in steering might be anticipated. Accordingly, very careful experimental and theoretical studies were made to make sure. The results on the trials showed that the calculations gave ample stablitity, and after the pilots had become more experienced it was found possible to cut down the vertical fin surface.

The design of the car presented no difficulties, as we could follow aeroplane practice, using a standard aeroplane power-plant.

To connect the car to the envelope or gas-bag was a different story, however. This is the most delicate part of the design, and the point where we were most ignorant. The non-rigid airship keeps its form against the pressure of the air because it is held out full and taut by inner gas pressure. It now was necessary to suspend the car containing all the heavy weights from the fabrics of this gas-bag in such a manner as not to deform the bag or put undue local stresses in any part of it. The calculations involved in the design had to be devised from general naval architectural principles but were not very satisfactory on account of the indeterminate nature of the distribution of load between the various suspension cables. It was desired to use the lightest fabric that could be considered safe, but the envelope must remain fair and stiff with no more than 1 in. of water pressure.

The loads were arranged in what appeared a reasonable manner, and the curves of bending moment and shearing force drawn, considering the envelope as a beam. The calculation made was identical with that used in computing the longitudinal strength of vessels, and need not be described further.

To verify the calculated strength of envelope fabric and the



Four views of a water model of B-class envelope undergoing test inclined at 30° and level trim.

---

* From *Aviation*, U.S.A.

internal pressure necessary to preserve fair form under the influence of the suspension loads and the forces to be expected on fins and rudders, a water model experiment was made. The theory of this test was given by Haas and Dietzius in "Formanderungen der Hülle von Prall Luftschiffe." It is there shown that a one-thirtieth scale model of the airship if made of the fabric it is intended to use, and filled with water instead of gas, will, if suspended in an inverted position, behave statically exactly like the full size ship. That is to say, the stresses and deformations of the envelope will be the same. Tests were made at different pressures and at different trims to make sure that when diving or climbing nothing abnormal would happen. The static balance and control were also studied by inflating the ballonets with air under different conditions.

The calculations appeared to be verified nearly enough, and the design was proceeded with. We had no means of knowing what factors of safety to use, in spite of a knowledge of the stresses. However, theory was again resorted to, and the worst possible conditions in service investigated. Based on such study, a factor of 9 under normal conditions appeared reasonable and was adopted. Curiously enough, we learned later that this is the usual French practice.

The characteristics of the design were as follows :—

Length	160 ft.
Diameter	31·5 ft.
Height	50 ft.
Power of main engine	100 h.p.
Power of blower engine	2 h.p.
Maximum speed	45 m.p.h.
Cruising speed	35 m.p.h.
Endurance at 45 miles	10 hours.
Endurance at 35 miles	16 hours.
Petrol capacity	100 galls.
Ballonet volume	19,250 cub. ft.
Envelope volume	77,000 cub. ft.
Gross lift at ·068 lb. per cub. ft.	5,275 lbs.
Weight empty	3,256 lbs.
Instruments, etc.	100 lbs.
Blower outfit	100 lbs.
Radio outfit	250 lbs.
Lighting set	15 lbs.
Two men	320 lbs.
Fuel and oil	633 lbs.
Ballast	290 lbs.
Margin	311 lbs.
Useful load, 38 per cent. or	2,019 lbs.

The 1917 Programme

The plans were approved by the Secretary of the Navy, January 27, 1917, but instead of authorising the construction of one or two units as an experiment to work out the design, he ordered 16 airships to be produced as rapidly as possible. This came as a thunderbolt, and it seemed at first impossible of execution. It was impossible to allow six months to build an experimental ship, develop the proper gas-tight fabric needed, correct defects in design and then instruct contractors in the manufacture.

(*Note.*—This original design was described in FLIGHT for April 12, 1917.—ED.)

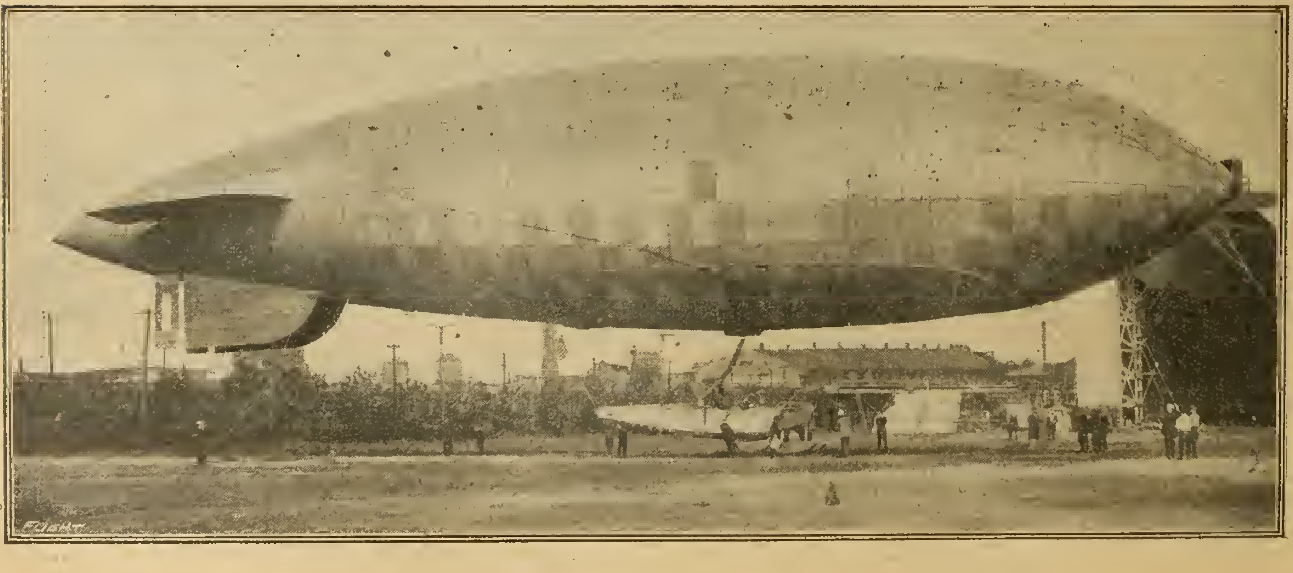
The Chief Constructor, therefore, decided to go ahead with the construction regardless of the unproved nature of the design, and on February 6, 1917, sent copies of the plans and specifications to five firms which had offered their facilities to the Department for War work and which he considered to be in a position to help. Representatives of these five firms met with the Chief Constructor on February 12 to discuss ways and means for getting the 16 ships built quickly.

The five firms requested to undertake the work were the Curtiss Aeroplane and Motor Corporation, the Connecticut Aircraft Co., and the three great rubber manufacturers—Goodyear, Goodrich and U. S. Rubber. The conference resembled a patriotic meeting rather than a gathering of prospective Government contractors ; but, in spite of a very great desire to help the Navy, it was immediately apparent that no one of them was in a position to handle the work. In the first place, they were without experience in airship building with the exception of the one unsuccessful attempt of the Connecticut Aircraft Co. None of the rubber companies had ever made fabric of the hydrogen-resisting quality and strength required, and it would be necessary not only to develop new processes, but to put in new machinery and special equipment to manufacture it. Supplies of the special fine cotton cloth needed would have to be obtained, and the market for it was in an abnormal condition.

None of the firms represented had any building large enough to erect an airship, and, though the Navy was planning to put up eight airship sheds at coastal stations, the date of completion of such sheds was probably too remote to render them available for the first few ships turned out. It was of utmost importance that one ship should be rushed to completion in order to prove the design before the others were too far advanced.

It was agreed at the conference that the manufacturers should form a committee, which committee should arrange that each concern would bid for such proportion of the work as appeared to be within its capacity, that the raw materials, information and experience of all would be pooled both before and during manufacture, and that each would bid a flat price with a guarantee and bond. The present form of cost-plus contract or "Navy Order" was then unknown, and the bid price arrived at was purely an estimate based, to a large extent, on information from abroad which the Bureau made available to the committee. The price agreed upon was about $40,000 per airship, with a guarantee to produce a practical ship making more than 35 m.p.h., and a guarantee to replace any defective parts for three months. As things worked out, most of the contractors lost money, for the work was done as a rush job and no expense was spared.

The Goodyear Co., as the most experienced, having built free balloons for a number of years, was in the best position to go ahead. R. H. Upson and R. A. D. Preston, aeronautical engineers of the Goodyear Co.'s staff, had had several years' experience in designing, making and practical handling of free balloons. They could be relied upon to cope with the present problem. Goodyear agreed to put up at its own expense a complete erection and testing establishment consisting of a field near Akron, Ohio, with a large capacity hydrogen



One of the U.S. Navy B-Class dirigibles, with original double fins

generating plant and an airship shed 200 ft. by 100 ft. by 100 ft., together with the barracks for the necessary field organisation. This decision was reached on March 20, 1917; ground was broken for the hangar and hydrogen plant on April 1, 1917, and the first balloon (a free balloon) was inflated in the hangar on June 1, 1917.

The Goodrich Co., to make up for its lack of experience in making airship envelopes, cabled for M. Julliot, the well-known engineer of the Lebaudy firm in Paris, whom they had been in correspondence with. M. Julliot sailed immediately, and later, when the United States had declared war on Germany, the Department was able to arrange for the release from the French Army of M. Julliot's assistants, M. Bourguignon and M. Gautier. These men, together with Mme. Bourguignon, who was a skilled fabric worker, were of the greatest assistance in introducing the practical refinements in manufacture about which information was so much needed.

The United States Rubber Co. decided not to attempt to build complete airships, but undertook to supply fabric for the Connecticut Aircraft Co.

First Trials

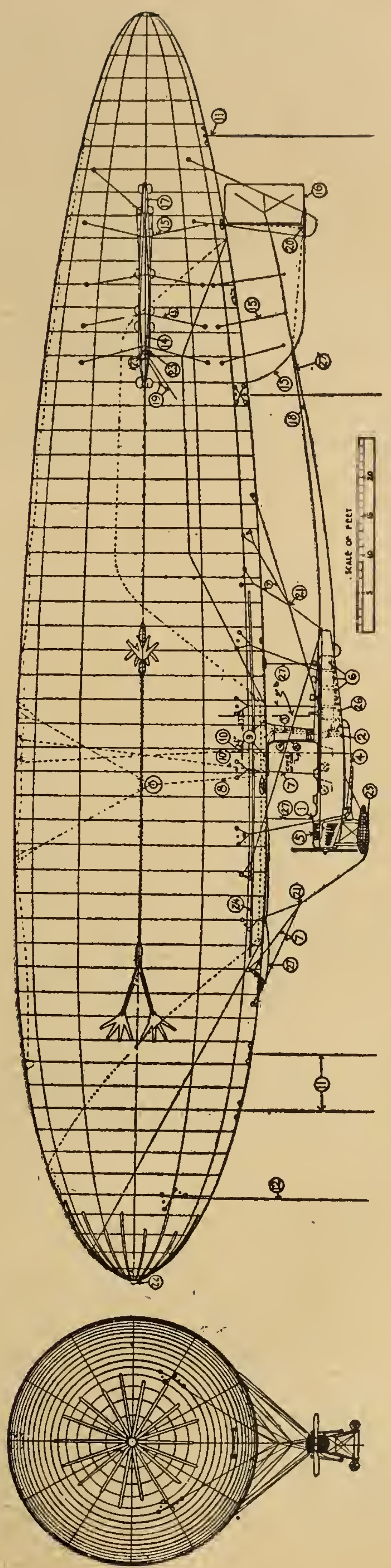
The Goodyear Co. completed the first airship in May, 1917, before their shed at Akron was completed. The Goodrich Co. had in the meantime found an abandoned shed at the "White City," Chicago; put it in order and arranged for a large supply of hydrogen in flasks. In order to get a trial of a type ship for the benefit of all contractors, it was arranged to ship the first Goodyear ship to Chicago. The ship was assembled, inflated, and given a short flight by R. H. Upson, of the Goodyear Co. He was so favourably impressed with the results that on the second time up, the weather being favourable, he considered there was less danger in trying to fly home to Akron than in attempting a return to the little field at Chicago, which was seriously restricted by buildings and telegraph wires. Accordingly, he headed for Akron at midnight, and at noon of the next day, Decoration Day, 1917, landed in a meadow 10 miles from Akron. Had the oil supply held out he could have landed on the Goodyear field, but the motor seized at the last minute.

The flight was remarkable in several particulars. In the first place, it was one of the longest airship flights on record up to that time. In the second place, it was a maiden flight of a new airship designed from theoretical and experimental data by a designer of no experience and built in two months by a firm without previous airship experience. In the third place, the flight is astonishing because Mr. Upson was not then an airship pilot, and by our present standards could not have been expected to handle the ship until he had gone through several weeks' instruction at the hands of an experienced pilot. However, he was an experienced balloonist, and as an engineer had a thorough appreciation of how the airship was designed to function. This flight was very encouraging for the production programme, as it proved that the design was all right and permitted the contractors to go ahead with confidence.

From then on the ships were delivered with regularity, and by the end of the year were operating at the various naval air stations. The following table gives the dates of delivery of these ships :—

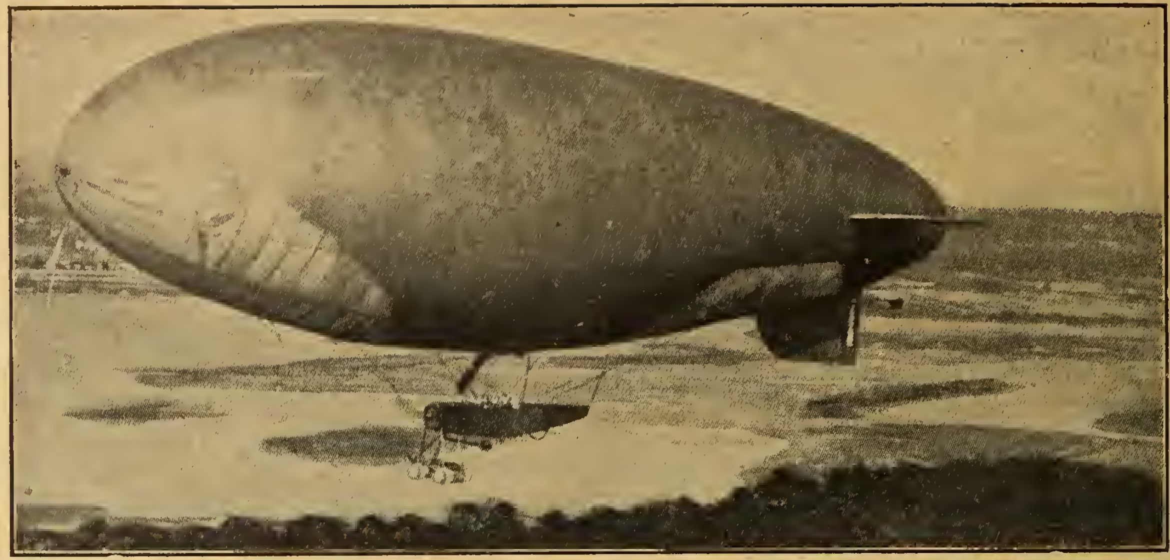
No.	Manufacturer.	Date.
B 1	Goodyear	July 19, 1917.
B 5	Goodyear	August 11, 1917.
B 13	Goodrich	September 11, 1917.
B 3	Goodyear	October 22, 1917.
B 4	Goodyear	December 4, 1917.
B 15	Connecticut	December 14, 1917.
B 14	Goodrich	January 11, 1918.
B 2	Goodyear	January 22, 1918.
B 9	Goodyear	January 31, 1918.
B 8	Goodyear	February 25, 1918.
B 7	Goodyear	February 27, 1918.
B 6	Goodyear	March 3, 1918.
B 10	Goodrich	April 15, 1918.
B 16	Connecticut	April 15, 1918.
B 11	Goodrich	May 8, 1918.
B 12	Goodrich	June 6, 1918.

As the airships came along improvements and changes based on experience were incorporated. Suggestions for improvements in details of design came first from the contractors, and later, as more Navy pilots became trained, useful suggestions came from the service. The Goodyear Co. proposed many refinements in design, which they introduced as a result of the experience of their test pilots, Mr. Upson and Mr. Preston. The enterprise of that firm in providing a flying field at Akron, near their works, placed them in a position to experiment in the air.



THE U.S. NAVY B-CLASS DIRIGIBLE: Side front and elevations to scale

DESCRIPTION OF PARTS, B-CLASS DIRIGIBLE: (1) Car. (2) Blower. (3) Blower line. (5) Engine. (6) Petrol tanks. (7) Car suspensions. (8) Valve cord. (9) Pressure tubes. (10) Rip cords. (11) Grab ropes. (12) Mooring ropes. (13) Vertical fin. (14) Horizontal fins. (15) Fin suspension. (16) Rudder. (17) Elevators. (18) Rudder control. (19) Elevator control. (20) Pulley for valve cord. (21) Concentration rings. (22) Nose piece. (23) Pulley for control cables. (24) Rim loop. (25) Pontoons. (26) Water ballast tank. (27) Cables Operating Valves.

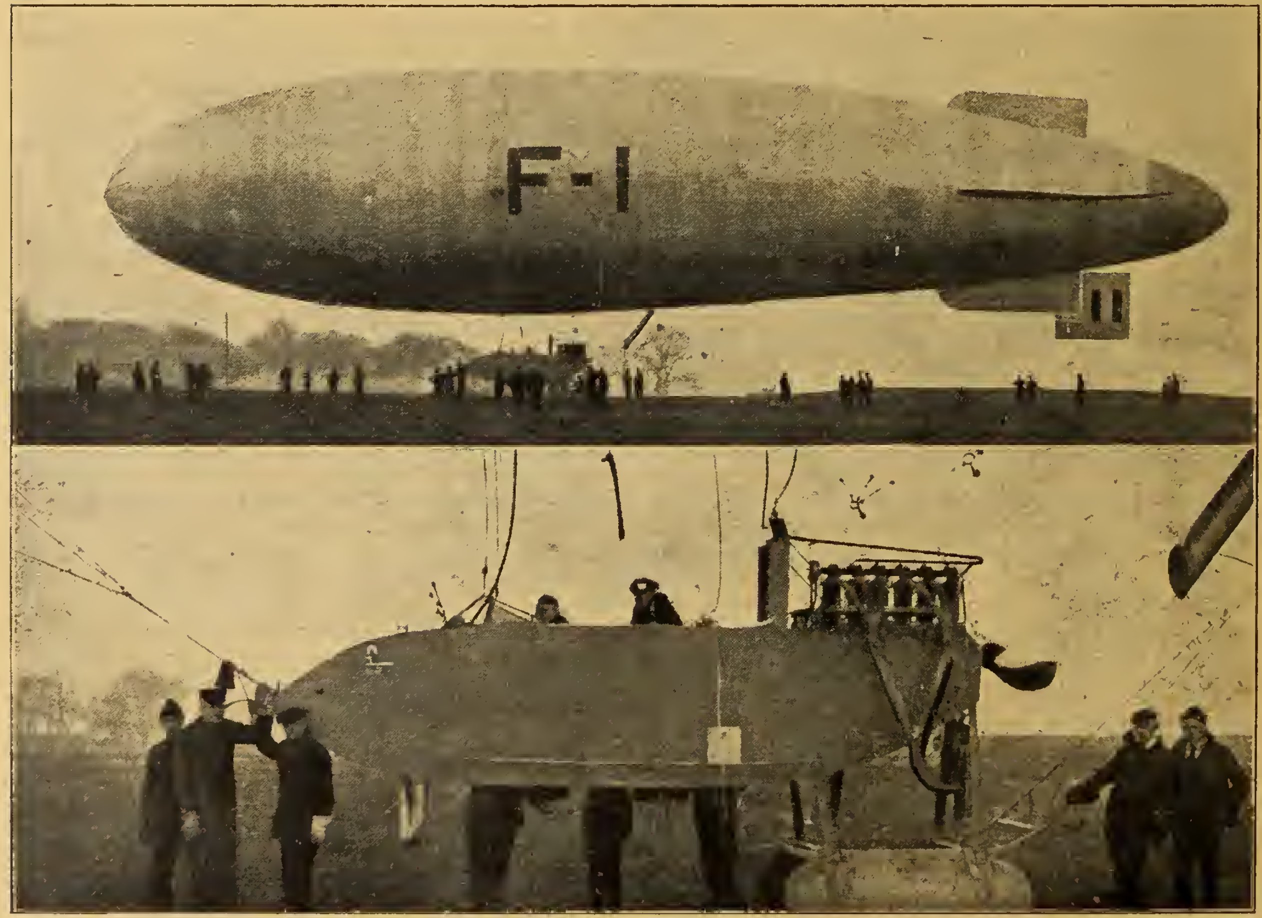


An improved U.S. Navy B-Class Dirigible with single double-cambered fins

Improvements in B Class

The improvements of most interest were those which led to an increase in speed. The first ships had a speed of about 40 m.p.h. It was found that one of the vertical fins could safely be left off, thus cutting down the resistance of one fin and its supporting wires. Later the car was suspended closer to the envelope, shortening the suspension and saving resistance. Still later, the suspension itself was simplified and knots and loops cleaned up. A somewhat longer and easier form of envelope gave greater lift and probably less, or at least no more, resistance. The air pipes to the ballonets were placed inside the envelope to save resistance. Improved propellers were developed also. The air scoop finally became only a short sheet metal tube hinged to the envelope proper, which could be let down into the slip-stream of the propeller or pulled up out of the way, greatly decreasing the resistance and weight of the ship by eliminating the scoop under the car, the blower and air line to the bag.

As a result, the speed was progressively raised from 40 miles to 48 miles with the same engine. The designed maximum speed was 45 m.p.h., but the contractors were required to guarantee 35 only.



The F-1 pusher type dirigible, a modification of the B-Class. Below a view of the car

A gratifying feature of the construction was the weight. If the ships had run over the designed weight their usefulness would have been seriously compromised. Fortunately, all ships, including the first of the series, showed a useful lift in excess of the designed load. In some cases it appeared that the structural weights would run over, but in those cases the buoyancy also ran somewhat in excess of the designed figures, leaving a good margin for the useful load.

The ships in service have more than fulfilled all expectations. Designed to cruise for 16 hours, a record on patrol of 40 hours has been made with one of them at Key West. Aside from the short life of the fabric on some of the first ships, which was replaced, the ships have stood up well, and seven are still in use. One Goodrich ship was in continuous service with its original envelope for fifteen months. Another ship made by Goodyear kept one inflation of gas for nine months, and during this time was in the air 743 hours.

The Navy's first attempt to design, build and operate airships has been fraught with difficulties, but has been on the whole very successful. This is to some extent due to the modest size selected for the first attempt, but mainly to the energy and enthusiasm of the people concerned, both in and out of the service. The B class airships, as these 16 were called, were used at home for training and coast patrol. In France our air forces operated French ships, and in England English ships. But though the B ships had no direct War service, they contributed their mite by training our pilots so that they could go abroad and take over immediately the operation of the foreign types. About 170 pilots were so trained in the United States on B ships before the Armistice. In addition, B ships were used on coast patrol, and flew over 13,600 hours, or about 400,000 miles.

The B class airships are in no way an improvement over contemporary English airships of the same type, and are in some respects less handy and simple, though of greater carrying capacity and endurance. The only noteworthy features are the conditions of their design, manufacture and initial operation. The ships were put into production from plans without waiting for the perfection of an experimental ship.

From the beginning the manufacture of a rubberised fabric for the envelope was recognised as the principal technical difficulty. The rubber companies had considerable experience in proofing fabric, but had never attempted anything to meet the rigid requirements now in effect. The specifications called for a life of six months in service, with high strength value and a low hydrogen permeability. The French specifications were copied exactly as to fabric. It was soon found that if over-cured the permeability was good but the life short, and *vice versa*. The quality of the fine cotton cloth used made trouble, and there were other difficulties which at the time seemed very serious but are now forgotten.

All contractors succeeded in doing what they had undertaken: to produce fabric in accordance with the specifications. The first few envelopes from one contractor perished quickly, but were promptly replaced with fabric coated with a different compound developed from this experience. Since then progress has been continuous, as more information has been obtained from our own experience and research and from abroad.

(*To be continued.*)

Personals

Death

To Lieut.-Col. John Cyril Porte, late R.A.F., who died on October 22, aviation in general, and the flying-boat in particular, owes a great deal. Born at Brandon, Cork, on February 26, 1884, Lieut.-Col. Porte first turned his attention to aviation when serving in the submarine section of the Royal Navy. He experimented with gliders, and learned to fly in 1910, after building a small machine of the Santos-Dumont Demoiselle type. He actually qualified for a pilot's certificate in France in 1911 on a Deperdussin monoplane. He flew this make of machine in the circuit of Britain of 1911, and in the Military Trials of 1912. In 1914 he went to the United States with a view to making a flight across the Atlantic on a flying-boat, built by the Curtiss Co. under his supervision. On the outbreak of War Lieut. Porte returned home and on rejoining the R.N.A.S. set to work to develop the flying-boat for naval purposes. For some time he was in command at the R.N.A.S. station at Hendon, but then went to Felixstowe, where the "Felixstowe Fury" was developed. On the formation of the R.A.F. he became Lieut.-Col. He was an Associate Fellow of the Royal Aeronautical Society.

To be Married

The engagement is announced between Lieut. J. A. V. Boddy, D.L.I. and R.A.F., son of the Rev. and Mrs. A. A. Boddy, All Saints' Vicarage, Sunderland, and Marjorie D'Arcy, younger daughter of Mr. and Mrs. A. J. Ewen, of Leicester.

The engagement is announced between Mr. M. W. H. Evans, late Lieut., R.N.A.S., only son of Mr. W. J. Evans, C.B.E., and Mrs. Evans, of Glencourt, Brondesbury Park, and Nancy, elder daughter of Mr. and Mrs. R. J. Lindsell, of Fairfield Bury, St. Ives, Huntingdonshire.

Items

Sir Richard Glazebrook, late director of the N.P.L. at Bushy House, Bushy Park, is to be presented, in December, by the staff with his portrait in oils, the work of his cousin, Mr. H. Glazebrook.

The will of Lieut. the Hon. Edmund William Claude Gerard De Vere Pery, Viscount Glentworth, 24, eldest son of the Earl of Limerick, R.A.F., formerly of the Warwickshire Yeomanry, of Dromore Castle, Limerick, Ireland, has been proved at £725.

AERODROMES IN THE UNITED KINGDOM

The Air Ministry announces that the following lists of aerodromes are issued as an addition or in amendment of the lists already published.

List B.—*Service Stations also available for Civil Use (Amendments).*

The following aerodrome has been transferred to List E, and is now published in that list:—

Aerodrome.	Nearest Railway Station.	Nearest Large Town.
Sherburn-in-Elmet.	Sherburn-in-Elmet.	Selby

List C.—*Aerodromes temporarily retained for Service purposes (Amendments).*

The following aerodromes have been transferred to List E, and are now published in that list:—

Aerodrome.	Nearest Railway Station.	Nearest Large Town.
Lake Down.	Amesbury.	Salisbury.
Newhaven (S).	Bishopstone.	Newhaven.
Sedgeford.	Sedgeford.	Hunstanton.
Yatesbury.	Calne.	Marlborough.

Reference: (S) = Seaplane Station.

List D.—*Aerodromes licenced as suitable for "Avro (504 K) and similar types of Aircraft" only. Except in very few instances accommodation does not exist. The licences have also in the majority of cases been issued for limited periods only.*

Aerodrome.	Location	Nearest Town.
Brighouse.	Stoney Lane.	Halifax.
Leamington.	Polo Ground, Radford Road.	Leamington.

List E.—*Stations no longer in use by the R.A.F.*

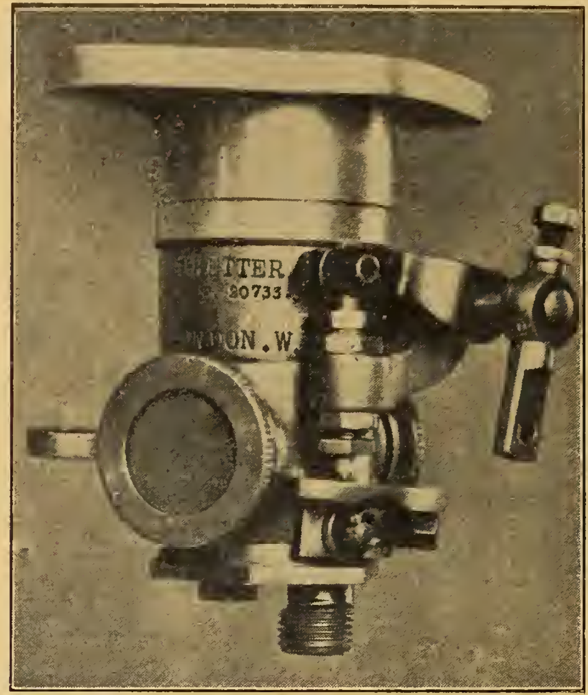
These stations have been passed to the Government Property Disposal Board. They will be relinquished as soon as the Government property thereon has been disposed of. In many cases the aerodromes are now under cultivation, but it is probable that the sites still form the best emergency landing grounds in the immediate neighbourhood.

Aerodrome.	Station.	Town.
Lake Down	Amesbury	Salisbury.
Newhaven (S)	Bishopstone	Newhaven.
Scapa Flow (S)	Thurso (by boat)	Kirkwall.
Sedgeford	Sedgeford	Hunstanton.
Sherburn-in-Elmet	Sherburn-in-Elmet	Selby.
Yatesbury	Calne	Marlborough.

Reference: (S) = Seaplane Station.

THE SAUNDEAR CARBURETTOR

To many, a carburettor without a float would seem to be very much of the order of *Hamlet* without the Prince, but for aviation work, where a machine has often to be upside down, it is recognised that a float is not an unmixed blessing. For that reason alone, therefore, the carburettor invented by Mr. Albert Saunders, now being placed on the market by the Saundear Carburettor Co., of 24, Parker Street, Kingsway, W.C., is more than usually interesting. It possesses other qualities, however, equally important from the aviation point of view, one of the chief being the fact that, owing to the petrol being cut off when the engine is not running, it is practically impossible for a fire to occur. This will be made clear from the following description.



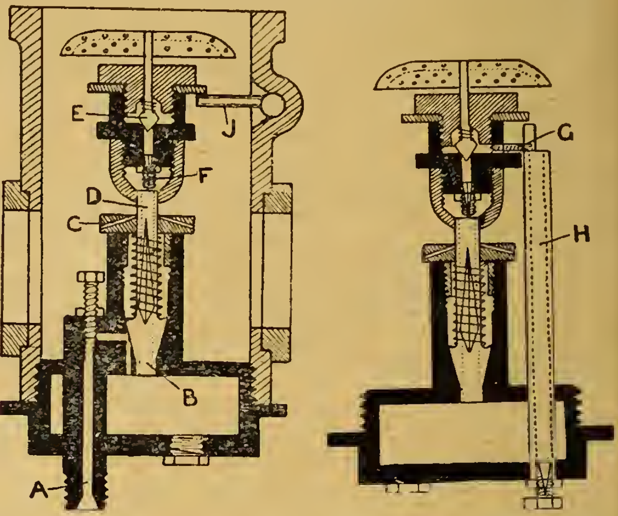
The Saundear carburettor, complete with flange for attachment to inlet pipe

The general neatness and compactness of the carburettor itself can be gathered from the photograph, while the sectional drawings illustrate the working of the interior arrangement. The petrol flows through the pipe A and past the valve B, which is lifted by the suction of the engine. It is then drawn up through the V-shaped variable grooves, which, as they pass through the collar C, form virtual jets increasing in area the further the stem is raised. The petrol then mixes with the main air, which is passing through the main body of the carburettor to the intake-manifold.

The pilot supply works in a somewhat similar manner. Immediately the engine is turned over, the suction is sufficient to raise the small valve E and to draw petrol up the hollow stem D through the adjustable jet F, past the valve and out, by G, into a stream of air drawn up through the pipe H, which completely breaks up the petrol into a fine spray.

The adjustment of petrol and air is equally ingenious. It will be seen from the photograph that on the side of the throttle sleeve there is fixed a ledge, along which slides a pin raising or lowering a lever which, through the lever J, in its turn opens or closes the valve B. The inclination of this ledge can be varied to give a very fine adjustment by means of an eccentric nut.

By this arrangement the opening or closing of the throttle valve automatically varies the supply of petrol, and so the mixture is correctly proportioned to suit any position of the throttle, once the carburettor has been properly set to suit the engine. It is claimed that, by reason of this inter-connection between the supply of petrol and the quantity of air admitted to the carburettor, the possibility of carbon being deposited in the engine is practically eliminated.



THR SAUNDEAR CARBURETTOR: On the left section showing the main petrol supply, and on the right showing the pilot jet

It is claimed that one result of the absence of a float level is that as soon as the engine is cranked the petrol is sucked up, filling the cylinder with an explosive charge, and thus ensuring a start at once.

◇ ◇

Aircraft Disposal

THE Aircraft Disposal Department, Ministry of Munitions, has been transferred from York House, Kingsway, to the Welcome Club, Earl's Court Exhibition, West Kensington. This Department has now for disposal huge stocks of aeroplanes, aeroplane engines and equipment.

Avros at Brighton

ON Saturday, October 25, the Avro air fleet visited Brighton for the third successive week-end. The new aerodrome at West Blatchington Farm, which consists of about 50 acres, is being fenced round and hangars are being erected there. Tea was served on the ground and a band was present.

A very large crowd collected on the aerodrome for each of the three days. Owing to the high wind the parachute descents had to be postponed, but Maj. A. G. Taylor, A.F.C., put up a very fine exhibition of trick flying.

The chief interest, however, centred in the appearance of the little Avro-Green Baby, which had been brought down from Hamble by Capt. Hamersley, M.C. The Baby played about in the air as usual, and delighted the crowd immensely. Another attraction was the display of the model aeroplane kites designed by an A.I.D. official at Hamble. These were made to perform most extraordinary feats in the air.

Next week-end the Avros will visit Bournemouth; the contemplated visit to Eastbourne could not be arranged.

◇ ◇

A Carnival at Manchester

THE northern Avro fleet held a carnival at Alexandra Park aerodrome last week-end for the benefit of the Manchester and Salford Hospital Saturday Fund. Over 9,000 people paid for admission, and passenger flying went on briskly till dusk came on, leaving many applicants for tickets disappointed. About £300 was handed over to the hospital fund. The flying display was as fine as was to be expected from the Avro pilots. Another display will be given on the same aerodrome next week-end.

A Vickers-Vimy Touring the Continent

A VICKERS-VIMY bomber, which is to make a tour of Europe, giving demonstration flights at the chief centres, left Hounslow at 10.30 a.m. on October 17, and arrived at Paris at 1.10, the trip having taken 2 hours 40 mins. The machine, which carries two pilots and one mechanic, after giving exhibition flights in Paris went on to Bordeaux and then to Biarritz.

Under a Swedish Bridge

A BRIEF message from Stockholm states that Captain Saunders, a British airman, with a De Havilland aeroplane, on Monday performed the first "bridge flight" in Sweden by flying through the arch of a railway bridge near Stockholm.

THE STATIC HEAD TURN INDICATOR FOR AEROPLANES*

By SIR HORACE DARWIN, K.B.E., F.R.S.

An instrument to indicate whether, under all conditions, the path of the aeroplane is a straight line or whether it is turning to the right or left is much required. It is well known that when flying in a cloud or at night, and no fixed object is visible, even the most experienced pilot may, without realising it, be flying on a sharp curve. If, however, the angle of banking is great the muscular reaction of his body will have to be increased to counteract the increased force acting on it. This will tell him that his course is not straight, but there is nothing to show whether he is on a right-hand or left-hand turn. If he tries to straighten his course he is just as likely to increase the curvature as to straighten out. If he observes his compass he will probably find that it is swinging so much that it will tell him something is wrong, but give no guide to what he should do.

A turn indicator enables a straight compass course to be kept when flying in clouds or at night, and this is valuable for long-distance flights. But straight flying is always important. If the clouds are low and the aeroplane leaves their lower surface when on a sharp turn there may not be sufficient time to allow the machine to be put into a safe position for landing before the ground is reached.

The late Capt. Lucas, D.Sc., F.R.S., proved that when flying in a northerly direction the compass turned with the aeroplane, and when flying in a southerly direction the opposite took place. Before he investigated the subject at the Royal Aircraft Establishment all that was known was that the compass became unreliable in cloud flying; he found what the facts were; discovered the cause of the behaviour of the compass and designed and made a compass which was a very great improvement on the compass then in use, although it did not completely overcome the difficulty. This scientific achievement was of the greatest value to the flying service. It was when doing such work as this that he was killed, and the country lost a brilliant scientific man.

In June, 1912, a memorandum by Mr. C. C. Mason and myself was submitted to the Advisory Committee for Aeronautics. In it the principle of the static head turn indicator was explained. At a latter date Dr. Lucas tried some experiments with the manometer supplied by me, a very different one from that now made by the British Wright Co. This manometer was crude and bad in principle, and broke down after a short trial, but showed some promise. The experiments were not continued owing to press of other work, and because I think even he did not then realise the value of a satisfactory turn indicator, and I certainly did not.

The object in view at that time was to obtain the true vertical for bomb dropping. Major Dobson tried some interesting experiments at Upavon with very simple apparatus. Later I made an elaborate instrument which was probably too difficult to manipulate.

Very many attempts have been made to make instruments which would show the true vertical when flying in a circle. If a pendulum hanging from a support on an aeroplane would always point in the true vertical direction it would be easy to make an instrument which would show whether the wings were level. But it is well known that this is not the case; on a truly banked turn the pendulum will remain at right angles to the plane of the wings, and the pendulum will only show whether the aeroplane is under or over banked. Many inventors have suggested pendulums, or their equivalents, such as a level, or bubbles rising through a vessel containing a liquid, or a flame which points vertically upwards. Very few of the inventors of these instruments realised the fundamental difficulty, and those few who did, failed to overcome it.

Another possible method is to make use of the fact that on a turn the apparent attraction of gravity is increased. The index of an ordinary spring balance supporting a weight would move when on a banked turn, and show a greater weight than when flying straight. In this case a left and right turn would have the same effect. Also the indication would be very small for turns of large radius. The vertical acceleration, especially on bumpy days, would have a far greater effect than even sharp turns.

It has also been proposed to measure the banking angle by an electrometer giving the difference of the electro-static potential at the wing tips. This method was, however, not found to be a success.

Successful turn indicators using gyroscopes have been made.

We will now describe the static head turn indicator.† In conjunction with a good aeroplane compass and a cross level, a true compass course can be kept in clouds or at night. The success of this instrument is due to the large amount of experimental work done at Orfordness and at the Royal Aircraft Establishment, and to the design of the Ogilvie pressure gauge manufactured by the British Wright Co. Unless a pressure gauge as good and as sensitive as this instrument had been designed, the turn indicator would not have been a success.

A great number of experiments had to be tried in order to determine the best position for fixing the static heads, on the relative advantages of fixed and swivelling static heads, and on the effect of side-slip.

A sensitive differential manometer is fixed on the instrument board, and the Ogilvie pressure gauge is used for this purpose. The two openings from it are connected to two static heads, fixed to the wings as far apart as can conveniently be arranged, and in a position so that the air pressure at these points is influenced as little as possible by the wings or body of the aeroplane. The manometer will then indicate a difference of pressure when the aeroplane is turning. The hand will move in one direction for a turn to the right and in the other direction for a turn to the left.

The pressure gauge was designed by the British Wright Co. for use with the turn indicator, and is of the Ogilvie type. An extremely sensitive circular rubber diaphragm separates two chambers in the instrument. These chambers are connected, one to each static head, and the minute difference of pressures caused by the aeroplane turning deflects the diaphragm by a small amount. The deflection is communicated directly by a silk thread, without intermediate gear, to the indicating hand and moves it to the right or the left. The scale carrying the zero mark and divisions is adjustable by the pilot during flight by the use of one thumb, and he can easily set the scale in the correct position when flying on a straight course immediately after leaving the ground. This adjustment is most desirable, as it is found that the position of the hand when on a straight course does not correspond with absolute equality of pressure on the two sides of the diaphragm.

This is due both because it is impossible to make both static heads absolutely similar, and also because the actual static pressure at the two positions where the static heads are fixed are not equal. No doubt if it were possible to fix the static heads at a great distance in front of the wings the amount of adjustment required would be greatly reduced. The adjustment required is seldom more than 10°.

The air inside the static openings is very nearly the true air pressure outside in a well-designed static opening. The static heads used are the same in form as those used in the standard air-speed indicator. The tube moves through the air in the direction of its axis; the stream-line end of the tube disturbs the air as little as possible, and thus the air passes over the holes in the side of the tube at right angles to their direction. It had been found by experiment that the air pressure inside the tube is very nearly the true pressure outside, whatever the velocity the tube moves through the air may be.

A great authority on birds tells me that he has no doubt that birds breathe through their nostrils. He might find it difficult to actually prove this, but it is very unlikely that he is not correct. It is an interesting fact that the nostrils of birds fulfil to some extent the conditions of a well-designed static opening; the nostrils are holes in the beak, and in flight the beak moves through the air point forwards. It is clear that this arrangement is advantageous to the bird. To ensure ease in breathing, the air inside the lungs should be at the same pressure as the air outside. I do not know whether men in aeroplanes find any difficulty in breathing when the head is in the wind. If they do, no doubt the difficulty could be reduced by breathing through properly constructed static openings.

Experiments were tried with fixed static heads, as it was hoped that the swivelling form was not necessary. They were fixed to the struts between the wings, but in this position side-slipping had a considerable effect; in some cases this was so great that the index of the pressure gauge showed a right-hand turn when a left-hand turn was taken. The fixed static heads were then placed in front and above the leading edge of the upper wing. In this position the results were much better, but the heads must be truly parallel. In this exposed position it was found that they were liable to become accidentally displaced, and as this might easily happen without the pilot knowing it, then the instrument would not be trustworthy. When swivelling heads are used and placed in the standard position, the effect of side-slip is greatly reduced, and turns to the right or left are correctly indicated. To eliminate all effect of side-slip the static heads must be put inconveniently far from the wings.

---

* Paper read before the Royal Aeronautical Society at the Royal Society of Arts on Wednesday, October 29, 1919.

† Secret Patent (applied for March 20, 1918) was taken out for this invention. The Patent No. 123,996 was published on April 10, 1919. In the Service it is known as the "Aero Turn Indicator with Mark I and Mark II Static Heads."

The swivelling static heads are required to adjust their angle with the greatest freedom. They are carried by swivelling bearings allowing universal movement, and fixed to rigid standards. The air is always free to flow by way of a rubber tube which twists to accommodate the adjustment of the head to right and left, and bends to permit of inclination up and down. The static head, thus free to move in all directions, is maintained parallel to the direction of the wind by means of a conical vane. Its weight has no tendency to move it out of the true direction as it is carefully balanced about its swivelling bearings.

It was also found important to avoid sharp bends or constrictions in the tube, as otherwise the indication on the dial was sluggish. The air tube on the static head openings becoming blocked with ice is a possible cause of failure.

Some of the earlier experiments were made with venturi tubes instead of static openings at the ends of the air tube. This will reduce the air pressure at both the outer ends of the air tube, and it will reduce it most at the end which is moving fastest through the air. When flying in a circle, the outer wing tip is moving faster than the inner wing tip, and the air in the air tube will be drawn outwards, and this will cause a pressure on the manometer. This pressure will be in the same direction as the pressure caused by the centrifugal force, and the two pressures will be added together and the effect will be greater than when static heads are used. The result is that the pressure on the manometer is increased, and this is an advantage.

This arrangement was tried, but the readings on the manometer were found to be much more unsteady, and for this reason the instrument was less satisfactory than when static heads were used.

Major G. I. Taylor has investigated the question of gusts and eddies in the air. In a gust the static pressure as well as the velocity vary. When static heads are used the change of velocity has no effect on the air pressure in the air tube, and unsteadiness of the manometer readings is only caused by the variation in the pressure. With venturi tubes, both the variation of velocity and pressure will cause unsteadiness. It has been found that the fluctuations in static pressure due to gusts are of the order of $\rho u^2/2_1$, where u is the fluctuation of the velocity in the gust. The velocity of the gust may increase or diminish the velocity of the venturi tube through the air, depending on the direction of the gust; and may even have opposite effects on the ends of the air tube, increasing the velocity at one end and diminishing it at the other.

If the velocity of the venturi tube through the air is v and a gust of velocity u meets it, then the velocity through the air becomes $v + u$. The reduction of pressure in a venturi tube is approximately proportional to the square of the velocity of the air. The reduction of pressure is $\frac{1}{2}\rho\ [(v + u)^2]$ or $\rho v\ u$ as u is small compared to v. With a quick-flying aeroplane v is very large, and the reduction of pressure will be by no means small even if the velocity of the gust is very small, and we should expect the pointer of the manometer to be unsteady.

It follows from the foregoing that we should expect this unsteadiness to be from 10 to 20 times as great with venturi tubes as with the static heads, and this has been verified by tests in the air.

Small differences of pressure have to be measured, and as venturi tubes are very sensitive to change of shape, it would also be very difficult to make them sufficiently alike.

It is found also that in actual practice a venturi tube gives an unsteady suction even in a uniform wind. This is probably caused by the flow of the air through the venturi tube becoming unstable at some velocities. Pitot tubes for this reason also, are better than venturi tubes.

A manometer has been made sufficiently sensitive to indicate turns of large radius, and as steadiness of the readings is of very great importance, it is far better to use static heads than venturi tubes.

In order to make the action clear, we will assume that the aeroplane is moving in a circle, that it is not banked, and that the air tube connecting the static heads is horizontal and points along a radius of the circle. The forces acting on the air in this tube are:

1. Gravity acting vertically downwards. As the tube is horizontal this will cause no difference of pressure at the manometer or cause any tendency of the air to move along the tube.

2. The atmospheric pressure at the static heads. As the tube is horizontal the pressures at the ends of the tube are equal and in opposite directions, and no effect is produced on the manometer.

3. The pressure of the inner surface of the tube against the air; this clearly has no effect on the manometer.

4. Centrifugal force is the one remaining force which can cause a movement of the differential manometer. The air will tend to move along the tube in an outward direction and can only be prevented from so doing by a difference of pressure on the two sides of the diaphragms in the manometer. It is this difference of pressure which is indicated on the manometer and shows a right or left-hand turn.

All turns, however, are banked, and this assumption is only made to make the action clear.

Let us now consider a banked turn and assume that the aeroplane is banked at the correct angle. By the correct angle is meant an angle which causes no side-slip; that is such an angle that the apparent direction of gravity (that is the resultant of gravity and centrifugal force) is at right angles to the plane of the wings.

Again consider the forces acting on the air in the tube.

1. As the banking is at the correct angle, the resultant of gravity and centrifugal force act at right angles to the direction of the tube and have no effect.

2. The pressure against the inside of the tube clearly has no effect.

3. The atmospheric pressure at the two static heads is not equal; as the aeroplane is banked, the outer end is higher up and at a place where the air is at a less pressure. The differential manometer will show this difference of pressure.

Or we can consider this last case differently. The forces acting on the air in the tube are:—

1. Gravity acting on the air in the tube. As the tube is banked this will tend to make the air flow inwards.

2. Atmospheric pressure at the static heads. As the pressure at the outer end is less than at the inner end these pressures will tend to make the air flow outwards. The tendency of (1) and (2) are obviously equal and in opposite directions, and the combination of the two will have no effect.

3. The pressure against the inside of the tube clearly has no effect.

4. Centrifugal force is the only remaining force, and this clearly will cause a difference of pressure on the two sides of the diaphragm of the manometer. Although these two ways of considering the forces which act on the air in the tube are so different they are both correct.

If V = the speed of the aeroplane.
r = radius of the circle in which it is flying.
b = the distance between the static heads.
ρ = the density of the air.
P = the differential pressure on the air required to prevent its movement along the air tube.
β = the angle of banking.

With horizontal flight, no side-clip and the air tube in the vertical plane passing through the centre of the circle.

$$P = v^2 \rho b \cos \beta / r$$

Usually β is the correct banking angle, then $\tan B = v^2\ gr$: In order to make P large, b must be large. As the density of the air becomes less with increased height the indications will also become less.

The instrument can only be used for measuring r if we know the speed and the density of the air, but it is not wanted for this, and is only useful for showing that the aeroplane is turning to the right or the left.

If an aeroplane is flying near the ground at 80 m.p.h. in a circle of one mile radius, a complete circle would be flown in 4½ mins., and the correct banking angle would be 4°—40′. If the static heads are 30 ft. apart the air pressure in the manometer would be about 1 mm. head of water when flying near the ground. This pressure will move the head on the dial through about 14° or about 1½ divisions, and the turn will be clearly shown. If the height of the aeroplane is so great that the density of the air is reduced to half its normal amount the indication will also be reduced to one-half.

The turn indicator has been tried on many different types of aeroplanes. The following are some extracts from a report which we have been kindly allowed to see and quote:—

"In connection with the daily cloud and horizon observations, it has been necessary to attempt to fly through thick layers of cloud. This has been tried on several types of scouts, and after considerable practice it was found possible to get through several thousand feet of solid cloud, but it required very rigid concentration on the control of the machine, even then it frequently got out of control, and after losing height, climbing had to begin again. It was practically impossible to have any sense of direction during a long climb in cloud. Layers of cloud of various thicknesses up to 6,000 ft. were got through, but it was decidedly unpleasant flying."

The turn indicator was then fixed to a 110-h.p. Le Rhone Camel, a difficult scout to fly through clouds. The first position of the static heads was not found satisfactory. A second position was tried. The report goes on :—

"Although not extremely sensitive, it was most useful, enabling the machine to be flown in comfort for a considerable time in clouds. . . . As compared with the experience in clouds on scouts without turn indicators, flying in clouds was now quite pleasant, as the machine never showed any sign of getting out of control. To fly straight was quite easy, keeping a fairly reasonable compass course, to make a gentle spiral up or down, or a very steep spiral. . . .

"The static heads were only tried in two positions, but it may be that a position could be found without their being unreasonably far in front of the plane, so that the indicator would be more sensitive.

"It would need some considerable practice before the average pilot could take a Camel, or most scouts through much cloud, but it makes cloud flying on scouts possible, whereas without turn indicators it is practically impossible."

I have received most kind help in writing the above from Mr. Griffith Brewer, Squadron-Leader Stewart, Major Dobson and Mr. C. C. Mason.

AVIATION IN PARLIAMENT

Air Ministry Reductions

Mr. Gilbert, in the House of Commons on October 22, asked the Under-Secretary of State to the Air Ministry whether he will state what reduction in staff has taken place in his Department, including those employed at depôts, since November 11, 1918; and whether he is taking any steps to make further reductions?

The Under-Secretary of State for Air (Maj.-Gen. Seely): I am not sure what my hon. friend means by "including those employed at depôts," but I assume that this is to be interpreted as including all persons employed. Since November 11, 1918, the numbers employed by the Air Ministry at headquarters and depôts have been reduced from 68,150 to 24,700 on September 30, 1919. These are approximate figures since all returns are not made up to the same date. Further reductions have been made since September 30, and the process is continuing as rapidly as possible.

Royal Air Force

Mr. Clough asked the Under-Secretary of State to the Air Ministry if he will inform the House what was the strength of the personnel of the Air Force on October 18; what it was on August 12, 1919; and what it was on the date of the Armistice?

Maj.-Gen. Seely: The particulars asked for by my hon. friend as to the strength of the Royal Air Force on the dates mentioned by him are as follow:—

	Officers.	Other ranks.
Date of Armistice	30,122	263,410
August 12, 1919	9,044	39,671
October 18, 1919	6,005	31,976

An Hon. Member: Can he say whether all the anti-aircraft stations have now been abolished in this country?

Maj.-Gen. Seely: I could not say that without notice. It does not come under my Department, but under the Home Forces. It ought to be put down to the Secretary of State for War.

Sir W. Joynson-Hicks: How many women are included in that last total?

Maj.-Gen. Seely: I could not say that without notice.

Army, Navy, and Air Force (Revised Estimates)

Mr. Arnold asked the Prime Minister when the revised and detailed estimates for the Army, Navy and Air Force will be introduced; and what opportunities will be granted for their discussion?

Mr. Chamberlain: I hope that the Naval and Air Force Estimates will be presented early next month. I am informed by the War Office that the Army Estimates cannot be ready before the end of next month, but my right hon. friend the Secretary of State for War will lay a Paper explanatory of Army expenditure at the same time as the Treasury Papers on the financial position which I propose to lay.

Women's Royal Air Force

Lieut.-Comdr. Kenworthy, on October 23, asked the Under-Secretary of State for the Air Ministry how many women, officers and other ranks, respectively, were in the Women's Royal Air Force on October 1, 1919; and how many women, other than those in the Women's Royal Air Force, were employed by the Royal Air Force on the same date?

The Under-Secretary of State for Air (Maj.-Gen. Seely): The numerical strength of the Women's Royal Air Force on September 30, 1919, was:—

Officers	164
Other ranks	5,800

It is proposed to reduce this number to 400 by December 1, and to 200 by January 1, 1920. The number of female civil subordinates on the same date was 2,529.

Lieut.-Comdr. Kenworthy: Are we to understand that the 400 and 200 respectively apply to all ranks, or only to officers?

Maj.-Gen. Seely: Of course, to all ranks.

Demolition of R.A.F. Aeroplanes

Mr. Alfred T. Davies, on October 27, asked the Under-Secretary of State to the Air Ministry whether large numbers of aeroplanes have been destroyed by burning in the occupied districts of France and Belgium; whether aeroplanes of the newest type were being delivered under contracts until the summer of this year; and whether the Canadian Government, adopting a different policy, disposed of similar aircraft with commercial advantage?

The Under-Secretary of State for Air (Major-General Seely): In answer to the first part of my hon. friend's question, instructions have been given: (*a*) that any aircraft declared obsolete for all purposes (*i.e.*, Air Force and civil) shall be reduced to produce, and the produce handed to the Disposal Board; and (*b*) that any aircraft totally wrecked and beyond repair shall be reduced to produce, and the wreckage burned after removal of all parts of value. The number of crashed aircraft burnt after the removal of the valuable parts under (*b*) has been 28. In addition, since July 1, 1919, the residue of 259 crashed and 359 deteriorated or obsolete machines has been burnt after the valuable parts had been removed. The answer to the second part is in the affirmative. I have no official knowledge of the matter referred to in the third part of my hon. friend's question, but I think he has in mind a transaction carried out by the representative of the Ministry of Munitions in Canada on behalf of His Majesty's Government. If I am correct, I would refer him to the Minister of Munitions.

Commercial Aviation and Government Assistance

Col. Burgoyne asked the Under-Secretary of State to the Air Ministry whether any subsidy, or advantages in lieu of subsidy, is being made by the Government to aviation firms for the development of commercial aviation; and if so, which are the firms and what is the nature of the subsidy?

Major-General Seely: The answer to my hon. and gallant friend is that whilst no direct subsidies are being made by the Government for the development of civil aviation, assistance is given to all firms desirous of receiving it in the following directions: The free supply of meteorological information and free communication services (*i.e.*, wireless, signals, flying directions, etc.). Arrangements are also in hand for the establishment of a system of emergency landing grounds throughout the country which will be open to all firms who wish to make use of them. At Government aerodromes, other than those required purely for R.A.F. services, aerodrome facilities and shedding are available for all firms on lease, thus saving them a considerable proportion of the initial capital expenditure.

An Hon. Member: What is the contemplated cost of all these advantages which are being offered to these private firms?

Major-General Seely: The cost is comparatively small, as my hon. friend will see if he looks at the list, and the advantages are very great. I can give the hon. member a precise estimate if he likes.

Sale of R. 38 to the United States

Lieut.-Col. Moore-Brabazon asked the Under-Secretary of State for the Air Ministry whether he has made any arrangements with the United States Government for the building of a Rigid airship in this country for the United States Navy?

Major-General Seely: Arrangements have been made between the United States Navy and the Air Ministry by which the Airship R. 38 embodying the newest features in design and construction will be completed without delay. The vessel will be handed over to United States Naval personnel on completion, and will proceed to America with her American crew as soon as the shed to house her is ready. The United States Navy will take over the vessel at cost price, the Royal Air Force undertaking the training of the American Naval personnel free of cost except pay and rations.

The Route to Egypt (Casualties)

Sir William Joynson-Hicks, on October 28, asked the Under-Secretary of State for the Air Ministry whether his attention has been called to the statements recently made by Colonel G. L. P. Henderson as to the serious number of deaths to pilots on the new air route to Egypt, and whether he can make a full statement to the House in regard to the whole position?

The Under-Secretary of State for Air (Maj.-Gen. Seely): I cannot go into detail within the limits of a Parliamentary answer, but I shall be glad to make a full statement on the first possible occasion.

The broad facts are these: In the spring and early summer the War Office communicated to us the urgent demands of Egypt for aircraft of large size and endurance in order to cope with the situation, which was described as critical. At the end of March the request was for as many Handley Page machines as could possibly be spared, and at the end of April they telegraphed urgently for additional squadrons. In view of the fact that no Handley Page machine had ever been packed and sent by sea, it was decided that the machines must be sent by air to meet the critical emergency, although considerable risks were necessarily involved.

At the end of April the first squadron was ordered to proceed, and special measures were taken to assist the move of this squadron. An officer with a special and practical knowledge of the route was sent out to arrange for facilities such as landing-grounds, spares, petrol, etc. Flying-boat escorts based on Toranto at first and then on Alexandria were also arranged. The squadron left on May 3. On account of the accidents which occurred, an officer was then stationed at each aerodrome on the route, whose primary duty it was to assist machines in getting through. Great difficulty, however, was experienced by these officers in getting messages by telephone or telegram through in time for action to be taken, and also in getting the necessary spares to the points required, owing to the difficulty of transport. Train communication was equally ineffective. A further difficulty was that owing to rapid demobilisation it was impossible to get the best qualified personnel within the time available. It was further arranged that replacements for the three squadrons who had gone to Egypt should be sent by air by the staging method. Two pilots and a few mechanics were stationed at each staging aerodrome. At the present moment 51 Handley Page machines have left for Egypt; of these 26 have arrived, 10 are on later stages of the route, and 15 have been written off.

A month ago the Chief of the Air Staff requested that a special committee of inquiry should be instituted composed of officers outside his own Department, and that inquiry is now proceeding. I should here like to emphasise the fact that the making of this route had nothing whatever to do with civil aviation, the whole being organised by the Service side. One machine crashed badly, and four lives were lost. Three other bad accidents occurred, involving four fatal and four non-fatal injuries. This loss of life is greatly to be deplored, but it must be borne in mind that the situation was critical, and that prompt action was essential. I am advised that the sending of these machines by sea would have meant that they could not have been ready for action until many months after they were required.

Sir W. Joynson-Hicks: Having regard to the very large loss of life and large cost involved, would not the right hon. gentleman consider the desirability of having a more independent inquiry than that by some officers of the Air Service?

Maj.-Gen. Seely : This inquiry is as independent as it can be. The Chief of the Air Staff realised that it was important to have as independent an inquiry as possible a month ago, owing to the accidents involved in transporting this great number of machines over a practically untried route. The officers who are investigating it—I think they must be officers, because practically everyone who understands the air has been in the Air Service during the War—are outside the Department of the Chief of the Air Staff, and are quite independent of that Department.

An Hon. Member : Who are they ?

Maj.-Gen. Seely : I know some of them. If the hon. member will put down a question I will give him full details. The fullest inquiry will be made, and if it be found that a mistake has been made by anyone concerned, from myself downwards, I need hardly say appropriate action will be taken.

Mr. Stewart : How many of the Air Force are missing ?

Maj.-Gen. Seely : The machines lost—15—have been totally written off, and others have been damaged. The total casualties so far are what I have given.

Mr. Houston : When the right hon. gentlemen says 15 machines have been written off, does he mean that these machines have crashed ?

Maj.-Gen. Seely : It means that they are of no further use—either fallen into the sea or so broken up that they are of no use. Twenty-six have arrived.

Blandford Camp

Maj. Colfox asked the Under-Secretary of State for Air whether large numbers of women are still being conveyed daily to and from Blandford camp from a distance by road ; whether the huts at Blandford camp are good enough and large enough to house all the necessary staff on the spot ; and whether any considerable reduction has been, or is likely to be, made in the personnel at the camp ?

Maj.-Gen. Seely : The answer to the first part of my hon. and gallant friend's question is that about 50 women are conveyed by lorry from Blandford to the camp. They return home by Service train. As to the second part, the women staff are of two categories—mobile and immobile. The former are housed in the camp. The terms of service of the latter do no allow this to be done compulsorily. As the Records Office is shortly to be moved from Blandford, it is not considered desirable to substitute and train fresh mobile staff to take the place of the latter. The answer to the third part of the question is that reductions are continuously taking place, and the women staff show a reduction of 37 per cent. between July 31 and September 30.

Air Stations, Orkney and Shetland

Sir W. Joynson-Hicks asked the Under-Secretary of State for Air whether the aeroplane stations in the Orkney and Shetland Islands are being demobilised ; and whether at the same time fresh huts are still being built ?

Maj.-Gen. Seely : As I indicated in my answer to my hon. friend's question No. 105, the air stations in the Orkneys and Shetland have been or are being closed down, with the exception of two. No new huts are being built, but at one of the stations to be retained wooden huts from other stations in the Orkneys and three small aeroplane sheds are being re-erected.

Sir W. Joynson-Hicks asked the Under-Secretary of State for Air how many air stations there are or have been in the Orkney and Shetland Islands ; and what was and is the personnel of those stations ?

Maj.-Gen. Seely : The answer to the first part of my hon. friend's question is three, one of which is being closed down as speedily as possible ; to the second, eight ; to the third, 292 officers and 1,836 airmen ; to the fourth, 21 officers and 305 airmen. As soon as all available stores have been evacuated the two stations which are being retained will be placed in charge of care and maintenance parties, except during the months when the Fleet is exercising, at which times the personnel will be temporarily increased.

Sir W. Joynson-Hicks asked the Under-Secretary of State for Air what has been the total expenditure during the War on flying in the Orkney and Shetland Islands ; whether quite recently numerous masses of stores were left lying out in the open ; and whether any estimate can be given of the cost per hour of flying at those stations ?

Maj.-Gen. Seely : I regret that it is not possible, without an unjustifiable expenditure of labour, to give my hon. friend the information he asks for in the first and last parts of this question. In regard to the second part, my information is that no large quantities of stores have been left in the open, but I am having further inquiry made on the point.

Sir W. Joynson-Hicks asked the Under-Secretary of State for Air whether an inquiry has recently been made in regard to the deficiencies discovered when closing some of the air stations in the Orkney and Shetland Islands ; and what is the result of such inquiry ?

Maj.-Gen. Seely : A Court of Inquiry was held in the spring of this year into the causes for deficiencies in the stores of the Shetland Wing. The Court found that, owing to the difficulties experienced in the administration of these outlying stations, the system of storekeeping was in certain instances imperfect, with the result that the book and actual stocks did not agree, both deficiencies and surpluses being shown. The amount of the deficiency was about £1,000.

Woodsford Aerodrome

Maj. Colfox asked the Under-Secretary of State for Air if work is still being carried on in connection with the Woodsford Aerodrome, near Dorchester ; whether special trains are still being run daily to carry workpeople to their work there ; what has been the total cost of this aerodrome ; to what use is it to be put ; and whether the land not already covered with buildings and no longer required can be handed back and used once more for agricultural purposes ?

Dr. Macnamara : I have been asked to reply, as the Woodsford Aerodrome is in Admiralty occupation. The completion of the aerodrome as an airship station has been abandoned. A few minor works are still in hand to complete the buildings required for use by the Admiralty. Special workmen's trains are not being run ; they were stopped on September 12. The approximate total cost of the aerodrome will be £185,000. The station is to be used for the temporary storage of machinery. As regards the land, the farm tenant has never been dispossessed of the portion referred to, and is still in occupation. The requisition cannot, however, be withdrawn until the question of the ultimate disposal of the station is settled.

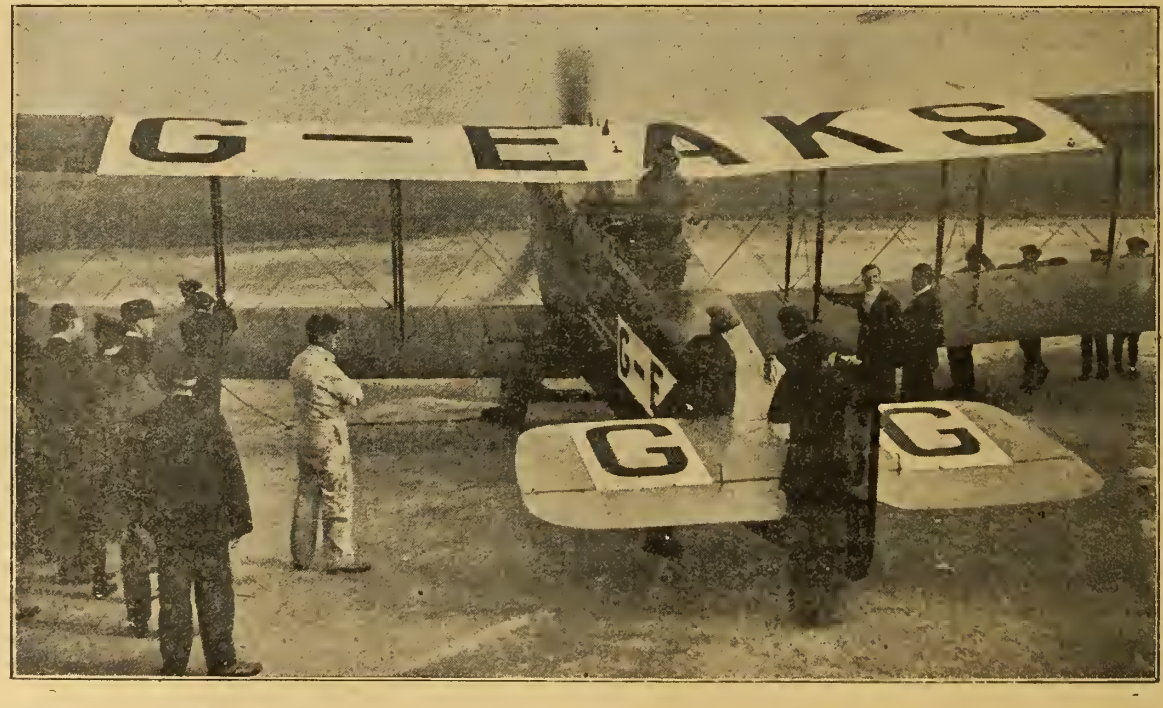
* * *

U.S. Aviators Murdered by Mexicans.

It is announced from San Diego (Cal.), that Lieuts. Connolly and Waterhouse, two U.S. Army aviators, who were reported missing on August 21, were murdered, after being rescued, by two Mexican fishermen, at Bahia, Los Angeles, Lower California, where the aviators had alighted after losing their way during a border flight.

The identity of their slayers, who came from a Mexican sloop, is known both to the American and Mexican authorities, and a search is being made for them.

The bodies of the aviators arrived on board a destroyer on Sunday. Messages scrawled on the *fuselage* of the aeroplane indicated that the officers were for nineteen days without food, and were compelled to drink water from the radiator.



LONDON-AUSTRALIA FLIGHT : The start from Hounslow of the Sopwith-Rolls-Royce "Wallaby" on October 21. Capt. Matthews, the pilot, waving farewell

AIRISMS FROM THE FOUR WINDS

At last a definite date—July, 1920—is announced for the great International Aero Exhibition to be held at Olympia by the Society of British Aircraft Constructors, Ltd. It promises to be the largest and most comprehensive gathering together of aircraft, aero engines, their components and accessories that has yet been organised. By the time the Show is on, there should be plenty of indication as to post-War commercial tendencies. By the official support already accorded the Exhibition success is assured beforehand, and it is likely to attract visitors from every quarter of the globe. Activities will not be confined to the halls of Olympia, as in conjunction with the indoor Exhibition provision will, it is hoped, be made for trials and demonstration flights at an aerodrome within easy distance.

By way of a reminder, past aero shows have been in the hands of the Society of Motor Manufacturers and Traders, which body, as far back as 1909, commenced to do good missionary work in this direction. Developments have been so pronounced during the War that the new body in the form of the S.B.A.C. was naturally called into existence, to look after the aircraft side of industry. Hence the change-over of the Exhibition to this latter body. The S.B.A.C. now comprises in its membership practically every British manufacturer of aircraft, aircraft engines and their component parts, accessories and materials, and this body has entered into an agreement with the Society of Motor Manufacturers and Traders under which the pre-War aero exhibitions will be continued under the joint management of the two societies. The arrangements provide for the setting-up of a joint committee to promote aero exhibitions in the United Kingdom and the use of the exhibition organisation maintained by the Society of Motor Manufacturers for the carrying out of its annual motor and other exhibitions. And so there is peace and harmony where otherwise there might easily have been unnecessary competition and a divided camp.

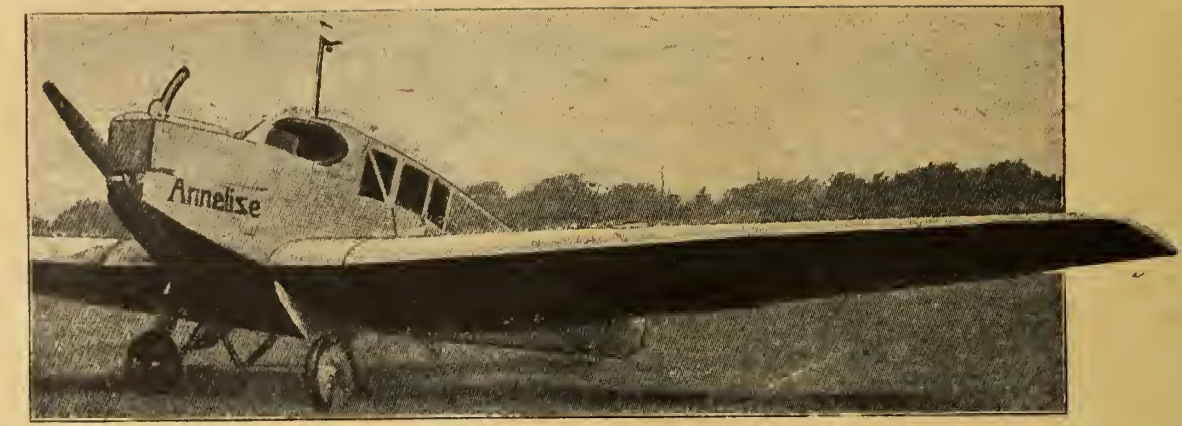
What may happen if the Income Tax continues to "zoom": Another *flight* to Australia. Departure of Mr. Stonie-Broke from Income Tax collector in 1925

In this connection, another reminder is as to the opening of the Sixth International Aircraft Exhibition at the Paris Grand Palais on December 19. Close upon 200 firms have already reserved space, many foreign countries being included in the list. Caudron, Farman, and Bréguet aeroplanes will be shown at some of the largest stands. Levasseur, Bernard, and other firms of repute will also have numerous exhibits. The Astra and Clement firms will be showing other than lighter-than-air craft, since these are not to be included in this year's exhibition. Among the Italian firms to be represented are Bianci, Fiat, Macchi, and Caproni. British exhibitors will include Boulton and Paul, Handley Page, the Westland Aircraft Co., and British Aircraft, Ltd. A special section of the exhibition will be occupied by aerial transport firms, including "Airco," the Cie. Aérienne Française, and the Cie. Trans-aérienne.

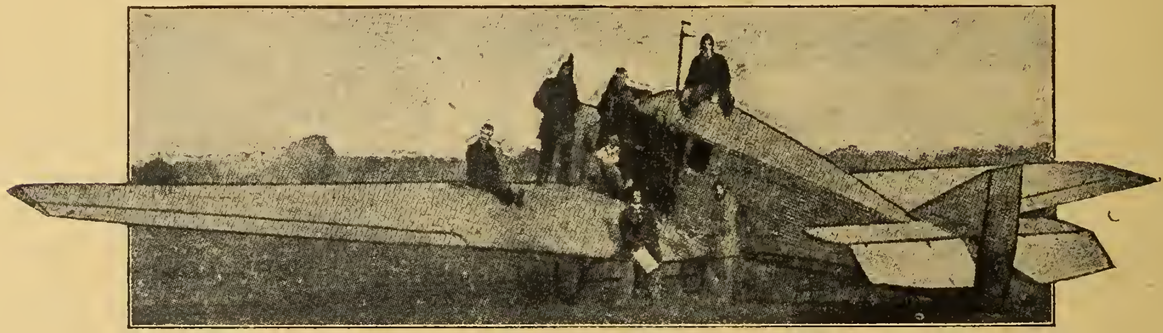
Admiral Lord Jellicoe is a consistent advocate of a strong Pacific fleet, and during his tour in Australia he has been emphasising this important Imperial project. Lord Jellicoe also maintains that Australia should become self-contained in regard to the manufacture of guns, mountings, munitions and last, but not least, aircraft. In dealing with the latter section of war equipment, Lord Jellicoe at Melbourne pointed out that war experience had shown that submarines can operate successfully over immense distances from their bases. This necessitated the provision against submarine attack in all parts of the Empire, while Australia must even prepare to meet attack from the air.

Upon arrival at Honolulu the other day, the greeting given Admiral Jellicoe included a squadron of aeroplanes circling round the battle-cruiser *New Zealand*.

In one direction—tribal disturbances—the use of aircraft is being very distinctly felt and appreciated. The latest trouble on the Indian frontier is a case in point. It has been necessary to give the Waziristan natives, a tribe that was the reverse of friendly during the Afghan upset, a bit of a lesson, and, therefore, instead of throwing a large body of troops into action, the military authorities have decided to occupy only essential posts, while the real work of punishing the tribesmen will be carried out by intensive bombing from aeroplanes. Already the all-sufficient air force for this purpose is *in situ*, and preliminary



THE JUNKERS (GERMAN) TOURING MONOPLANE: Three-quarter front view. This machine, which is built of metal throughout, is of the "wireless" type, having no external lift bracing. The wings are built up of tubes and covered with corrugated aluminium sheet, as is also the *fuselage*. On September 13 last this machine is said to have reached an altitude of 6,750 metres (about 22,200 ft.) with eight people on board. The engine is a 185 h.p. B.M.W. (Bavarian Motor Works). The pilot sits in front of the cabin, immediately behind the engine



THE JUNKERS TOURING MONOPLANE: Three-quarter rear view

The Junkers Touring Monoplane: The cabin and the eight passengers with which the machine reached 22,200 ft.

aerial operations have already had considerable effect on the Warra Wazirs. It is hoped that these up-to-date "persuasive" methods may prove an easy and rapid solution for all our frontier problems.

* * *

Swiss authorities are busying themselves already over International aerial regulations. Under a new law it is provided that foreign aeroplanes must land in certain specified towns on the frontier for examination by Customs officials. They must also obtain permission if they require to fly inside the country. Several other points will be submitted later to an international congress—probably held at Berne in 1920—concerning commercial and tourist aerial traffic. A suggestion, however, made by a correspondent that in view of the possibility of mountaineering by air, shares in Swiss mountain railway companies have already fallen, is, we think, straining "contingencies" a bit far.

* * *

France has decided that the cessation of War hostilities officially ceased on October 23 last. Wonder when our "Government" will make up *their* mind that it has happened.

* * *

According to the *Daily Express* correspondent under date October 19 from Bombay, a party of Italian airmen are now at Bombay, waiting to proceed to other centres in connection with d'Annunzio's projected flight from Rome to Tokyo, which they expect will begin in a month's time. They say that five S.V.A. machines will attempt the flight, with the possible addition of two Caproni triplanes.

Presumably by this, d'Annunzio contemplates he will have settled the Fiume business, as he has declared that he will never leave there until Fiume is a free port under the suzerainty of Italy.

* * *

Following the meeting in Kingsway a while back, the airship combine is now in such shape that its completion and active operations may very shortly be announced.

* * *

It was certainly a novel, if somewhat elaborate, ruse to secure a taxicab on the part of the pilot of an aeroplane, who is reported a few days back as having planed down on Farnborough Common on to the top of a passing taxicab, in which were two occupants. The taxi was crushed inwards, but no one was injured. It was rather rough on the "fares" whatever one may think of the taxi bandit, and somewhat careless of the pilot not to notice that the flag was down. But perhaps Mr. Bandit was earning a bit extra on his own, with the flag up! In which case it thoroughly served him right; at the same time, we don't think there is much money in aeroplane taxi-touting.

* * *

If any should be in doubt as to the correct thing for aeroplane "going away," some ray of light may be forthcoming from the following record of facts appearing in the *Mail* in connection with the pair-of-Rolls-Royces and set-of-sables-wedding of Miss Queenie Thomas, the British film star, and Mr. George Newman the other day. After the Carlton Hotel reception the happy couple went by car to Hounslow (did each go in one of the R.-R.'s we wonder ?), from there by aeroplane to Paris, and the bride, according to the reporter, "wore a long double-breasted leather coat, brown buckskin breeches, and service laced boots to the knee. The costume was completed by a brown duvetyn cap with a thin border of red and having two peaks which could be fastened under the chin or used to give an alternative shape to the crown of the cap."

So now you know all about it.

* * *

St. Michael, the patron saint of aviators, has a special stained glass window in his honour, in the Spanish Church in Spanish Place. In this an aeroplane is depicted with the inscription "Defende Nos in Proelio."

* * *

A couple of Richthofen stories appear in Count Czernin's Memoirs, extracts from which have been appearing in *The Times*. Under date February 2, 1918, Count Czernin notes the following in his Brest diary :—

"The two Richthofen brothers were here a short time ago. The elder has brought down in air fighting some 60 enemy airmen, the younger 'only' some 30. The elder has a face like that of a young and pretty girl. He told me 'how it is done.' It was, he said, quite simple ; all you had to do was to get quite close to your opponent from behind and then shoot hard ; the other fellow would then drop. But you had to overcome your own 'funk,' and fly quite close up to the enemy.—Modern heroes!

"Two good stories were told about the two Richthofens. The English had set a price upon the head of the elder. When he heard of this he informed them by means of leaflets from the air that, in order to facilitate their task, from the next day forward his machine would be painted bright red, so that they might the more easily recognise him. Next morning when the squadron came out of its sheds *all* the machines were bright red.—One for all and all for one!

"The second story. Richthofen the younger and an Englishman were circling round each other and firing like mad at each other. They were getting closer and closer, and already they could distinguish each other's features. Suddenly something jammed in Richthofen's machine-gun, and he could not fire any more. The Englishman looked wonderingly across, and when he realised what was the matter with Richthofen he waved his hand, turned round, and flew off. Fair play! I should like to meet this Englishman and tell him that, in my eyes, he is greater than the heroes of old."

* * *

The scramble for head and body gear after some of the aviation and other functions, which for our sins we have at times had to attend, has even upon occasion resulted in having to depart minus our hat, in spite of the most elaborate numbering "system." *Apropos* this, the following "Office Window" story of the other side of the picture is distinctly refreshing :—

In a West-end restaurant there is a page in charge of the cloak room, and he has never yet been known to make an error in regard to the articles entrusted to his care. He gives no tickets, but relies on an exceptionally good memory. A new customer was surprised the other evening at the alacrity with which his hat and overcoat were returned to him over the counter.

"Tell me," he begged curiously, "How do you know that these are mine ?"

"I don't," answered the page.

"Then why do you hand them to me ?"

"Because," said the page, "you handed them to me."

"TICKETS" AT NORTHOLT : The Central Aircraft Co. are busy out Northolt way giving passenger flights and doing school work. Our photograph shows two pupils who have just obtained their Royal Aero Club certificates. On the left is Mr. Tanner, whose actual flying time was 3 hours 15 mins., and on the right, Mr. Pool, who got his "ticket" after 3½ hours in the air. Mr. Herbert Sykes, O.B.E., who is chief instructor, is seen between his two latest pupils. The machine used is the C.A. Co.'s "Centaur 4," with Anzani engine. As each pupil is allowed 10 hours' flying, Messrs. Tanner and Pool are looking forward to nearly 7 hours' flying before leaving the school

THE ROYAL AIR FORCE

London Gazette, October 17

The following temporary appointment is made at the Air Ministry :—

Staff Officer, 3rd Class.—(T.) Flying Officer T. Kerr-Jones ; Sept. 29.

Air Attache.—Sqdn. Leader J. P. C. Sewell, O.B.E. ; Sept. 25.

Flying Branch

Capt. N. G. Stewart-Dawson, D.S.C., to be actg. Maj. while employed as Maj. (A. and S.) ; May 17.

Capt. H. L. H. Owen, A.F.C., is graded for purposes of pay and allowances as Maj. while employed as Maj. (A.) ; from May 1 to June 30.

Capt. F. L. C. Butcher is graded, for purposes of pay and allowances, as Maj. while employed as Maj. (A'ship) ; May 1.

Capt. (actg. Maj.) K. B. Harbord to be Capt. (A.) from (S.O.) and relinquishes the actg. rank of Maj. on ceasing to be employed as Maj. ; Oct. 5, 1918 (substituted for notifications in the *Gazette* of July 15 and Sept. 23.

Lieut. W. H. Park, M.C., to be actg. Capt. while employed as Capt. (A.) ; May 17.

Second Lieutenants to be Lieutenants. :—W. D. Redmond ; June 1, 191 R. Bretherton ; Nov. 8, 1918. E. C. Crouch ; Dec. 27, 1918. A. C. James ; June 13.

Pilot Officer T. P. T. Jones to be Flying Officer ; Sept. 14.

Sec. Lieut. G. A. Osborne (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (O.) ; July 10, 1918.

Sec. Lieut. L. Hudson to be Sec. Lieut., from Unemployed List ; May 20, with precedence next below Sec. Lieut. T. Smith (Obs.).

Lieut. J. L. Periera relinquishes his commn. on reversion to I.A.R.O. ; Oct. 9.

The following relinquish their commns. on ceasing to be employed :—Lieut. L. Patterson, M.C. (Lieut., R. Art.) ; April 11. Lieut. R. F. L. Bush (Lieut., R. Art.) ; May 2. Sec. Lieut. T. B. Anderson ; May 9. Lieut. J. O. Leach, M.C. (half-pay list) ; June 28. Capt. J. Selwyn (Capt., R. Art.) ; Sept. 23. Capt. C. Patteson, M.C., A.F.C. (Lieut., S. Wales Bord.) ; Oct. 4. Sec. Lieut. S. W. P. Foster-Sutton (Lieut., E. Kent R.) ; Oct. 8.

(Then follow the names of 133 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank :—F. B. Harland (caused by wounds) ; Oct. 2. D. M. Murdock (contracted on active service) ; Oct. 6. W. Biheller ; Oct. 8.

Sec. Lieut. R. Leask (Lieut., High. L.I., T.F.) relinquishes his commn. on account of ill-health (caused by wounds), and is granted the rank of Lieut. ; Oct. 6.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—S. J. Bolitho ; June 25 (substituted for notification in *Gazettes* of March 14 and July 1). W. H. Saunders (contracted on active service) ; July 12 (substituted for notification in *Gazette* of July 15). C. T. Skipper ; Oct. 10.

Sec. Lieut. W. H. Perks resigns his commn. ; Oct. 18.

Sec. Lieut. L. F. Ross is antedated in his appointment as Sec. Lieut. (A. and S.) to May 5, 1918.

Sec. Lieut. R. R. Nelson is antedated in his appointment as Sec. Lieut. (A. and S.) to May 26, 1918.

The initials of Flight-Lieut. P. J. H. Summer are as now described, and not P. J., as stated in *Gazette* of Sept. 26.

The rank of Lieut. T. R. Adair is as now described, and not Sec. Lieut., as stated in *Gazette* of Sept. 19.

The notification in *Gazette* of May 23 concerning Sec. Lieut. T. B. Anderson is cancelled.

The notification in *Gazette* of July 8 concerning Lieut. R. T. Percival is cancelled.

The notification in *Gazette* of July 29 concerning Sec. Lieut. H. P. Brummell is cancelled.

Administrative Branch

Lieut. (Hon. Capt.) C. W. A. Millar is graded for purposes of pay and allowances as Maj. whilst employed as Maj. ; Dec. 21, 1918 (substituted for notification in *Gazette* of May 27).

Capt. F. E. Hellyer, O.B.E., is graded for purposes of pay and allowances as Maj. whilst employed as Maj., from May 1 to June 24.

Flight Lieutenants (*S.O.*) *to be Flight Lieutenants* :—R. Belli-Bivar, M.B.E. ; Sept. 9. H. B. Kavanagh, M.B.E., R. R. L. L. Thom ; Sept. 22.

Lieut. F. W. H. Durrant is graded for purposes of pay and allowances as Capt. whilst employed as Capt., from (T.), from March 6 to Aug. 16 (substituted for notification in *Gazette* of Sept. 23).

Flying Officer T. Gibson to be Flying Officer from (S.O.), and is graded for purposes of pay and allowances as Flight-Lieut. whilst specially employed ; Sept. 15.

Lieut. C. G. Stewart to be Lieut., from (A.) ; April 17.

Flying Officer J. E. Doyle, D.F.C., to be Flying Officer, from (A.) ; Sept. 25.

Flying Officer to be Flying Officer, from (S.O.) :—J. C. Barraclough ; Sept. 15. R. J. Slade ; Sept. 22.

Sec. Lieut. R. R. W. Millward to be Lieut. ; Aug. 21.

Pilot Officer E. Higgs to be Flying Officer ; Sept. 9.

Sec. Lieut. Horace Fenn Turner to be Sec. Lieut., from (K.B.) ; April 17 (substituted for notification in *Gazette* of June 27 wherein this officer was described as Sec. Lieut. Horace F. Turner).

Sec. Lieut. (Hon. Capt.) F. C. Marsh (Maj., Hsrs.) relinquishes his commn. on ceasing to be employed ; Oct. 11.

(Then follow the names of 26 officers who are transfd. to the Unemployed List under various dates.)

Lieut. A. B. Kinnair relinquishes his commn. on account of ill-health, and is granted the rank of Capt. ; Oct. 10.

Lieut. H. C. R. Milward (R.H.A., T.F.) relinquishes his commn. on account of ill-health (contracted on active service), and is permitted to retain his rank ; Sept. 24 (substituted for the notification in the *Gazette* of Sept. 30).

The notification in the *Gazette* of Aug. 2, 1918, concerning Sec. Lieut. G. H. Tait is cancelled.

The notification in the *Gazette* of Aug. 15 concerning Sec. Lieut. W. W. Smith is cancelled.

The notification in the *Gazette* of July 8 concerning Sec. Lieut. F. A. A. Hewson is cancelled.

Technical Branch

Capt. H. R. Lecomber, O.B.E., is graded for purposes of pay and allowances as Maj. while employed as Maj., Grade (A.) ; May 1.

Flight-Lieut. M. V. Wrigley to be Flight-Lieut., Grade (A.), from (S.O.) ; Aug. 1 (substituted for notification in the *Gazette* of Sept. 23).

Lieut. S. W. Bryant is graded for purposes of pay and allowances as Capt., while employed as Capt., Grade (A.) ; Nov. 26, 1918.

Flying Officer F. J. Cooke is graded for purposes of pay and allowances as Flight-Lieut. while employed as Flight-Lieut., Grade (B.), from (S.O.) ; Sept. 22.

Lieut. A. Bushfield is graded for purposes of pay and allowances as Lieut. while employed as Lieut., Grade (A.) ; July 1.

Flying Officer W. J. Standish is graded for purposes of pay and allowances as Flying Officer while employed as Flying Officer, Grade (A.), from Aug. 8 to Sept. 11.

Lieut. P. A. Wright to be Lieut., Grade (B.), from (Ad.) ; June 22.

Lieut. W. W. McDonald is graded for purposes of pay and allowances as Lieut. while employed as Lieut. (Grade (B.) ; May 24.

The following Sec. Lieuts. are graded for purposes of pay and allowances as Lieuts. while employed as Lieuts., Grade (A.) :—H. J. Adkins, from May 1 to Sept. 11. H. J. Dann ; June 11.

Pilot Officers to be Flying Officers, without pay and allowances of that rank :—C. A. Cordeaux ; Sept. 11. E. Parrett, S. A. Smith ; Oct. 1.

Sec. Lieuts. (Ad.) to be Sec. Lieuts., Grade (A.) :—E. T. Fielding ; Nov. 28, 1918. L. T. Bulmer ; March 20.

(Then follow the names of 34 officers who are transfd. to the Unemployed List under various dates.)

Capt. (actg. Maj.) D. G. Nairn, O.B.E. (R.A.S.C., T.F.), relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Maj. ; April 26 (substituted for notification in the *Gazette* of April 25).

The notification in the *Gazette* of April 29 concerning Sec. Lieut. C. W. O'Brien is cancelled.

Medical Branch

Lieut.-Col. G. N. Biggs (Maj., R.A.M.C., T.F.), from Unemployed List, to be restored to establishment without pay and allowances of his rank ; Aug. 13.

Flying Officer R. G. J. McCullagh to be Flight-Lieut. ; Aug. 14.

Transferred to Unemployed List :—Capt. W. P. Whippell ; April 28. Maj. (actg. Lieut.-Col.) J. L. Birley, O.B.E. ; Oct. 7. Maj. (actg. Lieut.-Col.) H. C. T. Langdon, O.B.E. ; Oct. 10.

Dental Branch

Flying Officer L. Wigoder to be Flight-Lieut. ; Oct. 7.

Capt. R. Fyson is transfd. to Unemployed List ; Sept. 20.

Memoranda

Pilot Officer W. J. Bray to be Flying Officer ; Oct. 1.

(Then follow the names of 23 cadets who are granted hon. commns. as Sec. Lieuts.)

The following temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed :—K. N. Barnes, A. J. Bohringer, F. E. Coles, F. J. Crinage, F. A. Crouch, C. H. Grace, H. Petrie, W. A. Pett, W. W. Purves, R. E. Tiffin ; Sept. 16.

The notifications in the *Gazette* of Aug. 26 concerning the following officers are cancelled :—Sec. Lieut. M. L. Bisson, Sec. Lieut. J. H. F. Hock, Sec. Lieut. G. T. Horne, Sec. Lieut. W. E. May, Sec. Lieut. E. Moorland, Sec. Lieut. L. M. Montgomery, Sec. Lieut. S. J. Livingstone.

Permanent Commissions.

The notification appearing in *Gazette* of Aug. 1 appointing the following officers to permanent commns. is cancelled :—Maj. T. S. Impey (A.), Maj. J. S. Mills, D.S.C. (A.), Maj. E. H. M. O'Farrell (A.), Capt. H. F. Delarne, D.F.C. (A.), Capt. C. T. MacLaren, O.B.E. (A.), Capt. E. M. Pollard (A.), Capt. G. T. Porter (A.), Lieut. H. de V. Leigh, D.S.C. (A.), Lieut. J. F. Nalder (Ad.), Lt. T. Roberts (A.), Lieut. J. S. C. Robinson (O.).

The notification in *Gazette* of Aug. 22 appointing Lieut.-Col. O. H. K. Maguire, D.S.O. (A.) to a permanent commn. is cancelled.

The intials of Maj. P. R. Burchell are as now described, and not " R. P.," as stated in *Gazette* of Aug. 1.

The surname of Lt. C. C. Bazell is as now described, and not " Bazzell," as stated in *Gazette* of Aug. 1.

The notification in *Gazette* of Sept. 5 concerning Capt. F. E. P. Barrington is cancelled (the notification in *Gazette* of Aug. 1 is to stand).

The name of Lieut. M. Minter is as now described, and not Lieut. M. Minter, M.C., as stated in *Gazette* of Aug. 1.

The name of Capt. C. H. Elliott-Smith is as now described, and not Capt. C. H. Elliott-Smith, M.C., as stated in *Gazette* of Aug. 1.

The classification of Lieut. A. S. Thompson is (Ad.) and not (A.) as stated in the *Gazette* of Aug. 1.

The date of appointment of Lieut. J. Whitford to a permanent commn. is Aug. 16, and not " Aug. 1 " as stated in the *Gazette* of Aug. 1.

The following temp. appointments are made at the Air Ministry :—

Staff Officers, 1st Class.—(Air.)—Maj. G. J. Watney ; March 25 ; and to be actg. Lieut.-Col. until April 30. (Substituted for the notification in the *Gazette* of June 20.)

Staff Officer, 2nd Class.—(Air.)—Capt. W. E. G. Bryant ; March 25 ; and to be actg. Maj. until April 30. (Substituted for the notification in the *Gazette* of June 20.)

The following temp. appointments are made :—

Staff Officer, 2nd Class.—(T.)—Sqdn. Leader F. Jolly (from Aug. 15 to Sept. 19).

Staff Officers, 3rd Class.—(Air.)—Flying Officer (actg. Flight Lieut.) O. R. Gayford, and relinquishes the actg. rank of Flight Lt. ; Sept. 22.—(P.) Flight Lieut. A. McR. Moffatt ; Oct. 13.—(Q.) Sec. Lieut. W. A. Glasper ; June 12.

Flying Branch.

Wing-Comdr. I. T. Courtney, C.B.E., to be Wing-Comdr. (A.) from (S.O.) ; Oct. 1.

Sqdn. Leader Sir N. A. R. D. Leslie, Bart., C.B.E., to be Sqdn. Leader (A.), from Air Attaché ; Sept. 25.

Flight Lieut. D. S. Earp to be actg. Sqdn. Leader whilst empld. as Sqdn. Leader (O.) ; Aug. 1 to Oct. 11.

Capt. M. Henderson, D.S.O., is graded for purposes of pay and allowances, as Maj. whilst empld. as Maj. (A.) ; from June 17 to July 31.

Flight Lieut. H. I. Hanmer, D.F.C., to be Flight Lieut. (O.), from (S.O.) ; Sept. 1.

Lieut. R. E. Butler to be actg. Capt. whilst empld. as Capt. (A.) ; from Dec. 1, 1919, to April 25.

The following Lieuts. are graded for purposes of pay and allowances as Capts. whilst empld. as Capts. (A.) :—R. S. Capon ; to July 31. L. C. Pockney ; May 1. W. Jones ; June 13.

Lieut. F. R. Hockney relinquishes the grading for pay and allowances as Capt. on ceasing to be empld. as Capt. (A.) ; June 3.

The following Flying Officers relinquish the grading for pay and allowances as Flight Lieuts. on ceasing to be empld. as Flight Lieuts. (A.) :—A. A.

Leitch, M.C., D.F.C.; Sept. 5. W. S. Reid; Sept. 6. E. W. White; Sept. 25.

The following Flying Officers actg. Flight Lieuts.) relinquish the actg. rank of Flight Lieut. on ceasing to be empld. as Flight Lieuts. (A.) :—(Hon. Flight Lieut.) L. N. Sutherland; Sept. 1. L. Clarke; Sept. 4. A. J. C. Styran, M.C.; Sept. 19.

Flying Officer V. Stranders to he Flying Officer from (S.O.); Sept. 8.

Sec. Lieuts. to be Lieuts. :—(Hon. Lieut.) G. E. Clavey; July 22, 1918. A. J. Rankin; Sept. 10, 1918. E. E. Taylor; Oct. 13, 1918. W. E. J. Bloodworth; Sept. 27, 1918. S. T. Crowe (since reclassified to Admin.); April 25. W. J. Millen; June 30. P. F. O. F. B. Candy (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A. and S.); Sept. 27, 1918.

The following relinquish their commns. on ceasing to he empld. :—Capt. (Capt., R.W. Surr. R.) L. M. Boddam-Whetam, from (S.O.); Aug. 28). Sec. Lieut. L. E. G. Judge (Sec. Lieut., L.N. Lancs. R.); Aug. 29. Sec. Lieut. D. W. Clarke (Lieut., R.F.A.); Sept. 17. Maj. G. Henderson (Maj., Indian Army); Sept. 18. Lieut. E. V. C. Hamilton (Lieut., Worc. R.); Sept. 19. Lieut. R. G. Lewis (Lieut., S. Wales Bord.); Sept. 20. Lieut. (Hon. Capt.) H. A. Courtenay, D.F.C. (Capt., R.A.S.C.), Lieut. P. Gurrey (Lieut. Suff. R.); Sept. 25. Lieut. Hon. Capt.) C. F. Yarde (Capt., R.A.S.C.); Sept. 26. Lieut. A. C. Jelf (Sub-Lieut., R.N.); Oct. 1. Capt. A. Howe (Capt., R.W. Kent R.); Oct. 4. Capt. D. R. Hanlon (Capt., R.G.A.); Oct. 7. Lieut. E. E. S. Wheatley (R.W. Surr. R.); Oct. 9. Lieut. E. V. A. Bell (Lieut., Hamps. R.); Oct. 13. Lieut. C. G. Stewart (Lieut., R. Scots Fus.); Oct. 14. Lieut. (Hon. Capt.) T. A. Francis (Capt., R. Ir. Regt.); Oct. 15.

(Then follow the names of 141 officers who are transfd. to the Unemployed List under various dates.)

Capt. C. H. Brewer, M.C., relinquishes his commn. on account of ill-health caused hy wounds, and is permitted to retain his rank; Oct. 13.

The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank :—T. G. Drew-Brook (caused by wounds); Sept. 30. E. H. Stanes, M.C. (Manch. R.), C. B. Whitney (contracted on active service); Oct. 14. A. B. E. Graham; Oct. 22.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—E. L. Milhorrow (contracted on active service); Oct. 10. V. L. Watts (caused hy wounds); Oct. 11.

The surname of Sec. Lieut. L. A. Rohertson is as now described, and not "Rohertson," as stated in *Gazette* of Sept. 26.

The initials of Sec. Lieut. R. C. Adams are as now described, and not "F. C." as stated in the *Gazette* of Sept. 26.

The surname of Sec. Lieut. R. J. Ottaway-Wilson is as now described and not R. J. O. "Wilson" as stated in the *Gazette* of Feb. 21.

The notification in the *Gazette* of June 17 concerning Sec. Lieut. J. H. Taylor refers to "John Homes Taylor."

The notification in the *Gazette* of March 11 concerning Lieut. W. Green (E. Yorks R.) is cancelled.

The notification in the *Gazette* of March 25 concerning Lieut. P. H. Clarke is cancelled.

The notification in the *Gazette* of July 25 concerning Sec. Lieut. F. C. Logan is cancelled.

The notification in the *Gazette* of Aug. 19 concerning Sec. Lieut. H. Toms is cancelled.

The notification in the *Gazette* of Oct. 3 concerning Sec. Lieut. F. W. F. Turner is cancelled.

Administrative Branch

Group Capt. T. B. Wood, C.M.G., to he Group Capt., from (S.O.); Oct. 1.

Sqdn. Leader A. C. E. S. Bowlby relinquishes the grading for pay and allowances as Wing. Com. on ceasing to he empld. as Wing Com.; Sept. 12. Sqdn. Leader A. ap Ellis to he Sqdn. Leader, from (S.O.); Oct. 1.

Flight Lieuts. to he Flight Lieuts., from (S.O.) :—E. D. Cole, F. J. Wise; Aug. 15. C. C. Treatt; Sept. 1. H. A. J. Wilson, O.B.E.; Sept. 22.

Lieut. A. B. Monk to be actg. Capt. while empld. as Capt., from Oct. 4, 1918, to April 30 (substituted for the notification in the *Gazette* of March 25 and May 23).

The following Lieuts are graded for the purposes of pay and allowances as Capts. while empld. as Capts. :—Lieut. S. F. A. Welsh; April 2. Lieut. J. Woolfenden; May 1 to July 25.

Lieuts. to he Lieuts. :—R. W. Silk, from (O.); May 12 (suhstituted for the notification in the *Gazette* of June 10. J. E. Drummond, from (A.); July 25.

Flying Officers to be Flying Officers :—R. B. Luard, from (A.); Sept. 8. F. Dance, M.B.E., from (S.O.); Oct. 10.

The following Flying Officers relinquish the grading for pay and allowances as Flight Lieuts. on ceasing to he empld. as Fight Lieuts. :—W. E. N. Growden; Aug. 20. C. A. Howe; Aug. 26.

Flying Officer (actg. Sqdn. Leader) G. B. Redgrave relinquishes the actg. rank of Sqdn. Leader and the grading for pay and allowances as Flight Lieut.; Sept. 12.

Sec. Lieuts. to be Lieuts. :—R. P. Briscoe; Dec. 27, 1918. R. C. Rogers; June 6.

The following Sec. Lieuts. are graded for purposes of pay and allowances as Lieuts. whilst empld. as Lieuts. :—J. G. Le Brun (to Sept. 23), T. Surr (to July 14); May 1.

Pilot Officer G. P. Abhott relinquishes the grading for pay and allowances as Flight Lieut. on ceasing to be empld. as Flight Lieut.; Sept. 3.

Lieut. C. L. Mundey, M.C. (Lieut., R. Fus.), relinquishes his commn. on ceasing to he empld.; Sept. 30.

(Then foliow the names of 23 officers who are transfd. to the Unemployed List under various dates.)

Lieut. F. W. Dogherty relinquishes his commn. on account of ill-health, and is permitted to retain his rank (Oct. 22).

The following 2nd Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—F. C. Logan; (July 10). W. D. Layton (contracted on active service); (Oct. 14). J. O. Minshall (caused hy wounds); Oct. 15).

The surname of 2nd Lieut. J. H. Gray is as now described and not Grey as stated in *Gazette* Sept. 26.

The notification in *Gazette* of April 29 concerning Lieut. A. H. F. Brothers is cancelled.

Technical Branch

Maj. R. G. L. Markham is graded for purposes of pay and allowances as Lieut.-Col. whilst empld. as Lieut.-Col., Grade (A) (May 1).

Maj. H. E. Day, D.S.O., M.V.O., to be Maj., Grade (B), from (S.O.) (July 21) substituted for the notification in *Gazette* of Aug. 1).

Capt. C. B. Dalison is graded for purposes of pay and allowances as Maj. whilst empld. as Maj., Grade (A), from (A. and S.) (May 1).

Capt. W. S. Hammond, O.B.E., is graded for purposes of pay and allowances as Maj. whilst empld. as Maj., Grade (A.) (May 1).

Lieut. G. S. Hallas, M.C., is graded for purposes of pay and allowances as Maj. whilst empld. as Maj., Grade (A) (June 9).

Flight Lieuts. to he Flight Lieuts. :—N. H. Wood, Grade (A), from (S.O.); (Sept. 8). H. J. Lister, Grade (B.), from (S.O.); (Aug. 15). Lieut. W. T. Hope-Hawkins to he actg. Capt. whilst empld. as Capt., Grade (A.); (April 1, 1918).

The following Lieuts. are graded for purposes of pay and allowances as Capts. whilst empld. as Capt., Grade (A.) :—G. Baillie, C. E. Nightingale, J. H. Mackie, P. H. Paul, A. G. Ridgon (May 1).

Lieut. F. R. Wilkins is graded for purposes of pay and allowances as Capt. whilst empld. as Capt., Grade (A), from (Ad.) (May 1).

Lieut. H. B. Hawker is graded for purposes of pay and allowances as Capt. whilst empld. as Capt., Grade (B) (June 12).

Flying Officer F. J. Cooke is graded for purposes of pay and allowances as Flight Lieut. whilst empld. as Flight Lieut., Grade (B), from (S.O.) (Sept. 22).

2nd Lieut. (Hon. Capt.) F. C. Marsh is graded for purposes of pay and allowances as Capt. whilst empld. as Capt., Grade (B.) (May 1).

Lieut. A. J. McNah, M.C., to he Lieut., Grade (A.), from Grade (B.) (June 25, 1918).

Flying Officer C. G. Wigglesworth, R.F.C., to be Flying Officer, Grade (A.), from (Airship) (Sept. 8).

Flying Officer S. Empsall relinquishes the grading pay and allowances as Flight Lieut. on ceasing to be empld. as Flight Lieut., Grade (A.), (Sept. 8).

Lieut. R. J. Copley relinquishes the grading pay and allowances as Capt. on ceasing to he empld. as Capt., Grade (B) (June 11).

Lieut. A. J. McNab, M.C., to he Lieut., Grade (B.), from (O.) (April 27, 1918).

Flying Officer T. H. Sills to he Flying Officer, from (S.O.) (Sept. 30).

2nd Lieuts. to he Lieuts. :—R. W. Ellis (Sept. 28, 1918 (substituted for notification in *Gazette*, March 7); H. Edwards (May 14).

2nd Lieuts. to be Lieuts., without the pay and allowancesof that rank :—M. Thomson; (June 11, 1918). F. E. P. Langdon; (Oct. 5, 1918). A. West; (Dec. 4, 1918) (suhstituted for notification in *Gazette* of Mar. 7).

Pilot Officers to be Flying Officers, without pay and allowances of that rank :—H. S. Whitley; (Aug. 5). G. A. Slater; (Aug. 27).

The following 2nd Lieuts. are graded for purposes of pay and allowances as Lieuts. whilst empld. as Lieuts., Grade (A.) :—W. Dentith; (to Sept. 22). J. Driscoll, A. A. Gardner, J. G. Wright; (May 1).

Pilot Officer (Hon. Flying Officer) J. C. Dyson to be Pilot Officer, Grade (B.), from (S.O.) (Sept. 29), and to be Hon. Flying Officer.

2nd Lieut. (Hon. Capt.) F. C. Marsh to he 2nd Lieut., Grade (B.), from (Ad.) (May 1), and to he Hon. Capt.

2nd Lieut. H. Royston (late Gen. List, R.F.C., on proh.) is confirmed in rank as 2nd Lieut., Grade (B.) (Oct. 21, 1918) (substituted for notification in *Gazette* of Dec. 20, 1918, wherein this officer was shown under (Admin. Branch).

(Then follow the names of 57 officers who are transfd. to the Unemployed List under various dates.)

Lieut. T. J. Stannage relinquishes his commn. on account of ill-health, and is permitted to retain his rank (Aug. 1). (Suhstituted for notification in the *Gazette* of Sept. 2).

The notification in the *Gazette* of April 29 concerning Lieut. W. T. Hope-Hawkins is cancelled.

The notification in the *Gazette* of Feb. 14 concerning Lieut. W. T. H. Hawkins is cancelled.

The notification in the *Gazette* of Aug. 26 concerning Lieut. P. Cairn is cancelled.

The notification in the *Gazette* of Oct. 7 concerning Lieut. P. Cairns is cancelled.

The notification in the *Gazette* of July 8 concerning 2nd Lieut. E. H. Halley is cancelled.

The notification in the *Gazette* of July 25 concerning 2nd Lieut. F. C. Logan is cancelled.

The notifications in the *Gazette* of May 24, 1918; Oct. 22, 1918; and June 27 concerning Lieut. A. J. McNah, M.C., are cancelled.

The notification in the *Gazette* of Sept. 12 concerning 2nd Lieut. A. G. Rigdon is cancelled.

Medical Branch.

Capt. H. Harvey to be actg. Maj. while emplyd. as Maj. (July 28).

Capt. R. B. Lilly is transferred to unempld. list (Sept. 16).

Dental Branch.

The surname of Lieut. B. H. Moore is as now described and not "More" as stated in the *Gazette* of Aug. 8.

Memoranda.

Lieut. A. C. W. Williams is granted the hon. rank of Capt. (Aug. 16, 1918).

The following Prohationary Flight Officers are granted Hon. Commns. as 2nd Lieuts. :—F. A. Lewis; (Nov. 21, 1918). G. N. S. Lane; (April 24). J. R. F. Cheese; (Mar. 8). J. S. Stauffer; (Sept. 28).

The following relinquish their commns. on ceasing to be emplyd. :—Capt. A. Warnock (Capt. and Qmr., Ox. and Bucks L.I.); (Oct. 3). Maj. R. Money, O.B.E. (K.O.R. Lancs R.); (Oct. 9). Lieut. A. V. Burhury, M.C. (Lieut., Yorks R.); (Oct. 14). Temp. Hon. Lieut. H. Clark (Sept. 16).

(Then follow the names of 6 officers who are transfd. to the Unemployed List under various dates.)

The notification in the *Gazette* of Sept. 5 concerning Flight Lieut. C. E. Hogdson is cancelled.

* * *

The Great Northern Aerial Syndicate, Ltd.

FROM the Secretary of the Great Northern Aerial Syndicate, Ltd., we have received a copy of the prospectus of the parent company. There has been no necessity to issue an invitation to the public for subscriptions, the directors and their friends having taken up a substantial holding of the capital of £10,000. Later on it is proposed to form subsidiary companies for working the aerial schemes planned by the parent company. The document to hand is a straightforward bid for popularising the use of airships in preference to aeroplanes, and from the details set out in this preliminary prospectus of obligations and options already entered upon, with sound commercial management there should be every reason why the undertaking should succeed. Some little time ago we published short particulars of the districts contemplated to be covered by this enterprise radiating from Liverpool and other important west coast towns to the Isle of Man and the leading coast cities of Ireland, besides comprising inland flying routes to the east coast. When the parent company has more fully matured its campaign we shall hope to give fuller details of its ambitious and praiseworthy projects. The offices of the company are at 25, Lord Street, Liverpool, and the Secretary is Mr. W. E. Cooke.

SIDE-WINDS

Following on the acquisition by Sir W. G. Armstrong, Whitworth and Co., Ltd., of a large interest in the Siddeley-Deasy Motor Car Co., Ltd., of Coventry, the name of the latter is changed to Armstrong Siddeley Motors, Ltd. New London premises are being opened at 10, Old Bond Street, W. 1.

- \- \-

On Thursday, October 23, the B.A.T. commercial machine, piloted by Mr. Cyril Turner, left Hounslow for Amsterdam, at which city he arrived in 2 hours and 40 minutes. Maj. C. Draper, D.S.C., flew a B.A.T. "Bantam" fitted with a 200 h.p. Wasp engine from Hendon to Cowes in the morning, returning in the afternoon in 35 minutes. On Saturday, October 25, Maj. C. Draper piloted a B.A.T. saloon passenger machine with a full complement of passengers to Amsterdam. This trip was in addition to the regular service, but the demand for aerial transport to Holland is now growing, and it may be necessary to put on this service two machines per week instead of one.

- \- \-

During the week ending October 22 Handley Page Transport Ltd., in conjunction with Messageries Aeriennes, Paris, on their London–Paris Service carried 47 passengers and 2,184 lbs. of freight. A picture valued at £500 was carried on one of the machines. A return journey to Paris was made in one day, occupying altogether 6 hrs. 40 mins. actual flying, Lieut. McIntosh piloting the machine. During the same week 19 passengers were carried between London and Brussels.

- \- \-

The Airco aeroplanes between London and Paris had, at the completion of their ninth week, flown 34,000 miles at an average of 106 m.p.h. The "air expresses" had then accomplished successfully 135 of their 139 scheduled flights. Only one flight was prevented by weather, one interrupted by weather, and two interrupted by mechanical trouble. On 37 out of the 54 flying days the weather was unfavourable for flying.

◆ ◆ ◆ ◆

COMPANY MATTERS

Wolseley Motors, Ltd.

A meeting of holders of the 5 per cent. first mortgage debenture stock of Wolseley Motors, Ltd., was held on October 20 for the purpose of considering resolutions proposing that the 5 per cent. first mortgage debenture stock be exchanged for 6½ per cent. first mortgage debenture stock, forming part of an issue of debenture stock for £1,700,000.

Sir Vincent Caillard (chairman of the company), who presided, explained that the directors had come to the conclusion that in view of the rapid development which had taken place in the company's manufacturing capacity during the past five years, the time had arrived when a complete reorganisation of the company's finances was necessary. In order to enable the company to make the best possible use of the extensive additions which had been carried out during the War, it was necessary that further additions to the buildings and plant should be made, so as to balance the equipment of the shops, with that effected during the War, to bring them up to their maximum capacity.

In order to carry this into effect it will be necessary to take the following steps:—(1) To balance the machinery in the machine shops so as to bring every section up to the required standard for the programme on which the directors have decided. (2) To provide additional factory space for assembling and erecting purposes. A large portion of the space which was used for this purpose in the past has been absorbed during the War for the installation of additional machinery. (3) To extend the company's body manufacturing, painting, trimming, and finishing shops, which have not undergone any extension during the War.

Some of the extensions are in hand, and every effort will be made to complete the remainder as soon as possible.

Sir Vincent Caillard, in outlining the programme of the company, said that there would be three models:—The "Wolseley" Ten—a four-cylindered model, developed from the Stellite, to be sold as a two- or four-seater; the 15 h.p. four-cylindered four-seater, to be produced in large quantities, and the 20 h.p. six-cylindered car, to be fitted with examples of the best types of carriage work.

After explaining the financial resolutions, Sir Vincent Caillard expressed the appreciation of the London directors of the excellent services rendered to the company by the Birmingham directors and the staff.

Mr. Ernest Hopwood seconded the resolutions, which were duly carried.

PUBLICATIONS RECEIVED

The Thermionic Valve and Its Development in Radiotelegraphy and Telephony. By J. A. Fleming, M.A., D.Sc., F.R.S. London: The Wireless Press, 12-13, Henrietta Street, W.C. 2. Price 15*s.* net.

Transport by Aircraft. The English Electric Co., Ltd., Phœnix Works, Thornbury, Bradford.

The American Air Service. By A. Sweetser. London: D. Appleton and Co., 25, Bedford Street, W.C. 2. Price 10*s.* 6*d.* net.

Baby: From Bud to Blossom. By Mrs. J. Langton Hewer. London: The Eagle, Star and British Dominions Insurance Co., Ltd., British Dominions House, Royal Exchange Avenue, E.C.

The Struggle in the Air, 1914-1918. By Maj. C. C. Turner (late R.A.F.). London: Edward Arnold. Price 15*s.* net.

Wolseley Motors, Ltd., on War Service. Wolseley Motors, Ltd., Adderley Park, Birmingham.

The Birthplace of Aerial Power. The Grahame-White Co., Ltd., The London Aerodrome, Hendon, N.W. 9.

The Seventh Vial. By Frederick Sleath. London: Herbert Jenkins, Ltd., York Street, St. James's, S.W. Price 6*s.* net.

Catalogues

Electric Fans. The Sun Electrical Co., Ltd., 57-59, Neal Street, Long Acre, W.C. 2.

Steel Wire Ropes, Aircraft Wires and Fittings, etc. Brunton's Wire Mills, Musselburgh, Scotland.

Avro Aeroplanes for Commerce, Sporting and Private Purposes. A. V. Roe and Co., Ltd., Newton Heath, Manchester.

◆ ◆ ◆ ◆

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published October 30, 1919

1,286. L. Goldmerstein. Aeroplanes. (130,060.)
6,002. Sperry Gyroscope Co. Gyroscopic stabilisers. (133,067.)
7,035. G. Caproni. Multiplane areoplanes. (133,068.)
13,897. G. Pomilio. Guns mounted on aircraft. (133,078.)
16,364. G. Caproni. Carburettors. (133,085.)

APPLIED FOR IN 1918

Published October 30, 1919

508. L. Avorio. Captive balloons. (133,087.)
2,629. G. E. Bradshaw and A.B.C. Motors, Ltd. Means for securing bolts, studs, etc. (133,093.)
12,385. Goodyear Tire and Rubber Co. Kite balloons. (133,112.)
13,265. E. G. Cleverley. Suspension of flares, etc., from kite balloons. (133,115.)
16,040. S. C. Martin. Valve-operation indicators for rotary I.C. engines. (133,151.)
18,199. G. Ayling. Strut, spar, etc., construction. (133,205.)

APPLIED FOR IN 1919

Published October 30, 1919

6,678. J. D. Molesworth. Scenic railways for training of airmen, etc. (133,252.)
13,335. H. Middleton. Non-recoil guns for aerial warships, etc. (133,273.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xli, xlii, xliii, and xliv).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT
The Aircraft Engineer and Airships
36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates*:—

United Kingdom	s.	d.	Abroad*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 567 (No. 45, Vol. XI.) NOVEMBER 6, 1919 [Weekly. Price 6d. Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY W.C. 2.
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**
These rates are subject to any alteration found necessary under abnormal conditions

* *European subscriptions must be remitted in British currency.*

CONTENTS

Editorial Comment PAGE
"Our Future is in the Air" .. 1439
The Hun in tbe Air .. 1440
The R.A.F. as a Separate Service .. 1440
The Flying Services Fund .. 1442
Flight—and the Men: Sir Napier Shaw .. 1441
The Camera and the Plane .. 1443
The Flight to Australia .. 1444
Royal Aero Club: Official Notices .. 1450
The Bristol "Tourer" .. 1452
Airships 1453
Airisms 1457
In Parliament 1460
The Royal Air Force 1461
Company Doings 1464

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Nov. ...	Entrance Examination for R.A.F. College.
Nov. 7-15 ..	Olympia Motor Car Show.
Nov. 12 ...	"Some Physical and Psychical Effects of Altitude." Lecture by Dr. Chas. Atkin Swan before R.Ae.S.
Dec. 3 ...	"The Air Force." Lecture by Air-Commodore H. R. Brooke-Popham before R.U.S.I.
Dec. 19 to ... Jan. 4, 1920.	Paris Aero Show.
July, 1920	S.B.A.C. International Aero Exhibition at Olympia

EDITORIAL COMMENT

"Our Future is in the Air"

IN another column we publish certain extracts from the articles in the *Evening Standard*, written by Sir Percy Scott, which caused so much sensation a week or so ago. With those parts of Sir Percy's revelations relating to the neglect of gunnery in the Navy, and to our general want of naval preparedness at the outbreak of war, we have nothing to do here. They will doubtless be judged by history, if not now, and we can pass them by with the expression of opinion that if they are true—and we cannot doubt that they are—then the whole administrative system of the Royal Navy is utterly hopeless, and must be swept away, to give place to an organisation which knows its duty and will do it. During the War more than one highly-placed Naval officer was removed from his command for real or alleged incompetence, yet none of the Admiralty staff who were responsible for allowing us to go into the War with naval equipment far and away inferior to that possessed by the enemy has suffered in any way—except that some have been given the O.B.E.!

What we are very much concerned with are Sir Percy's views of the future and value of naval aviation. It is clear that in his opinion we are wasting money and deluding ourselves into a sense of false security by the building of capital ships costing anything up to eight millions a-piece. In this view he is in goodly company. Lord Fisher, in a letter to *The Times*, says: "It is as clear as daylight that future war at sea precludes the use of any vessel of war that can't go under water, because aircraft will compel it . . . . All you want is the present naval side of the Air Force—that's the future navy."

Now, here are two exceedingly eminent naval officers whose opinions coincide absolutely in the matter of future naval war. Lord Fisher is the one whose far-sighted brain grasped the certainties of the future, and, in face of the strongest opposition, succeeded in re-grouping the Fleet against the German menace. If others had had their way, the Navy would have been distributed as it was twenty years ago, and Germany's "chosen moment" would have resulted in a blow at our vitals from which it is more than possible we could not have recovered in time. It was he who anticipated the trend of design of the capital ship and got in first with the "Dreadnought" type of battleship, and thus gave us a two-years' lead of Germany in ship construction. Sir Percy Scott was the father of scientific gunnery in the Navy. It was he who was the first to realise that naval war was destined to undergo a complete change in character, and that the motto of the battle-winning fleet must be: "Gunnery, more gunnery and yet again gunnery." Invariably the ships he commanded headed the gunnery lists of the Navy. He introduced new methods of fire-control and gun-laying—methods which, as he has recorded, the hide-bound officials of the Admiralty would not adopt. It was he who was responsible for director firing, which has now been adopted by all the first-class fleets of the world.

It is worth while glancing thus briefly at the records of these two distinguished officers, because by so doing we are able to see that all their success has been the result of ability to assess the future. In all their prognostications of development it is possible to say that neither has been demonstrated to be wrong. Why, therefore, should they not be equally correct in their prophecies about the influence of aircraft on the naval wars of the future? Obviously, there is no reason at all. Yet in face of such opinions—which we cannot think are solely held by Lord Fisher and Sir Percy Scott—we are spending blindly and without enquiry large sums on the building of ships like the *Hood*—said to be costing about £8,000,000—which can be put out of action in an hour by aircraft and submarine attack. At the same time, we are scrapping as fast as we can the whole of the complex organisation of aerial defence built up during the War, and are putting nothing in its place. The airships are being sold to private concerns. The coastal seaplane stations are being closed down wholesale. Even the aeroplane establishment for working afloat with the Navy has been drastically reduced. Yet Lord Fisher and Sir Percy Scott tell us that air-power in the future is sea-power—and no-one in authority heeds them. We are not even taking the first steps to build up that adequate Flying Reserve of which we have written more than once.

It may be, of course, that both of these distinguished sailors are wrong. Doubtless, the Board of Admiralty will in due time assure the country that they are. But, surely, the right thing to be done is to enquire exhaustively and impartially into the tenability of the hypotheses they advance, and if it is held that they have allowed enthusiasm to run away with judgment—we do not think they have, but that is another matter—the country should be told so and why. We have had enough of the methods of red-tape, which sent our Fleet to fight the battle of Jutland without proper means of fire control, with guns that were outranged by those of the enemy, with shell that would not penetrate the armour of the German ships, and with searchlights hopelessly inferior to those of the Huns. These matters must no longer be left to be the playthings of permanent officials and of admirals who, while they may have done gallant service in the past, are a part of what is undoubtedly, so far as the senior ranks are concerned, the most conservative service in the world. We must have vision and breadth of outlook in these matters. We have never had these in the past and we have paid an enormous price in blood and treasure for our shortcomings. Let those in authority take heed to the warning.

◆ ◆ ◆

The Hun in the Air

Considerable alarm is being manifested in France at the belief that Germany is organising an elaborate and efficient system of commercial air transport, capable of being transformed at a moment's notice into a formidable weapon of war. The facts on which the apprehension is based seem to be that Germany is organising a complete network of commercial air routes, radiating from Berlin to numerous points on the frontier, and linking up all the chief ports. At the present stage of the development of flying such organisations can only be maintained by State subsidies, the aim of which in this case is clear. Then, it is estimated that Germany at the present moment owns no fewer than 20,000 aeroplanes, a number which would prove intensive manufacturing activity since the Armistice. An Airmen's Union has been formed, the effect of which will be to keep German aviators combined in an organisation admirably constituted for their instant mobilisation in case of war.

We can fully understand the alarm in France. The Hun cannot be trusted for a moment, and we have no shadow of doubt that if and when he thinks he has a fair chance of reversing the results of the Great War he will not hesitate for a moment, but will strike, hard and suddenly. There is only one thing that can be done. It seems to be fairly clear that we cannot forbid aerial development in Germany. After all, the War is over, and we are now at peace with the Hun—he is now numbered among the "friendly" nations. Aviation has an enormous commercial future, and we cannot expect to keep its development to ourselves and our Allies simply because aircraft can be converted at short notice into engines of war.

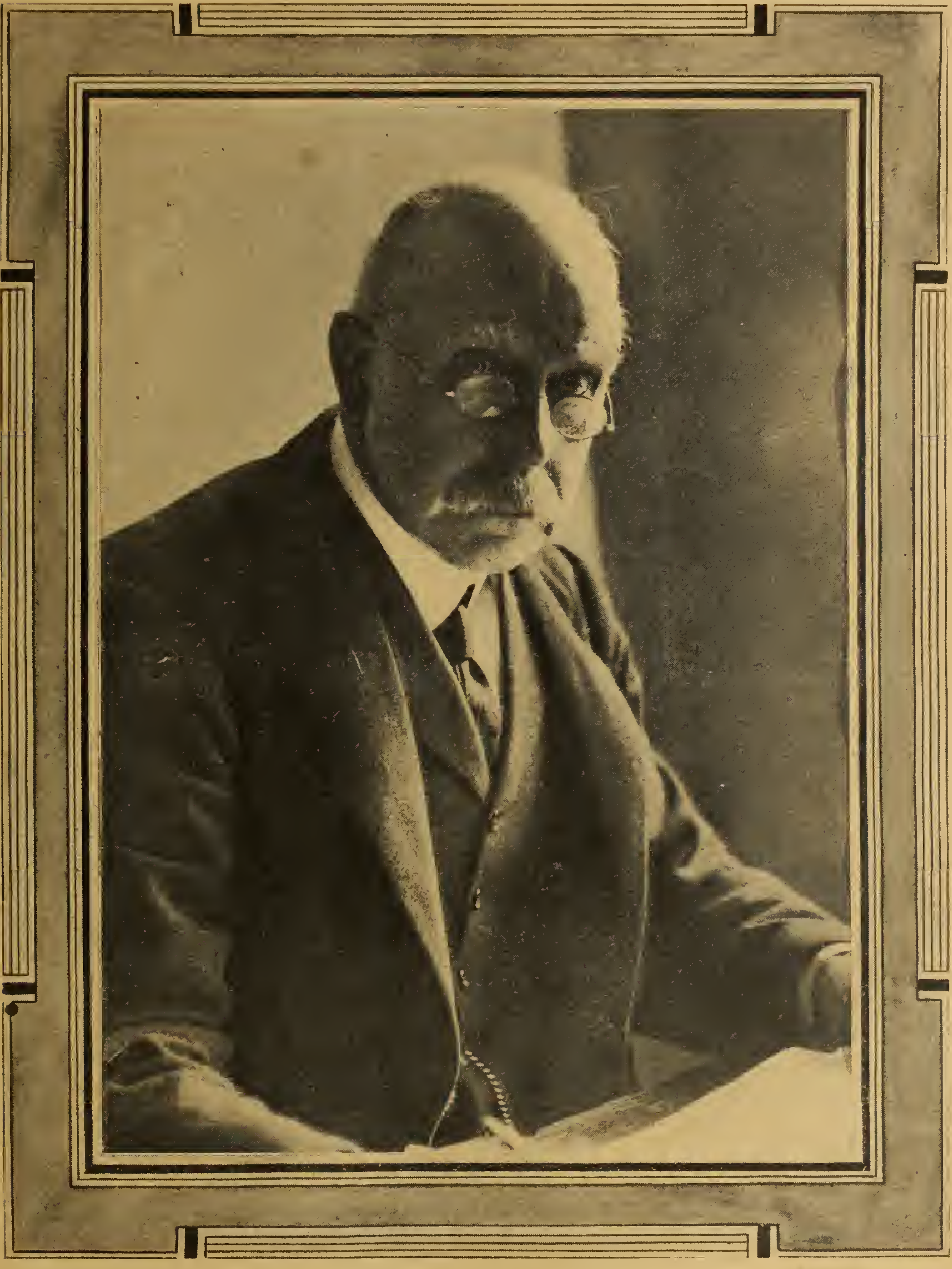
Germany must have her share in that development, and if she chooses to take it none can prevent her so doing. This is one of the risks that will have to be faced with our eyes open, and must be taken closely into account in fixing the measure of our own preparations against surprise. It is not a matter that concerns France alone. We are pledged by treaty to assist our Ally in case of unprovoked attack upon her, and, further, it is as certain as that night follows day that Germany would not dream of attacking France unless she were prepared at the same time to deliver a similar attack on ourselves. Undoubtedly, we shall have to prepare against surprise by taking similar counter-measures. If it be substantiated that Germany is in fact subsidising all these commercial services, we shall have to do something of the same sort. As a matter of fact, we ourselves have for some time been urging our own Government to give us a plain statement of aerial policy. As we have repeatedly pointed out, it is not necessary that we should maintain a huge and costly active Air Force which may never be used. What should be done is precisely what it is alleged the Germans are doing now. They are, it is said, organising comprehensive commercial services, ostensibly under private business auspices, but with the Government in the background to give a helping hand to development. They have inaugurated what they are pleased to call an Airmen's Union, which is in fact the same sort of Flying Reserve we have advocated as being the best type of organisation for ourselves. Whether our French Allies will respond to the menace—for it unquestionably is a menace—by taking similar measures we do not know. Nothing has transpired so far to lead us to think it is contemplated. But whatever is done by way of answer on the other side of the Channel, our own duty is clear. It is Britain that the Hun always has in mind when he sets about the task of aggressive organisation. It is Britain that is the arch-enemy, and we should be criminally foolish to think in any other terms. The Hun is unchanged and unchastened, and we may be certain that if we are so supine as to allow him to gain a preponderating lead in the air, he will not be slow to take advantage of the opportunity of gaining what he failed to obtain in the last War.

◆ ◆ ◆

The R.A.F. as a Separate Service

Last week, in dealing with the new organisation of the R.A.F. details attached to the Navy, we deduced that it had been absolutely and definitely decided that the rumoured intention of reverting to the old arrangement of dual Air Services

Flight—And the Men



"Flight" Copyright.

SIR NAPIER SHAW, M.A., Sc.D., F.R.S., F.R.A.S., Kt., Director of the Meteorological Office and head of the Meteorological Department of the Air Ministry was to be thrown overboard, and that the R.A.F. was to continue as a separate Service. For our own part, we have never had any real doubts about this. There has been a great deal of talk and rumour, and we know as a fact that a lot of intriguing has gone on behind the scenes, directed to once more cleaving the Air Service in twain and reverting it to the direct control of the Admiralty and the War Office. But after the experience of the War and the lessons it taught, and particularly regarding the view that is finding increasing acceptance among high military and naval authorities that the next war will be decided absolutely by air power, it is surely unthinkable that the Government could ever have seriously contemplated—even in the sacred name of economy—going back to the bad old organisation of two Air Services. Undoubtedly, the question of scrapping the Air Ministry, and with it the R.A.F. as a separate Service, has been recently discussed, but it is now definitely stated that the idea has been completely dropped, and that the R.A.F. is to continue along the lines of its present organisation. Although, as we have said, we never seriously believed that anything would come of the discussions, it is a relief to be assured that there is an end of them, and we trust most sincerely that they will never be revived again.

Now that the tongue of rumour has been stilled in the one direction, it has become busy in another. The latest report that is going the rounds is to the effect that Gen. Sykes is shortly to be appointed Air Minister, thus relieving Mr. Churchill, who combines that office with the Secretaryship for War. We are quite prepared for a change in the head of the Air Ministry, but we do not think for a moment there is anything in the specific rumour to which we allude. It is more than a little interesting, however, as indicating a particular trend of thought among the rumour-mongers. Gen. Sykes, it is well known, is at the head of the Department of Civil Aviation, and that his name should be coupled with the post of Secretary of State is significant of the importance which is beginning to be attached to the development of civil aviation. We trust the coincidence is of good omen, and that the Government is really determined—when it can spare time from the settlement of industrial unrest and the endeavour to reconstruct our finances—to outline a real policy for developing civil aviation.

◆ ◆ ◆

The Flying Services Fund

On another page we publish the text of an appeal by H.R.H. Prince Albert, himself an officer of the R.A.F., on behalf of the Flying Services Fund, which we feel sure will go straight to the hearts of our readers. The War is over, and, unfortunately, there seems to be a disposition abroad to cease giving to funds such as that which is the subject of appeal. People are apt to think, apparently, that with the conclusion of hostilities the necessity for supporting what they regard as purely war charities has ceased. This is not by any means the case. We still have some of the direst effects of war with us. As Prince Albert points out, the demands on the Fund now call for a monthly disbursement of £400 for grants and allowances, while in addition there are over 300 children of dependents of those killed in the service of the country to be educated. It is estimated that the necessities of the Fund will continue for at least another ten years. Therefore, it is evident that a large measure of support will have to be forthcoming if the Fund is to continue its good work. The appeal made by Prince Albert will not, we are sure, fall on deaf ears.

◆ ◆ ◆ ◆

General Sykes to Visit Canada and America

MAJOR-GENERAL SIR F. H. SYKES, Controller-General of Civil Aviation, has arranged to visit Canada, the United States, and, if possible, Newfoundland. He expects to leave England in a few days.

The visit has been in contemplation for some time, but it had to be postponed until recently on account of the pressure of business relating to civil aviation and the organisation of the Department. Even now it will not be possible for Gen. Sykes to make anything but a relatively short stay in America and the Dominion. Gen. Sykes's mission relates to the development of international civil flying.

Aerial Lighthouse at Hounslow

THE following "Notice to Airmen" has been issued by the Air Ministry:—

"Hounslow aerodrome is temporarily equipped for night flying. Each evening for a period at sunset a lighthouse in the aerodrome will give three flashes every ten seconds in the following order: Flash, one second; eclipse, one second; flash, one second; eclipse, one second; flash, one second; eclipse, five seconds. Ground searchlights and landing flares will also be displayed.

"These lights will be provided at any time during the night, if notification is made to Hounslow that machines intend to land, or if a machine is heard in the air. These arrangements are subject to alteration of which due notification will be given."

An R.A.F. Officers' Selection Board

THE Air Ministry announces that a Selection Board has been formed in order to advise the Air Council as to the award of promotions to post-War R.A.F. officers, and to decide the procedure to be followed in future for the periodical selection of officers for promotion. The following are the members of the first Board:—Air Marshal Sir H. M. Trenchard, Bart., K.C.B., D.S.O.; Rear-Admiral C. F. Lambert; Air Vice-Marshal Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O.; Air Vice-Marshal A. V. Vyvyan, C.B., D.S.O.; Secretary, Squadron-Leader H. L. Jackson.

Telegraphic Address of Civil Aviation Department

IT is notified by the Air Ministry that the telegraphic address of the Civil Aviation Department, Air Ministry, is now:—"Aircivil, Airministry, London." The telegraphic address "Civiatory, Estrand, London" has been cancelled.

Air Work in Russia

FROM the scanty details which are to hand, it appears that the R.A.F. detachment carried in H.M.S. *Vindictive* in the Baltic is rendering good service under adverse conditions. A Red destroyer was bombed on October 30, and four bombs were dropped on the Putiloff Works by an aeroplane which flew over Petrograd. Aerial photographs of Krasnaya Gorka show that the westernmost 6-in. battery has been severely dealt with by our bombs, but the anti-aircraft defence is now stronger and more accurate. It is reported that on October 26, one of our seaplanes was shot down off Kronstadt. A fast British motor-boat went to its succour, but arrived too late, the 'plane having been towed off by the Bolshevists. The R.A.F. detachment is under the command of Major Donald and Capt. Grace.

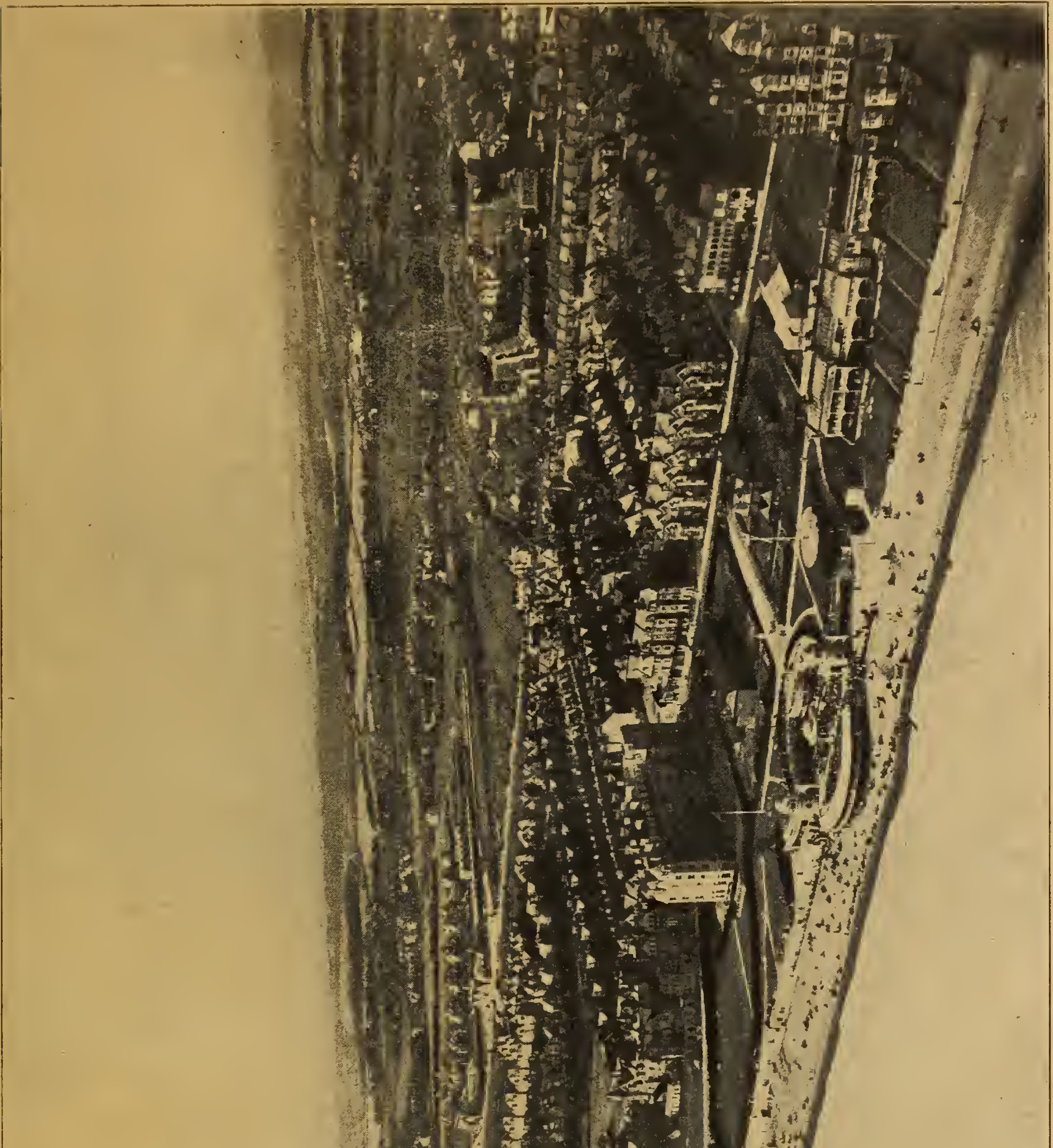
U.S. Air Service

A STRONG plea for a separate Air Service for the United States was made on October 27 by Senator Wadsworth, Chairman of the Military Affairs Committee of the Senate, and he also protested against the refusal of an appropriation of £3,000,000 demanded for military aeronautics. He asserted that since the Armistice aviation in the United States had fallen to a shameful position, behind France and England, both of which countries had recognised the commercial value of aviation.

The Service Estimates

IN the White papers published last week giving the revised estimates, the R.A.F. is the only Service to show a reduction. The estimate in the Budget of £66,500,000 is reduced to £57,500,000, due to the transfer of expenditure on winding up aircraft contracts to the Vote for the Ministry of Munitions. Provision is made for increased pay of the Air Force (£100,000).

The Camera and the 'Plane



Bexhill-on-Sea from an Avro seaplane

"Flight" Copyright

THE FLIGHT TO AUSTRALIA

In connection with the flight to Australia, for which the Australian Government has offered a prize of £10,000, events now appear to indicate that this competition may almost amount to a race. The Sopwith machine entered for this flight left Hounslow some time ago, and was, as recorded in Flight at the time, obliged to descend near Cologne. Some speculation as to the reasons for landing there has been occupying the minds of many interested in the flight. We are informed that the machine and engine are both quite all right, and that what caused the descent was exceptionally bad weather. The machine left Hounslow in reasonably good weather, but after crossing into France fogs were encountered and it was only occasionally that Capt. Matthews caught a glimpse of the ground. One of these showed him that he was over Ypres, and he had some trouble in finding Marquise aerodrome. However, this he ultimately succeeded in doing, and spent the night there. He left Marquise next morning, again meeting with very bad weather. Through a rift in the clouds he discovered a town below and decided to come down to enquire. After cruising about for nearly an hour he found a landing ground, and discovered that he was at Cologne. Apparently a very strong wind had upset all his calculations, and as he could not see the ground he had no means of ascertaining his actual drift. Continuous bad weather kept the "Wallaby" at Cologne until November 2, when a start was made. Even then, it was only possible to get on to Mayence.

In addition to the Sopwith "Wallaby" three other machines are now all but ready for the attempt, and are mainly waiting for an improvement in the weather before making a start. These are: A Martinsyde, an Alliance, and a Vickers-Vimy. As all the machines must start from Hounslow it would appear that the arrival of better weather will mean the start of all three machines more or less together, and an exciting race may therefore be looked to.

The Alliance Machine

The machine entered by the Alliance Aeroplane Co., Ltd., is, generally speaking, similar to the "Seabird" which flew from London to Madrid. It is a tractor biplane with totally enclosed *fuselage*. The pilot occupies the rear of the cabin, control being by means of hand wheel and foot bar. Windows in the side allow of looking out laterally and to a certain extent at an angle forward. A triangular opening in the side, level with the pilot's head permits him, if desired, to put his head outside, when he can see fairly well in a forward direction. The engine fitted in this machine is a Napier Lion of 450 h.p. As will be seen from the accompanying photograph, the engine is totally covered in, only the exhaust pipes projecting, and the forward corner of the outer banks of cylinders. The fuel tanks, which have a capacity of about 500 gallons of petrol, are mounted inside the body, in front of the cabin. The machine has a maximum speed of about 135 m.p.h.

Lieut. Roger Douglas, who will pilot the machine, was born in Queensland, and enlisted in the A.I.F. at the outbreak of War. He was at the landing on Gallipoli with the Australian Machine Gun Battalion; from there he went to Egypt, and ultimately arrived in France with the first contingent of the A.I.F. He was Sergt. in those days, and for bravery in the face of the enemy at Pozieres in 1916, was awarded the D.C.M., afterwards receiving his Commission on the Field. He gained a further decoration, viz., the M.C., at Polygon Wood in September, 1917. Having thoroughly proved himself on land, Lieut. Douglas sought fresh fields to conquer and joined the Australian Flying Corps. After doing good work in France, he was selected as instructor of

Photo. by Birkett.

THE FLIGHT TO AUSTRALIA: Lieut. Roger Douglas, M.C., D.C.M., who will pilot the Alliance machine, and his navigator, Lieut. J. S. L. Ross, of the Australian Flying Corps.

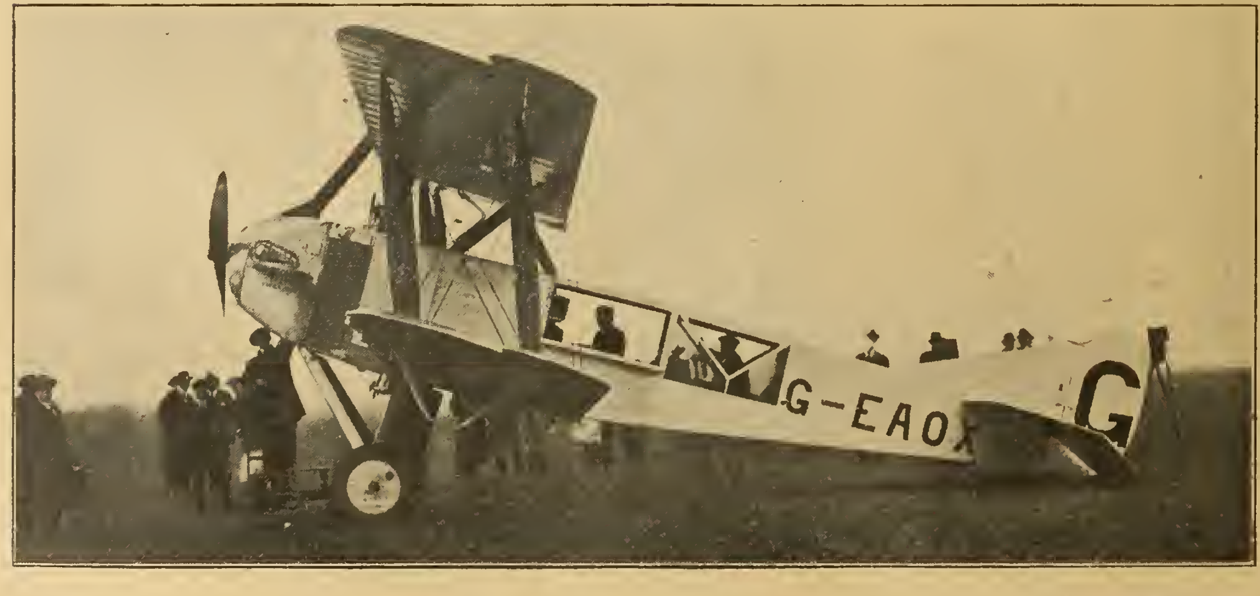


Photo. by Birkett.

THE FLIGHT TO AUSTRALIA: Side view of the Alliance machine, 450 h.p. Napier Lion engine

a Scout section of S.E. 5's; he underwent a course of navigation at Andover, so besides being an experienced pilot he is also a capable navigator.

Lieut. Ross, who will be the navigator of the machine, has also had considerable flying experience. He joined up early in the War as a Wireless operator, and received his commission and pilot's wings in October, 1916. He served continuously with the A.F.C. in France until September, 1918, when he was wounded in aerial combat whilst in charge of a squadron of S.E. 5's. He has also had considerable training in navigation, and both men have been working together since the Armistice.

Lieut. Douglas first conceived the idea of flying home in 1916, and immediately the Armistice was declared, he set out to obtain a machine capable of long distance flying. He has now had some weeks' experience in flying an Alliance aeroplane fitted with a 450 h.p. Napier aero engine, and is confident that he could not have secured a better machine for this flight. It is particularly steady in the air, has ample reserve of power, and the engine, with many remarkable performances to its credit, is firmly expected to do all that is asked of it. Every point has been considered in the preparations for this flight, even to such small items as painting the wings and struts green, so that they will be restful to the eyes on a long trip. It is intended to carry sufficient food to last five days.

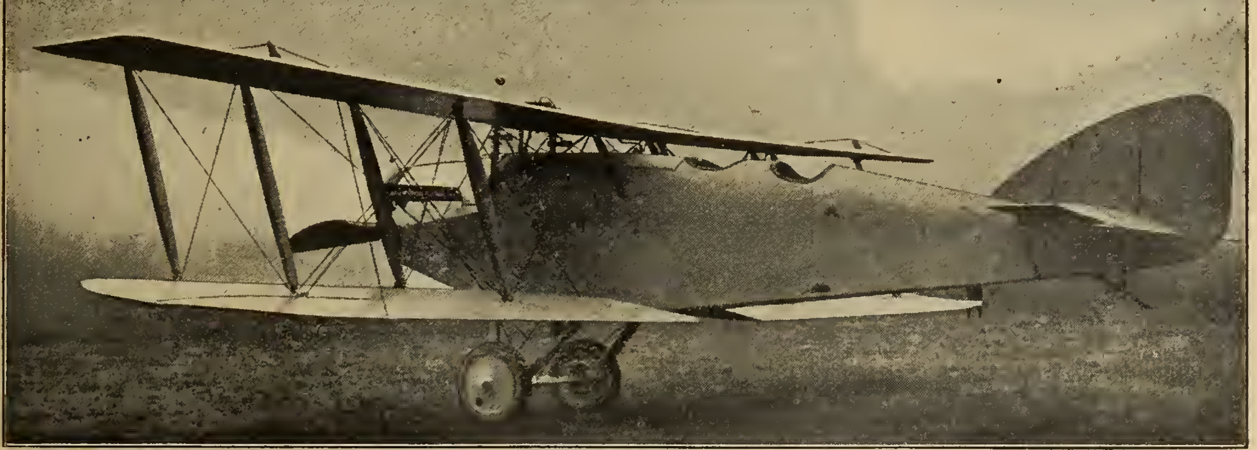
The Martinsyde Machine

With the exception of a few alterations in the seating arrangement, the machine entered by Messrs. Martinsyde, Ltd., of Woking, is similar to the standard Martinsyde Commercial Type "A 1." It is fitted with a Rolls-Royce Falcon III engine, of 275 h.p. Like all Martinsyde aeroplanes this machine is of extremely pleasing outline, as will be seen from the accompanying illustrations.

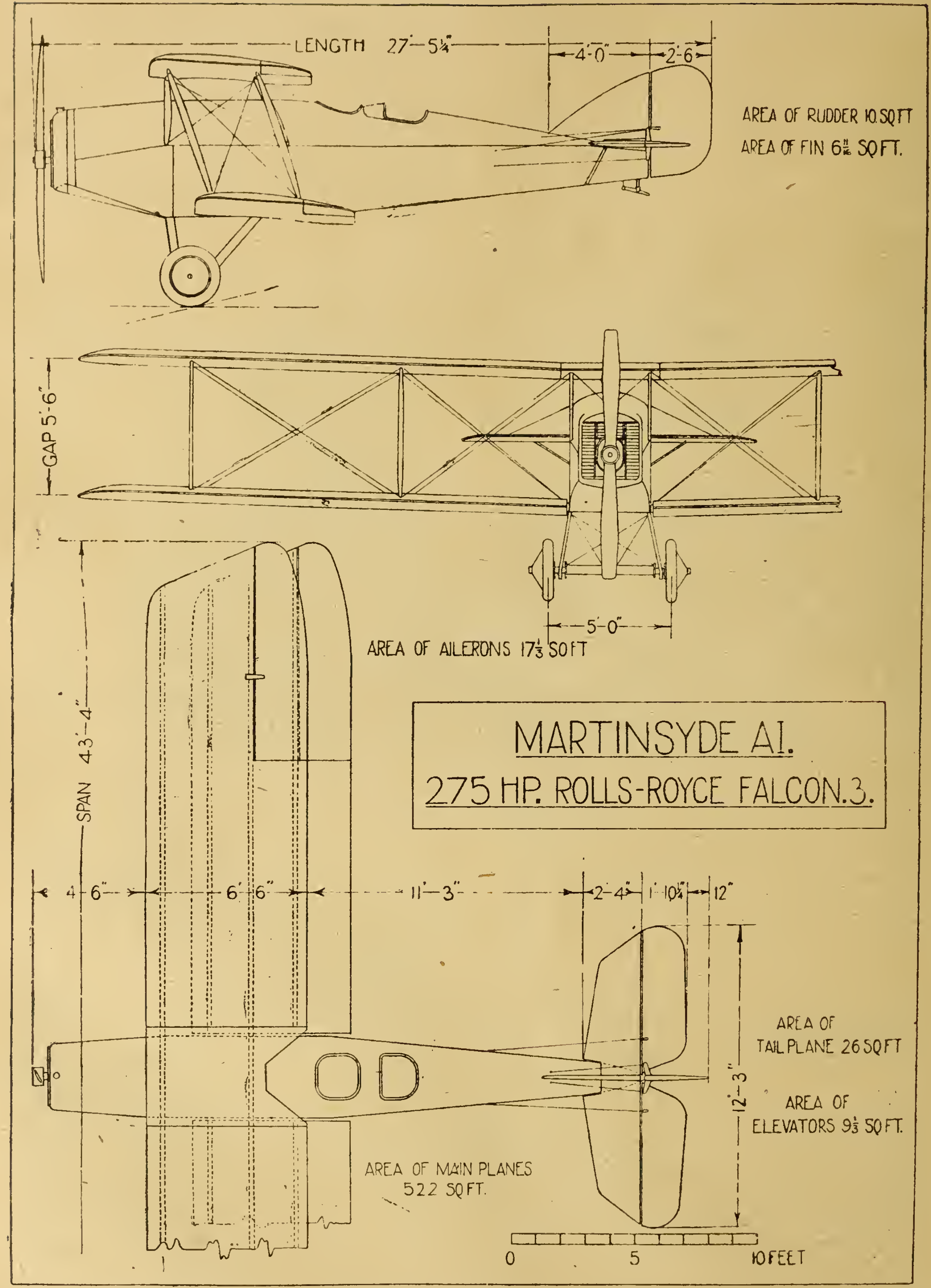
On the present venture, in addition to Capt. Howell and his mechanic, the machine will carry fuel for 10 hours—giving it a range of about 1,000 miles—spare parts for engine and machine, tool kits, etc.; a total weight of about 1,000 lbs. With this load the machine's most economical cruising speed is 100 m.p.h. Capt. Howell will use the land route so far as Calcutta, where he will fit floats and use the sea route from there onwards. These floats are interchangeable with the standard land under carriage, and do not entail any alteration or adjustment to the machine, the same fittings being used for both types of undercarriage.

On test these floats behaved exceedingly well, the machine rising off the water quickly and showing no tendency to

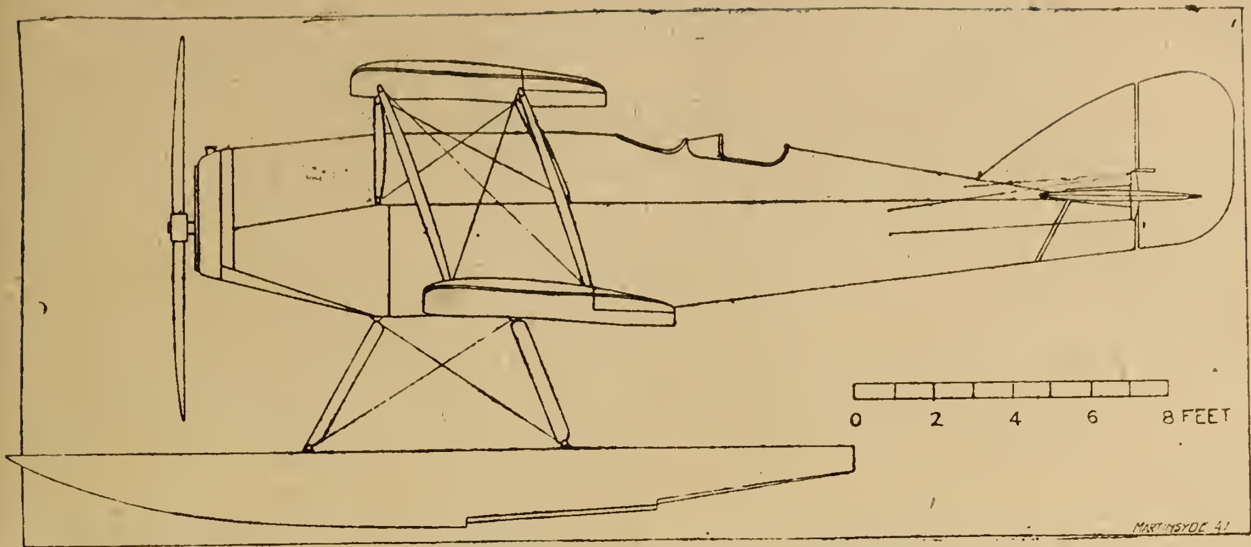
THE FLIGHT TO AUSTRALIA : On the left the pilot-navigator of the Martinsyde machine, Capt. Howell, D.S.O., D.F.C., M.C. ; and on the right, his engineer, Corpl. George Henry Fraser



THE MARTINSYDE MACHINE ENTERED FOR THE FLIGHT TO AUSTRALIA : Three-quarter rear view


LENGTH 27'-5¼"
4'-0"
2'-6"
AREA OF RUDDER 10 SQ FT
AREA OF FIN 6 11/16 SQ FT.
GAP 5'-6"
5'-0"
AREA OF AILERONS 17⅓ SQ FT
SPAN 43'-4"
MARTINSYDE A1.
275 HP. ROLLS-ROYCE FALCON.3.
4'-6"
6'-6"
11'-3"
2'-4"
1'-10¼"
12"
12'-3"
AREA OF TAIL PLANE 26 SQ FT
AREA OF ELEVATORS 9⅓ SQ FT.
AREA OF MAIN PLANES 522 SQ FT.
0
5
10 FEET

THE MARTINSYDE MACHINE ENTERED FOR THE ENGLAND-AUSTRALIA FLIGHT : Plan, side and front elevations to scale



THE FLIGHT TO AUSTRALIA : Side elevation of the Martinsyde machine fitted with floats for the last stages of the journey

porpoise ; nor did the floats affect the handling of the machine in the air. The floats add about 400 lbs. to the weight of the machine, but no difficulty is experienced in carrying the full load.

Capt. Howell thinks the sea route from Calcutta onwards solves the difficulties of bad flying country and the complete lack of landing grounds, prepared or otherwise.

The Vicker's Machine

The machine entered by Messrs. Vickers, Ltd., is a standard Vickers-Vimy-Rolls bomber, which will be piloted by Capt. Ross Smith, M.C., D.F.C., A.F.C., and by his brother, Lieut. Keith Macpherson Smith. The machine is identical to those supplied to the Royal Air Force. It will be remembered that one of these machines was earmarked for the bombing of Berlin just previous to the Armistice. It is also similar to the machine used by Capt. Sir John Alcock, K.B.E., D.S.C., for his Transatlantic flight, except that for this flight a smaller petrol capacity is required. The engines used are the Rolls-Royce "Eagle," Mark VIII. The petrol is drawn from the main petrol tanks by two Vickers Mark II centrifugal petrol pumps, and delivered to the service tank, which forms a section of the top plane, from which it runs by gravity to the engines.

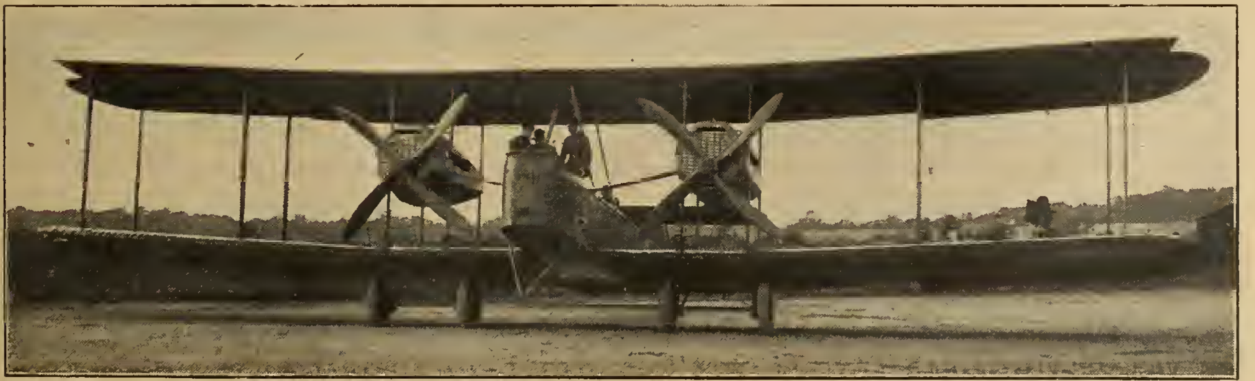
The maximum speed is over 100 m.p.h., but Capt. Ross Smith intends to throttle the engines down to a cruising speed of about 90 m.p.h. The weight of the machine empty is three tons ; when carrying her full load on this flight, consisting of 4 men, 516 gallons of petrol, 40 gallons of oil and 10 gallons of water, together with spares, kit, tools and sundries (adding another 800 lbs.), the total weight fully loaded will be nearly 5½ tons.

Capt. R. Smith and his brother, Lieut. K. M. Smith, were both born and educated at Adelaide, South Australia. At the outbreak of War, Capt. Ross Smith enlisted in the 3rd Australian Light Horse Regiment as a private, and sailed with the first Australian Expeditionary Force, landing in Egypt in December, 1914. After four months on Gallipoli he gained his commission, but later on contracted enteric fever and was invalided to England. He rejoined his regiment in March, 1916, was afterwards sent back to the Sinai Desert, and took part in the battle of Romani during the last Turkish attack on the Suez Canal in August, 1916. In October of the same year he joined the 67th (Australian) Squadron, Royal Flying Corps, as an observer, qualifying as a pilot in Egypt in July, 1917. He then rejoined his old squadron, now known as No. 1 Squadron, Australian Flying Corps, stationed in Southern Palestine, and remained there until the Armistice.

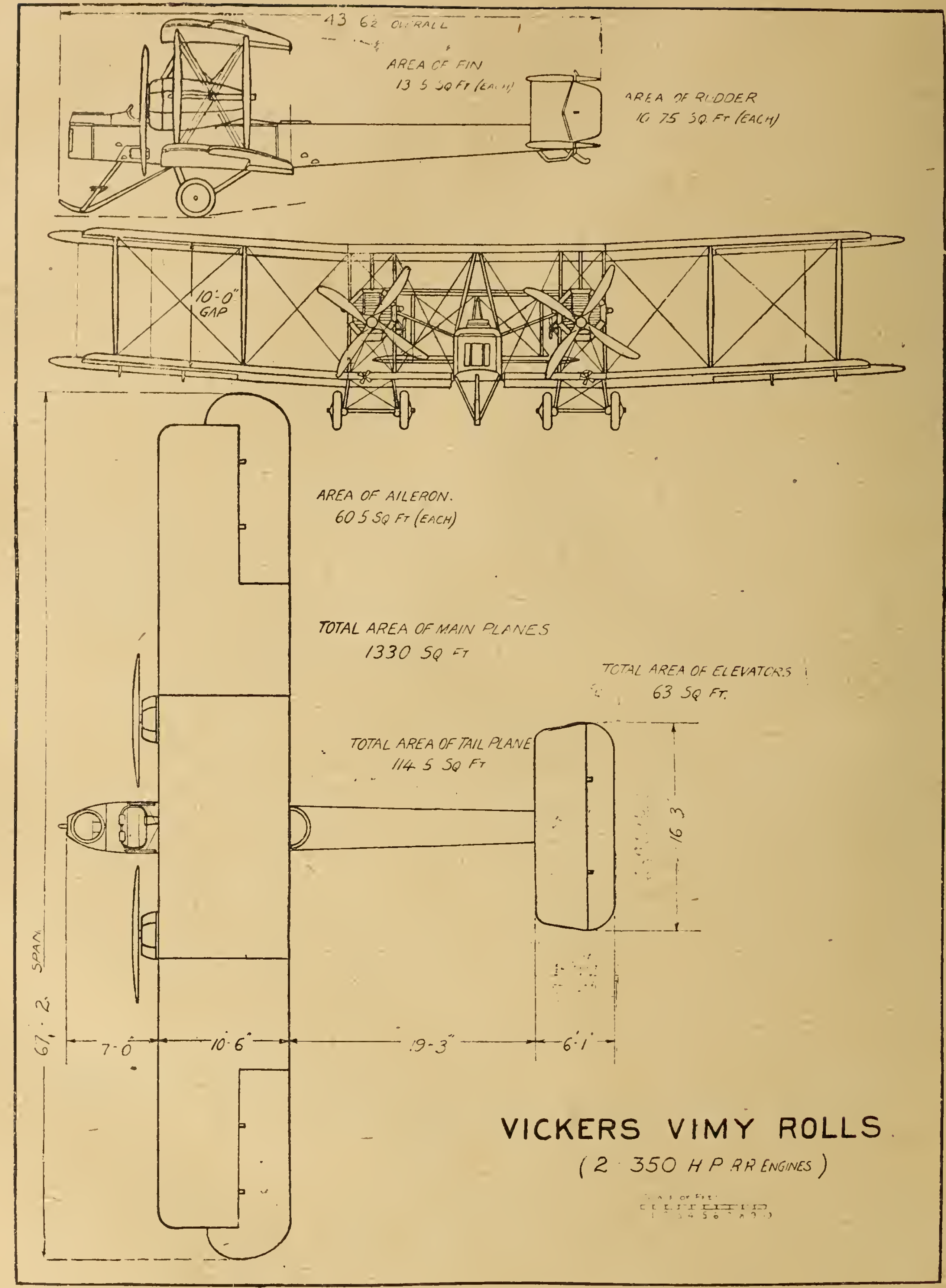
In December, 1918, he accompanied Air Vice-Marshal Sir W. G. H. Salmond, K.C.M.G., C.B., D.S.O., and Air Commodore A. E. Borton, C.M.G., D.S.O., A.F.C., on the first flight from Cairo to Calcutta, and after arriving at Calcutta, proceeded with Air Commodore A. E. Borton on his reconnaissance for aerodromes in Burma, Siam, Malay States and the Netherland East Indies. He returned to England about a month ago.

His brother, Lieut. Keith Macpherson Smith, R.A.F., will act as reserve pilot and observer. After leaving school, Lieut. K. M. Smith joined the staff of Messrs. Elder, Smith & Co., Ltd., of Adelaide, and on the outbreak of War offered his services for Overseas with the Australian Imperial Force, but was rejected. Several renewed attempts to enlist in 1915 and 1916 met with the same result, but subsequently he underwent an operation which considerably improved his health, and afterwards proceeded to England by the P. & O. steamship *Medina*, which was torpedoed and sunk in the English Channel during the voyage.

On arrival in England he joined the Royal Flying Corps as a cadet, shortly after becoming a pilot of unusual ability,



THE FLIGHT TO AUSTRALIA : The Vickers-Vimy-Rolls entered for the flight to Australia



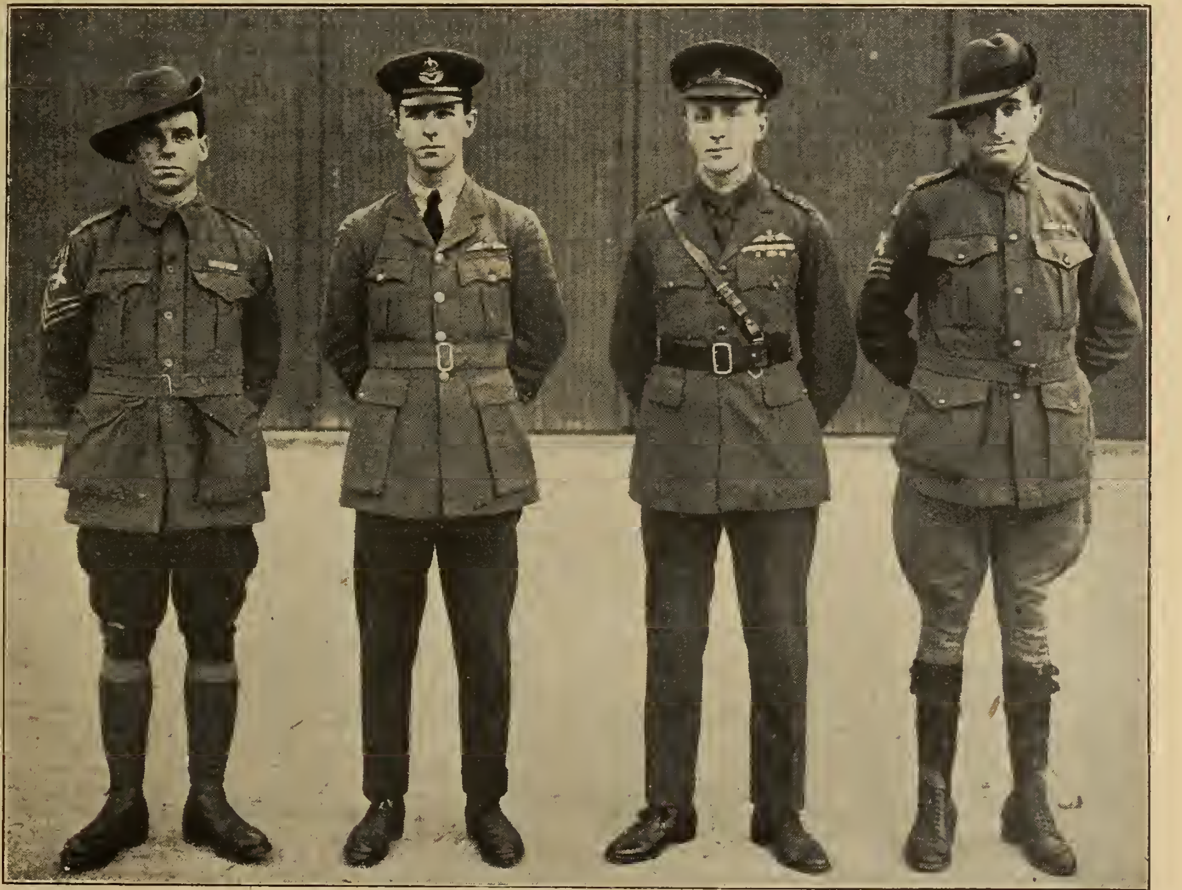
THE VICKERS-VIMY-ROLLS ENTERED FOR THE FLIGHT TO AUSTRALIA: Plan, side and front elevations, to scale

The Flight to Australia: Going over all the details of the Vickers-Vimy to see that all is in order

and was serving as an instructor in the North of England until the Armistice.

Capt. Ross Smith and his brother will be accompanied by Sergt. J. W. Bennett, A.F.M., M.S.M., and Sergt. W. H. Shiers, A.F.M., who will act as engineers.

Sergt. W. H. Shiers was also born and educated at Adelaide, and spent his early life on a farm. Later on he went to Broken Hill, New South Wales, and worked at the North Mine as an electrical engineer. He was a student at the Technical College at Broken Hill, studying engineering and mechanics in his spare time, and seven years afterwards proceeded to Barren Jack Irrigation Scheme in New South Wales as an electrician for the Yanks-Leeton area in connection with Government contracts. In March, 1915, he enlisted in the 4th Divisional Artillery at Sydney, and was sent to Egypt, where he transferred to the 1st Australian Light Horse Regiment. He took part in the battle of Romani, and in October, 1916, was posted to the 67th (Australian) Squadron, Royal Flying Corps, as a mechanic. He rapidly gained promotion, and owing to his ability and



THE FLIGHT TO AUSTRALIA: The Vickers crew. Reading from left to right: Sergt. W. H. Shiers, A.F.M., Lieut. K. M. Smith, R.A.F., Capt. Ross Smith, M.C., D.F.C., A.F.C., and Sergt. J. M. Bennett, M.S.M., A.F.M.

resourcefulness he was on many occasions sent out in the Desert to bring in crashed or damaged machines, which was at times a most difficult and arduous task. He has handled almost every type of engine, and for the last 12 months of the War was working on Rolls-Royce engines.

Sergt. J. W. Bennett was born at St. Kilda, Melbourne, in 1892, and spent 14 years of his early life at Hawthorn, Melbourne, where he received a public school education, and attended night technical classes. He took great interest in all things connected with the early progress of the internal combustion engine, both for car and aviation use, received a thorough and early training with Salway motor engineers, and was employed for a considerable time with other prominent motor firms in Australia. At the outbreak of war in 1914, he was on the mechanical staff of Messrs. Denny Lascells, Motor Department, Melbourne, but enlisted in the Mechanical Transport, Australian Imperial Forces, sailing as a 1st Class Air Mechanic in No. 1 Squadron, Australian Flying Corps, with which he served in Egypt and Palestine until the Armistice.

On account of the excellent records of these two sergeants, they were specially selected to accompany Air Vice-Marshal Sir W. G. H. Salmond, K.C.M.G., C.B., D.S.O., Air Commodore A. E. Borton, C.M.G., D.S.O., A.F.C., and Capt. Ross Smith, M.C., D.F.C., A.F.C., on the first Cairo to Calcutta flight, and Air Vice-Marshal Sir W. G. H. Salmond stated in India that the success of the flight was largely due to their skill and knowledge. They were subsequently awarded the Air Force medal for their work in connection with this flight, and accompanied Air Commodore A. E. Borton and Capt. Ross Smith on their reconnaissance for aerodromes in Burma, Siam, Malay States and Netherland East Indies. On returning to India, they both served with the North-West Frontier Forces in the late Afghan War.

◆ ◆ ◆ ◆

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE FLYING SERVICES FUND.

(*Chairman*: H.R.H. Prince Albert, K.G.)

I am appealing for further Subscriptions to the Flying Services Fund, which is administered by the Royal Aero Club.

This Fund was established by the Club in 1914 for the benefit of Officers and men of the R.N.A.S. and R.F.C. (now the R.A.F.) who were incapacitated on active service, and for the widows and dependents of those who were killed.

The expenses of administration are borne by the Royal Aero Club, and all Subscriptions are devoted entirely to those requiring relief.

The Subscriptions received amount to £15,000 and the sums which have been expended to date in grants, allowances and the education of children amount to £6,000. The monthly liability for grants, allowances, etc., is about £400, and the education of over 300 children of dependents calls for an increasing expenditure commensurate with their ages. The Committee are most anxious to ensure a proper education for the children of all dependents, and it is mainly for this purpose that further Subscriptions are required.

It is estimated that the necessities of the Fund will require it to be administered for at least ten years, and in view of the very real assistance we have been enabled to give to so many deserving and distressing cases, I appeal to all to subscribe liberally to this Fund.

Subscriptions should be forwarded to Lord Kinnaird, K.T., Honorary Treasurer, Flying Services Fund, Barclays Bank, Ltd., 4, Pall Mall East, London, S.W. 1, or to me at the Royal Aero Club, 3, Clifford Street, London, W. 1.

Albert,
Chairman.

Golf Meeting

Addington Golf Course, near Croydon, Tuesday, November 18, 1919, commencing at 9.30 a.m.

Morning Round.—18 holes, under handicap medal round.

1st prize, value £10, presented by Lieut.-Col. F. K. McClean and Lieut.-Col. J. T. C. Moore-Brabazon, M.P.

2nd prize, value £5, presented by Mr. E. W. Touboul.

Afternoon Round.—18 holes under handicap. Bogey.

1st prize, value £10, presented by Mr. Stanley May.

2nd prize, value £5, presented by Lieut.-Col. Charles Jarrott.

Handicap limited to 18.

Entries close Thursday, November 13, 1919, at 6 p.m. No entrance fee.

Members wishing to compete are to forward their names to the Secretary giving name of golf club and handicap.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

AVIATION AND THE WORLD'S FUTURE DOMINATION

In the *Evening Standard* a summary of Admiral Sir Percy Scott's book "Fifty Years in the Royal Navy" has recently appeared. As in the case of submarines and director-firing, Sir Percy has proved his correctness of vision years before the event. He takes an equally strong stand over the future dominating power of aircraft by its strength ensuring the World's Peace. Here is what he says upon the subject, as it appeared in the *Evening Standard*. In our leaders we further refer to this subject:—

The War Office, writes Sir Percy, in narrating his work on the London air defences, was as certain that a Zeppelin could not come to London as the Admiralty was that a submarine could not sink a ship.

On September 8, 1915, a Zeppelin really came over London. Although throughout my career in the Navy I had been specially interested in gunnery matters, I confess that I was surprised when, three days later, I received a letter from Mr. Balfour, who was then at the head of the Admiralty, asking me if I would take over the gunnery defence of London, as a temporary measure, since in due course the War Office would assume control of the work.

I accepted the appointment, and had a look round the so-called defences. After fourteen months of war they consisted of:—

Eight 3-inch high-angle guns,
Four 6-pounders with bad gun sights, and
Six pom-poms and some Maxims, which would not fire up as high as a Zeppelin, and were consequently only a danger to the population.

The ammunition supplied to the guns was quite unsuitable, and was more dangerous to the people in London than to the Zeppelins above.

In selecting the ammunition to fire at Zeppelins the authorities should have known: first, that a shell with a large bursting charge of a highly explosive nature was required, so that it would damage a Zeppelin if it exploded near it; second, that all that went up in the air had to come down again, and that, in order to minimise the danger to the public from falling pieces, an explosive should be used in the shell which would break it up into small fragments.

The ammunition supplied was exactly the opposite to what we wanted. The shells had so small a bursting charge that they could do no harm to a Zeppelin, and they returned to earth almost as intact as when they were put into the guns.

Serious as this state of affairs was, it was no reflection upon my predecessor. In getting what he did he had done wonders, for he received the minimum of support, and had to contend against the maximum amount of apathy, red-tapism, and opposition on the part of the authorities.

Gen. Galliene, who was in charge of the defence of Paris, had for the protection of his 49 square miles of city 215 guns, and was gradually increasing this number to 300. He had plenty of men trained in night-flying, and well-lighted-up aerodromes.

I had eight guns to defend our 700 square miles of the metropolitan area, no trained airmen, and no lighted-up aerodromes.

This was the state of affairs when the Admiralty handed the blunder over to me. To cheer me up they informed me that they could not give me any more guns at once, and that, although they had been experimenting for ten years, they had no time-fuse suitable for exploding high-explosive shell.

The only guns they had mounted on mobile mountings were Maxims, which were of no use against Zeppelins; they had no airmen who could fly at night, and if they had had them they would have been of no use, as there was no ammunition suitable for attacking Zeppelins.

The first thing was to find a satisfactory fuse. The Admiralty said that they had been ten years trying to get one and had not succeeded. One of my staff, Comdr. Rawlinson, C.M.G., D.S.O., solved the difficulty in ten minutes. The next thing was to get a design of high explosive shell which could be quickly manufactured.

The next thing was to get more guns. I knew that the Navy had some they could spare and which could be converted into anti-Zeppelin guns. I applied to the Admiralty for these guns, and promptly got a very big "NO."

I had anticipated this reply by writing to Sir John Jellicoe, the Commander-in-Chief of the Grand Fleet, and asking him for them. He promptly wired back that I could have twenty.

We extracted out of the Admiralty with difficulty another fourteen guns; Lord Kitchener very promptly gave me some; and with others that we picked up I found that in a very short time we had increased our number of guns from 12 to 118. But, unfortunately, mountings had to be made for these, which took a considerable time.

The few guns we had for the defence of London were mounted permanently in positions probably as well known to the Germans as to ourselves. We had no efficient guns mounted on mobile carriages which could be moved about and brought into action where necessary.

The French, I knew, had some of their splendid 75 mm. guns mounted on automobile carriages. I suggested to the Admiralty that they should ask the French Government either to supply or loan me one to copy. This they agreed to see about, and I have no doubt that in a few months they would have got the necessary papers through.

I was determined not to work their way. I wanted the guns, not papers, so I ordered Comdr. Rawlinson, a very clever officer, who spoke French like a Frenchman, to go over to Paris at once, and either beg, borrow, or steal a gun.

I told him he was to have it on the Horse Guards Parade, under Mr. Balfour's window, in less than a week. He was in a motor-car at the time. Looking at his watch, he said, "I can catch the boat. Please wire Folkestone to ship me and the car over to France."

Thus he left, going at about 50 miles an hour down South Audley Street. That is the sort of officer that is wanted in war-time! Twenty-four hours after leaving me he wired: "Have got gun, two automobiles, and ammunition."

Owing to the promptitude of Comdr. Rawlinson, we had this gun on the Horse Guards Parade under Mr. Balfour's window, before the official letter asking for it was written.

Although this was only one gun, its acquisition was very valuable, as it showed us what could be done, and how to do it. The rapidity of the French decision ought to have taught our deliberate Admiralty a lesson, but it did not; nothing could put any life into their movements.

With the French gun as a guide, we very soon mounted up eight of our own three-pounders on motor lorries, which gave a start to the mobile section of our defence.

Although the Admiralty did not give me any assistance as regards the defence of London, they wanted me to comply with their slow and unsatisfactory routine. But we were at war. Had I submitted it would have taken me fifteen months to get twelve guns, whereas I was aiming at getting 150 guns in six months. So I did not agree, and wrote to Mr. Balfour.

Mr. Balfour kindly arranged that my work should not be hampered by the ordinary Admiralty red-tapeism, so I was able to go ahead, and the defence of London, as far as guns were concerned, advanced rapidly. But not rapidly enough, so I went over to France to see if the French would help me again.

When I told Gen. Galliene the number of guns we had, he laughed and expressed surprise that the Zeppelins did not come every day.

He was a splendid officer, and promptitude itself. Five minutes' conversation, and it was decided that I should have 34 of the famous French 75 mm. guns and 20,000 shells, with fuses complete.

This brought our total up to 152. They were rather a mixed lot—*Mr. Asquith referred to them as rather a menagerie*—but I went on the principle that any guns were better than no guns.

On November 27 I received a letter from Mr. Balfour in which he told me that the long-drawn negotiations for the transfer of the defence of London against aircraft to the War Office were coming to an end.

I was proud to have been associated with the Anti-Aircraft Corps. It was a voluntary *corps d'élite*, composed of university men, barristers, artists, and City men. They were men of brains, who, moved by patriotic motives, put on the uniform of petty officer or able seamen and submitted in splendid spirit to the necessary conditions of service.

At noon on February 16, 1916, the War Office took over the gunnery defence of London, and consequently I was no longer responsible for it. I had commanded it for five months and six days. As my scheme of defence was not complete, it seemed a pity that new people with new ideas should take it over, but we did many peculiar things during the War.

The Future Navy

Some officers say that the battleship is more alive than ever; others declare that the battleship is dead. I considered that the battleship was dead before the Great War and I think her more dead now, if that is possible. The battleship of today costs roughly £8,000,000; she carries about 1,000 shells, containing about 100,000 lbs. of high explosive; her effective range is, say, fifteen miles; she is vulnerable to aircraft with bombs and aerial torpedoes, and to submarines, the latter carrying possibly a 15 in. or 18 in. gun, and the ordinary automobile torpedo is still in process of development, and may in future carry a ton of high explosive, which would probably sink any battleship.

For £8,000,000 we could build many aeroplane-carrying ships, equipped with aeroplanes carrying over 100,000 lbs. of high explosive. If these aeroplanes carried fuel sufficient for five hours, their range would be about 150 miles out and 150 miles home.

In the battleship we put all our eggs into one basket. In peace time the aeroplane-carrying ships could be used as passenger ships, and the aeroplanes for carrying passengers instead of bombs.

Then there is the relative cost of upkeep to be considered. The single battleship would require in peace time about—

	Pay. £
40 officers	8,000
800 men	60,000
Provisions and stores	30,000
Coal	10,000
	£108,000

Say £120,000 a year. The aeroplane-carrying ships and the aeroplanes would cost nothing; they would be earning money. The officers and men to form the crews of the ships would belong to the Merchant Navy. Aeroplane pilots will be as numerous as taxi-drivers and get about the same pay. The battleship waddles along at twenty miles an hour, and cannot waddle very far, and in comparison with an aeroplane has a very low rate of speed.

The object in war is to introduce high explosive material into your enemy's ships or country; transmitting this high explosive by guns is expensive, as the container of the high explosive has to be very strong, and consequently very heavy, to withstand the shock of discharge.

It take a battleship weighing 30,000 tons to carry 100,000 lbs. of this explosive. Ten aeroplanes weighing about three tons each would carry the same amount, so the relative weights of the carriers is as 30 tons—30,000 tons.

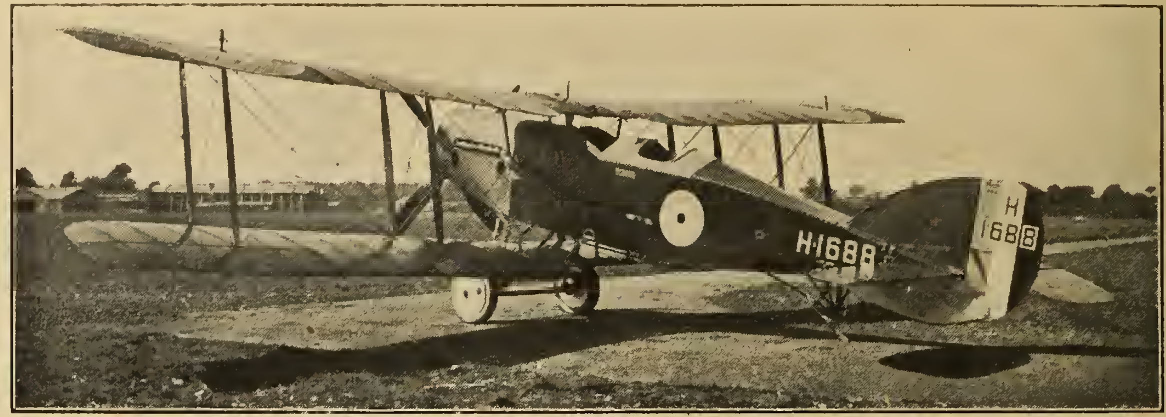
When the battleship nears the end of her coal or ammunition, she must waddle home at about the same speed as a South-Eastern Railway train (I am told that this is the slowest line on earth), and it takes her several hours to fill up, even if she uses oil fuel. The aeroplane does not waddle home, but comes back at 100 miles an hour, and it takes three minutes to fill her up with fuel and ammunition.

The battleship is dead. The future is with the aeroplane, which is going to develop rapidly in the next few years.

My task is completed, for from the summer of 1916 onwards to the end of the War neither the Admiralty nor the War Office had further need of any services I could render. Seeing that I had retired in the year preceding the beginning of hostilities, I was indeed fortunate in being able to take some part, however small, in the prosecution of the war on the water, under the water, on the land, and in the air.

THE "BRISTOL" TOURER

This machine, which is a development of the famous Bristol Fighter, has been designed primarily to provide a machine of great dependability, and capable of maintaining a fairly high speed for a considerable period of time. Its petrol tanks, which carry 70 gallons, are sufficient to allow of the machine remaining in the air for a distance of about 560 miles.



Dual controls are normally fitted to enable the passenger to take over the pilotage during a lengthy flight if desired, although the machine can be supplied fitted with pilot's controls only. When used for the transport of mails or cargo a load of some 300 lbs. can be carried in addition to the pilot and full complement of fuel and oil, although this weight can be increased should it be desired only to carry fuel for a shorter range of flight. The machine can be fitted either with a 275 h.p. Rolls-Royce Falcon III engine or with a 230-240 h.p. Siddeley Puma engine. Fitted with the former the machine can attain a speed of about 125 m.p.h., with a normal cruising speed of about 90 m.p.h. When the latter engine is fitted the maximum speed is 120 m.p.h. and the cruising speed 85 m.p.h. With either engine the petrol consumption for the distance traversed is the same, although taking into consideration the difference in speed the consumption with the Rolls-Royce engine is 15½ gallons per hour, and with the Siddeley Puma 15 gallons per hour.

Specification. (*Weights and dimensions*).

Weight, empty	...	1,750 lbs.
Weight, loaded	...	2,800 lbs.
Wing span	...	...	39 ft. 3 ins.
Wing area	...	...	405 sq. ft.
Wing loading	...	6·92 lbs. per sq. ft.
Chord of wing	...	5 ft. 6 ins.
Overall length	...	25 ft. 9 ins.
Maximum height	...	10 ft. 1 in.
Tankage—petrol	...	70 gallons
Ceiling	... ...	20,000 ft.

◆ ◆ ◆ ◆

The Next Schneider Cup Race

The Aero Club of Italy is proposing that the next competition for the Schneider Cup shall be included in a meeting to be held at Venice in September of next year, several days before the motor car race to be held in the same district. Other events which are being arranged include a 1,000-kilom. race, with a speed range competition and a trial for multi-engined machines. The last-mentioned will be held over a course of 1,200 kiloms. During the first 400 kiloms. all motors will be used; in the second 400 kiloms. the twin-engined machines will use one and the three-engined machines two motors, the one not used being sealed; while the last 400 kiloms. will be run under the same conditions, except that the other motor will be used in the case of the twin-engined machines, while in the three-engined machines the motor not previously used will be working and one of the others sealed up.

A New Canadian Prize

It is announced that a new £10,000 prize, open to Canadian pilots on Canadian machines, has been offered for the first successful trans-Pacific flight from Victoria to Japan.

M. Poulet's Progress

M. Poulet is making slow progress in his flight from Paris to Melbourne. He started from Avlona on October 22, but ran into a blizzard and had to go back. A few days later, however, he succeeded in getting on to Salonika, and on October 30 he went on to San Stefano.

To Test the "David"

On Saturday at 10 a.m. Bossoutrot set out from Toussus le Noble to fly to Morocco, but this time his mount is the new popular type 40 h.p. Farman "David." The destination was Casablanca, the route of the 4,000-mile journey being *via* Bordeaux, Biarritz, St. Sebastian, Vittoria, Madrid, Cordova, Seville, Gibraltar, Tangier and Rabat. Some demonstration flights may be made in Morocco and the machine is then to fly back to Paris.

Air Mails in Japan

Evidently the commercial possibilities of aviation are being recognised in Japan, as it is announced that an aerial mail service is being started between Tokyo and Osaka.

'Plane Post in Finland

A direct mail air route between the Finnish town Sortavala on the Ladoga and Murmansk has been started by British and French aeroplanes. The route covers practically the whole length of Finland.

A Royal Company in Holland

A Royal Dutch Aviation Company has been established at The Hague, but details as to its constitution and sphere of operation are lacking at present.

U.S. Squadron to Visit Brazil

No doubt with a view to bringing the qualities of American aircraft to the notice of the Brazilian authorities, arrangements are being made for an American flying squadron to visit Brazil early next year.

Adventures with the "Bodensee"

Passengers who set out from Friedrichshafen, on November 2, in the German airship "Bodensee," had an exciting time. When the vessel arrived at the landing-ground at Staaken, about 13 miles from Berlin, a strong wind was blowing. Caught by the wind, the airship crashed to the ground four or five times and then ascended. The vessel then drifted for some two hours, during which the mechanics managed to get the engines working, and the captain took the vessel once more over Staaken. Deeming it prudent not to attempt to land in the dark, the captain allowed the airship to drift, and eventually decided to bring it down on the dwarf fir trees at Creuchen, between Magdeburg and Stendal. All the passengers and crew, altogether about 30 persons, were rescued safely, but in the smash at Staaken, one of the spectators was killed, and about half-a-dozen injured.

AIRSHIP ENGINEERING PROGRESS IN THE UNITED STATES

By J. C. HUNSAKER, Eng. D., Commander, Construction Corps, U.S. Navy

(Continued from page 1427.)

Balloon Fabrics

Fabrics for balloons and airships usually consist of cotton cloth coated with rubber. The requirements are high strength, light weight, low diffusion, water resistance and durability. The latter is the most important desideratum, and from extended observations it would appear that the life of a rubberised fabric varies inversely with the intensity and time of exposure to sunlight. Attempts to devise an accelerated test using artificial ultra violet light, have led to the conclusion that, while such light causes deterioration, the greatest rate of deterioration occurs on exposure to direct sunlight accompanied by high humidity and temperature. The Bureau arranged at the beginning of this work to have the Bureau of Standards put in testing facilities. At first, the Bureau of Standards was used as a check on the fabric-testing apparatus at contractors' works, but very soon the chemists of the Bureau of Standards began to contribute valuable suggestions for improvement, and at the present time are conducting research to develop better material.

A study of British and other foreign practice in fabrc manufacture, combined with the results of extended exposure tests carried out under various climatic conditions with fabric made experimentally in this country for the purpose, has now led to the adoption of what is believed to be a marked improvement in rubberised fabric.

The cloth is very carefully inspected after manufacture, both before and after such treatments as desizing and washing. All slubs and imperfect spots are marked so that they may be cut out before rubberising. In the rubber factories the cloth is first passed through spreading machines, where thin coats of dough (rubber cut with absorbed naphtha and similar volatiles) are applied. Carefully selected pure up-river Para gum is used for this purpose, and there is added only a very minor percentage of sulphur and litharge without the usual organic cure accelerators previously used. This thin rubber solution fills up the interstices of the weave. Much heavier rubber dough is then applied on the spreading machines as the process proceeds. After 20 to 25 coats are spread and dried, a continuous, gas-tight film is produced.

The gas-tightness depends, however, upon such factors as the thickness of the rubber proofing and the count of the cloth: high count cloth and heavy proofing giving the minimum diffusion. For instance, with two-ply BB cloth having a gas film of from 3½ to 4 ozs., there is obtained very low diffusion. Added weights of proofing applied to higher count cloth would probably produce but slightly better results than are obtained with the above construction. Two plies of the treated cloth are stuck together by means of roll-ply machines. The fabric is then wound on drums, wrapped and steam-cured at carefully controlled temperatures and pressures.

Over-vulcanisation results in a fabric that ages rapidly, becoming brittle and stiff upon exposure. Examination of such fabrics upon exposure invariably shows high diffusion and rapid rise in acetone extract (indicating great oxidation). An acrid smell is always observed, and the rubber between the plies is hard, and shows a lack of its original adhesive properties. Under-vulcanisation is, therefore, the lesser evil, since exposure to the air and sun causes a certain degree of auto-vulcanisation.

Yellow and red organic dyestuffs soluble in naphtha are often added to the proofing gum. These dyestuffs become thoroughly incorporated throughout the rubber solution, and act as light screens in preventing the admission of sunlight to the rubber proofing. Yellow cadmium sulphide pigment is also used for this purpose.

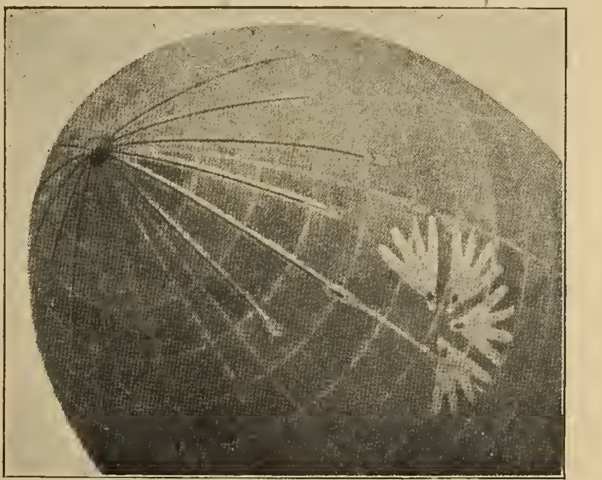
The exterior surface of the fabric is coated with pure gum rubber dough containing usually a substantial proportion of litharge, which has been found to act as a screen or filter in preventing the admission of light rays to the rubber proofing. To the same exterior dough coating a quantity of finely divided aluminium powder is added, and then spread as the outer facing. The principle of this is to provide a continuous, light-reflecting coat. Fabrics made with such a coating have proved to be efficient in this respect, remaining usually 20° to 30° Fahr. lower in temperature than similar fabrics without the aluminium facing. This aluminium coat is usually applied either with a spreader or a calico printing roll. In the latter case a larger number of coats are usually necessary on account of the thin character of the solution required for successful printing.

The inner or gas side of the fabric is coated with from ½ to 1 oz. of pure rubber, which helps to keep the cloth fungus and moisture-proof, reduces diffusion, and makes a good sticking coat for successful taping.

The exterior and interior seam tape is made fairly wide (2 ins. or 3 ins.), and contains a substantial amount of proofing. The exterior tape has an aluminium facing. Both tapes are now cut on the bias so that stretch may occur.

The seams in the envelopes of non-rigid airships constructed abroad are cemented with a pure gum cement consisting of solvent and fine Para-rubber only. A cement of this character is entirely satisfactory where the temperatures to which the envelope is exposed rarely reach 95°; but it was found that with the high temperatures prevailing in the United States during the summer this cement could not be depended on. General softening occurred, and the strength of the seam was reduced to the strength of the sewing, which is far below the strength of the fabrics used in making the balloon. One contractor, to overcome this difficulty, introduced a certain amount of resin into the cement which acted as a hardening agent. Even this was apparently insufficient, for when heated in an oven to a temperature of above 100° Fahr., the seams made with this cement showed a tendency to slip on account of the softening of the cement. Another contractor who had accepted the European practice of using a strictly pure gum cement encountered great difficulties with the earlier envelopes on account of the softening of cement. He investigated this problem very thoroughly, and finally developed a method of applying the pure gum cement with a semi-curing solution, with the result that the seams apparently hold up to temperatures of 130° Fahr. without softening. This practice is considered to be an important improvement.

The B class ships had envelopes made of doubled fabric, with the threads of the "bias ply" at 45 deg. to the threads



The nose of a C-type envelope, showing the stiffening wood battens and finger-patch suspension attachments.

of the other. The bias ply is necessary to prevent tearing, but is rather uncertain strength. It does help to take shear, however. Recent experiments with a three-ply fabric of which the middle ply only is bias are more encouraging, and indicate that we shall abandon the doubled fabric.

The three-ply fabric presents a remarkable degree of resistance to weathering. The aluminium surface, which keeps down the heat, is quite heavy, and is placed over a heavy outer film of rubber. Even though this complete outer film and the first layer of cloth and rubber should be broken down by exposure, there would still be two plies of fabric, with a heavy coating of rubber left to retard the diffusion of the contained hydrogen. It is through the use of high count cloth of low weight and high strength that the successful three-ply fabric can be produced, and the Bureau of Construction and Repair has consistently stimulated the production of this type of cloth. It is probable that present researches will result in the production of both ballonet and outer envelope rubberised fabrics of lighter weight, greater strength and lower permeability than even those that are now in use. For instance, some experiments with rubberised silk fabrics show that these fabrics can be made exceedingly light in weight, high in strength, and of very low diffusion, and that these characteristics are maintained after exposure even for periods of over 150 days, provided sunlight is shut out by a good aluminium outer coating.

After balloon fabric has been in service for periods of from three months upward, changes may take place in the rubber compounds that are used for proofing that cause increased permeability to be shown. These results are more common in fabrics exposed under moist conditions, especially in hot climates where there is a maximum sunlight, and is generally observed on fabric that is over-vulcanised or that contains insufficient proofing.

In the early days of the War the British had considerable trouble with the fabric used in their airships, and finally decided to reduce the diffusion through the use of a cellulose coating known as Delta Dope. Very good results were obtained with this, and it was used to some extent. Later on, in view of the poor results that were obtained with early American airship fabric, a material similar to that which the British used was developed by the Bureau and used with success. This dope was different in its composition and action from that used for coating wings of aeroplanes. The latter material is used to shrink the cloth. Airship dopes contain a special form of cellulose nitrate of a higher degree of nitration, and are made soft and pliable by the addition of castor oil, which prevents the tautening effect when applied to fabric. These dopes when applied dry rather slowly and leave a film that is soft and highly resistant to the diffusion of hydrogen. It is customary to apply two coats of clear dope and two or three coats of the same dope containing about 10 or 15 per cent. of aluminium powder. For application of the dope a portable spraying outfit of the extension-rod type was obtained by the Bureau for air stations. It was found possible with this apparatus and a small crew of men to apply one coat of dope to a 85,000 cu. ft. envelope in one day. Because of this fact the operation of the airship was held up very little, the doping being done on rainy days.

Previous to doping, an airship at Rockaway had given very unsatisfactory results, showing a daily loss of 1·18 per cent. After doping the daily loss was only ·08 per cent. hydrogen. Moreover, this airship continued in service for a period of six months after doping without showing high diffusion. Experience has shown that an airship which has a probable life of only six weeks could by doping be put into service again so that it would have an additional life of at least six months. It was also found that the aluminium dope had a tendency to keep the gas in the envelopes at a more uniform temperature. This, of course, would make the ships much more stable on account of the lessened expansion and contraction of the gas. In another instance a ship which had been in service for only a month undoped was giving unsatisfactory results, and was showing a daily diffusion of 4·47 per cent. When the ship was doped by brush with three coats a diffusion test showed a loss of only one-fifth of one per cent. daily.

Leakage of Helium

To determine the comparative permeability of various fabrics to helium and hydrogen, the Bureau of Construction and Repair forwarded to the Bureau of Standards a quantity of helium and a number of fabrics of special construction, including rubberised fabrics such as are used for the envelope of non-rigid airships, and fabrics such as may be used for the gasbags of rigids. It was found that the helium

The U.S. Navy C-1 dirigible, with twin engines

permeability was from 59 to 64 per cent. of that shown for hydrogen, and that a somewhat similar result was shown for the rigid fabric. The use of helium in airships of the future has been very much advertised, and the advantages of a non-inflammable gas are obvious. However, difficulties of supply render it necessary to devise ways to employ it with less loss than present hydrogen practices involve. The leakage through fabrics is less than with hydrogen, but the difference is not of great importance. The great bulk of gas now lost goes through the safety and manœuvring valves. It may be possible to rework helium that has become mixed with air. When the hydrogen in an envelope gets 20 per cent. of air in it, it is explosive and is promptly discharged.

Researches have been made by the Bureau into the causes of mildewing which has been observed upon cordage and fabric shipped from France and stored in a warm place under humid conditions. Wherever the mildew is found the rope and fabric have become rotted and unsafe. In the investigation, mildew spores were scraped from the surfaces and incubated on agar agar. The growths that were produced were identified as green penicyllium and black aspergillus. Mould cultures were then used in treating samples of various kinds of fabric and hemp rope after the fabric and rope had been brush-coated with various chemicals which might have an inhibiting action upon the growth of the mould. It was found that a dilute solution of ammonium phosphate containing a small quantity of sodium benzoate, or a very dilute solution of bichloride of mercury, could be used with entirely satisfactory results. American practice is to coat both inside and outside surfaces of fabric with rubber so that mildew cannot attack the cotton. We also use wire cable for suspensions, and are therefore more concerned with rust than mildew on important members.

Parachutes

All airships as well as kite-balloons are provided with parachutes to permit the crew to abandon ship in the air in case of fire. Fortunately, there has not yet been occasion to use the parachutes except in practice. It is believed, however, that if a fire does start there is some danger of the parachute catching fire before it gets away clear.

Feeling that it would be desirable to render fire-resisting the silk that is used in the construction of parachutes, experiments were conducted with various salts, and it was found that impregnation with 10 per cent. solution of ammonium phosphate gave successful results. The silk after treatment is dried and then formed into parachutes in the regular manner. The silk thus produced is resistant to flame, and when ignited ceases to burn almost instantly. Ageing tests have been made with cloth treated with ammonium phosphate and placed in an oven at high temperature for several days. These conditions failed to lower the strength of the fabric.

Suspension Systems

Practically all non-rigid airships which had been built up to the outbreak of the European War had what is known as a band suspension; that is, the lines carrying the weight of the car ran up to a band of strong, heavy fabric, which extended in a continuous line around the envelope. This band was located so that the lines reached the band at about the points where they became tangent to the envelope. As no portion of the band could take a very great load, such a suspension meant that each line from the car had to be sub-divided again and again so as to distribute the load into the band at very close intervals. There was thus produced a very large number of small lines close to the envelope, which greatly increased the power required to drive it through the air.

Early in the War the British Admiralty developed a much simpler and neater suspension, using the so-called Eta patch. An improved patch developed independently by the Goodyear Co. is used on all American airships.

In our suspension steel wires are used, running up from the car to a patch on the envelope, which consists of four tapering "fingers" radiating from the point to which the suspension wire is attached. Each finger consists of a strip of fabric extending outward from a central portion, from which two loops of manila rope project, to receive the thimble of the suspension wire. Under each finger is cemented to the envelope an extension of one end of a loop, which has been frayed out and impregnated with rubber. Each end of the loop thus distributes its load into the envelope throughout the entire length of the finger, and the two loops, having four ends, give four fingers. This construction provides for a very wide distribution of the load from each suspension wire.

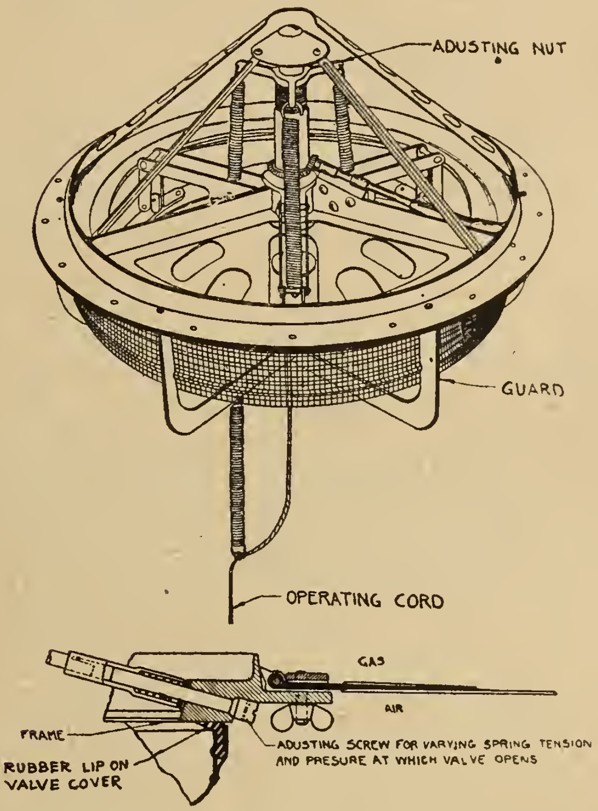
As a result of the use of the patch suspension, it has become possible to make the entire car suspension of steel wire cable, reducing the number and diameter of all suspension lines. This reduction in the amount of cordage in the neighbourhood of the envelope has resulted in a considerable increase of speed.

Fins on airships constructed abroad are of the flat, externally-braced type, in which the fin is stiffened by a series of king posts and wire struts, all on the outside of the fin, and, consequently, giving a considerable amount of resistance. We introduced at the very beginning of our airship building a fin which is entirely internally braced—that is, its internal structure is such that it requires no external king posts or bracing wires. Naturally, this fin is considerably thicker than the European type of fin, but apparently is just as efficient as a control surface and weighs no more for unit area.

Valve Construction

Earlier valves on our non-rigids were of a most simple type of construction, resembling the valves used abroad, and their tightness was nothing to be proud of. The problem of tight valves and certainty of operation was attacked by Mr. John Gammeter, of the Goodrich Co., who produced an entirely original valve, which it is believed has no superior. (See accompanying sketch.)

The tightness of this valve is due to the lip packing, which is carried by the cover of the valve, but when the valve is closed rests on a solid metal ring forming the frame of the valve. It extends toward the inside of the valve, gradually thinning to a knife-edge, and is made of soft rubber. In consequence, when the pressure comes on the valve the tendency is for the tip of this gasket or lip to press more and more firmly against the metal seat as the gas presures increases.


ADUSTING NUT
GUARD
OPERATING CORD
GAS
AIR
FRAME
ADUSTING SCREW FOR VARYING SPRING TENSION AND PRESURE AT WHICH VALVE OPENS
RUBBER LIP ON VALVE COVER

Sketch of one of the Gammeter valves, designed by Mr. John Gammeter of the Goodrich Co.

The ideal valve for an airship should remain tight until the pressure at which it is open has been reached, and it should then open wide and remain so until the pressure has decreased below the point at which it should open, whereupon it should close tightly. This valve very nearly meets these requirements. The arrangements of the linkage which carries the valve cover is such that the extension of the springs required to allow the full opening of the valve is very small. Consequently, the tension in the spring remains very nearly constant, and the ideal is very closely approximated.

In the first ships constructed by the Goodyear Co., the operation of the safety valves was controlled by a cord which extended across the diameter of the envelope, attaching together two valves, one on each side of the envelope. The theory was that when the pressure reached a certain amount, the sides of the envelope would be forced apart to a sufficient extent to produce a pull in the cord, causing the valves each to open and to remain open until the pressure fell sufficiently to allow them to close. The system works very well, but is difficult to keep in adjustment.

Present valves depend entirely upon internal pressure for their operation, and open outward like a pop safety valve. All valves may also be operated manually. The present approved arrangement of valves is to have one at about the mid-length of each side and one at the tail of the envelope clear of the fins. The two side valves act as safety valves, and are used for manœuvring only when both engines are stopped and a free balloon landing is necessary. The tail valve is the manœuvring valve for use under ordinary circumstances, so that the escaping hydrogen is well clear of fire from the engines.

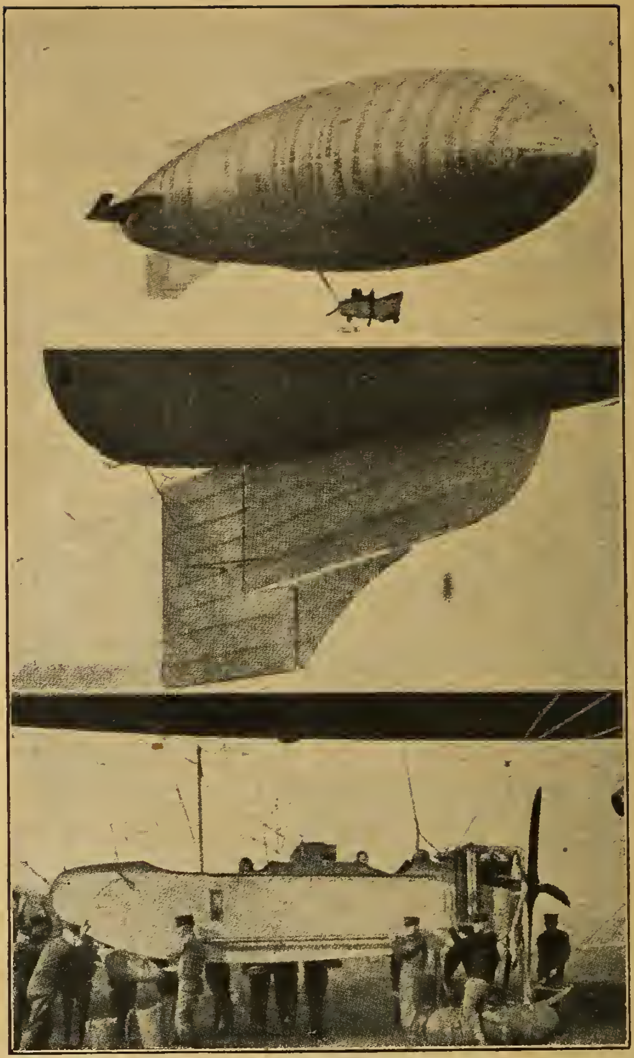
[In addition to these B class airships, a few others of similar design, but with such modifications as the fitting of a "pusher" power plant in place of the tractor type, were apparently put into service, and we give illustrations of two types of these craft, the F 1 and the A 4 or E type. The latter was designed completely by the Goodyear Co., and the following brief particulars of this ship may be of interest.—Ed.]

The length of the envelope is 162 ft., the maximum diameter 33 ft. 6 ins., and the capacity 95,000 cub. ft. The car is 18 ft. long, and is equipped with a 150 h.p. Thomas engine. Seating capacity for six is provided, but the regular crew generally consists of three or four. The ship was designed to have a cruising radius of approximately 12 hours at full throttle, or longer at lower engine speed. The speed with full load is 56 m.p.h. Parachutes are mounted on the underside of the car. The pontoon gear, which can be seen in the illustration, provides a cushioning effect in landing, and also permits a landing to be made on water.

For over-water flying an ingenious arrangement is provided whereby the necessity of releasing gas as the weight of fuel decreases is avoided. This is accomplished by bringing the ship down to about 50 to 100 ft. of the surface of the water and lowering a hose, at the end of which is fitted a water-ballast pump. This is allowed to pass over the surface of the water which causes the pump to rotate and thus force water up the hose into the ballast tank until equilibrium is maintained. Longitudinal balance of the airship is controlled by shifting air in the ballonets.

The blower arrangement for forcing the air into the ballonets consists of a small Sturtivant fan driven by an electric motor, for emergency, and by slipstream air scoop under normal conditions. Finger-patch type suspension is employed.

(*To be continued.*)



Another "pusher" modification of the B-Class, the A-4, with detail views of the tail and car

◆ ◆ ◆ ◆

Handley Page Machine in Athens

A Handley Page machine, piloted by Capt. W. Shakespeare, arrived at Athens on October 30, after a journey by stages from London. The machine is visiting Greece, for the Aviation Exhibition in Athens. Bad weather delayed the progress of the machine, and during its flight down the Italian coast from Pisa to Rome, it encountered a severe wind storm which threatened to divert its course over the Mediterranean. The stages of the journey were London-Paris-Lyons-Gulf of Genoa-Pisa-Rome-Benevento-Taranto-Athens.

The Effects of Altitude

At the next meeting of the Royal Aeronautical Society to be held at the Royal Society of Arts on Wednesday, November 12, at 8 p.m., Dr. Chas. Atkin Swan, L.R.C.P., M.R.C.S., M.B., Ch.M., will give a lecture on "Some Physical and Psychical Effects of Altitude." The chair will be taken by Sir W. Arbuthnot Lane, Bart., C.B., F.R.C.S.

War Risks Office Closed

The War Risks Insurance office at 53, Cornhill, E.C., has been closed, and all correspondence relating to the business of the office, including any business connected with the Air Raid Compensation Scheme, should now be addressed to the War Insurance Accounts Branch, Board of Trade, Gwydyr House Annexe, Whitehall, S.W. 1.

Avros at Windermere

It has been decided to keep the Avro seaplane station at Bowness open during the winter. In addition to taking up passengers, Capt. Howard Pixton is prepared to train a limited number of pupils during the winter. It would be a distinction for any pupil to learn to fly from such an instructor, as Capt. Pixton is probably the *doyen* of all pilots now regularly flying. His own flying ticket dates from 1910, in which year he joined Mr. A. V. Roe and went with him to America. Those were the days of early experiment, before the Avro had earned the reputation for reliability which it now enjoys. Capt. Pixton won the Schneider Cup in 1914, and has also won many other prizes for flying contests.

London-Paris 'Plane Mishap

While piloting a relief machine from Paris on the afternoon of October 29, Lieut. H. Shaw was compelled, owing to the adverse weather, to come down in mid-Channel. He alighted alongside the small coasting steamer *Harlech*, which took him and his passenger, Mr. Oelrichs, on board and also salved the express parcels which were in the cabin of the machine. The flotation gear, as fitted to all Airco machines, which had its first practical test, proved reliable in a very rough sea, but owing to the darkness it was found impossible to salve the machine. Lieut. Shaw's parcels were duly passed by the Customs at Weymouth, and forwarded to London immediately by train.

The Customs and Aviation

An interesting sign of the times is to be found in the London Customs Bill of Entry, which now contains in its import columns details concerning goods brought into Great Britain by air. A recent issue announces the fact that the Handley Page Transport Co., Ltd., have imported from France quantities of silk, fancy goods, ladies' hats and embroidery. These commodities were carried from Paris to Hounslow by the two-engined Handley Page aeroplanes engaged on the cross channel service.

AIRISMS FROM THE FOUR WINDS

Lord Fisher in *The Times* :—

" It's as clear as daylight that future war at sea absolutely precludes the use of any vessel of war that can't go under water, because aircraft will compel it. So why keep any of the present lot ?

" Not only that, but you've got also to scrap all the admirals and superior officers because they won't do for the new job. Put them all in some museum—like Greenwich Hospital (keep the submarines and Co.).

" All you want is the present naval side of the Air Force !—that's the future Navy—only costing a few millions ! "

- - -

Points upon the same theme from Sir Percy Scott's book :—

" Aeroplane pilots will be as numerous as taxi-drivers, and get about the same pay.

" The battleship waddles along at 20 miles an hour, and cannot waddle very far.

" It takes a battleship weighing 30,000 tons to carry 100,000 lbs. of this explosive.

" Ten aeroplanes weighing about three tons each would carry the same amount, so the relative weights of the carriers is as 30 tons-30,000 tons.

" When the battleship nears the end of her coal or ammunition she must waddle home. The aeroplane does not waddle home, but comes back at 100 miles an hour.

" The battleship is dead. The future is with the aeroplane."

- - -

A few years hence these forecasts will be still more emphasised by advances in scientific research outside aviation, but directly influencing and tending towards the greater use of aircraft. Already we have wireless communication and wireless direction finding, which are such elements in rendering the safe navigation of the air but a matter of time, and now, according to the Paris *Excelsior*, M. Abraham, a French scientist, and Gen. Ferrie have introduced an improvement in wireless telephony which it is confidently asserted will, within a short time, make it possible to 'phone from these shores to the United States !

- - -

Looks like scrapping the lot of War theories hitherto prevalent.

- - -

Again France leads us in officially recognising aeroplanes as regular mail carriers. The French Postal Authorities have informed the Compagnie Générale Transaérienne, the agents of the Airco Co. in France, that Airco machines will now be allowed to carry mails. The rate will be 3 fr., plus the ordinary foreign postage rates. The latest hour at which letters can be posted in Paris is 11 a.m. Letters will be distributed by special messenger at both ends.

- - -

Wonder when our G.P.O. will fall into line.

- - -

It must have been a novel experience for the Basuto chiefs when last week they took their half-hour flights over London from the Central Aircraft Co.'s aerodrome at Northolt. But we fancy that even more surprising to them was, later in the day, their sitting in front of a cinema stage and seeing their own flight reproduced on the screen.

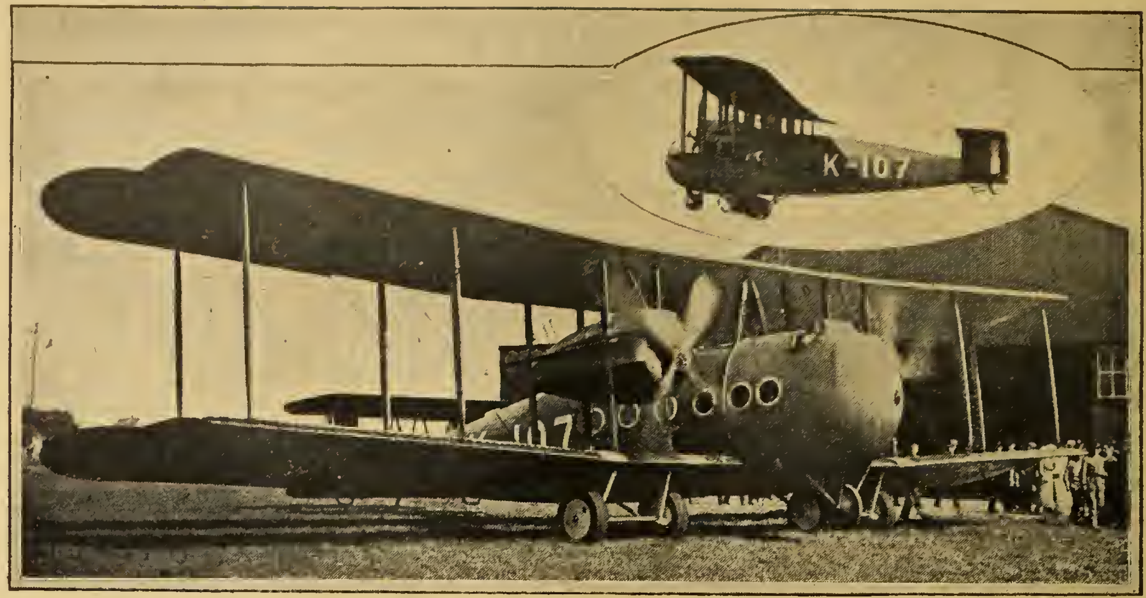
- - -

How's this for a high-flying record, even for so distinguished a flyer as the Italian patriot poet :—

A " RARA AVIS "

(*Parliament announces that the demobilisation of the W.R.A.F. is now practically complete*)

A Wraf-Bird was recently seen in the vicinity of one of our aerodromes. This species is fast becoming extinct



"VICKERS-VIMY COMMERCIAL" AEROPLANES FOR CHINA: One of 100 of these machines ordered from Messrs. Vickers, Ltd., by the Chinese Government, to be used for commercial aeroplane services in China. The speed of the machine is 100 m.p.h., and it has a carrying capacity of 16 passengers and one pilot, or 1½ tons of mails or goods, with an endurance of 5 hours. Our photograph shows one of these machines at the E.L.T.A. aerodrome at Amsterdam. Inset shows the machine in flight

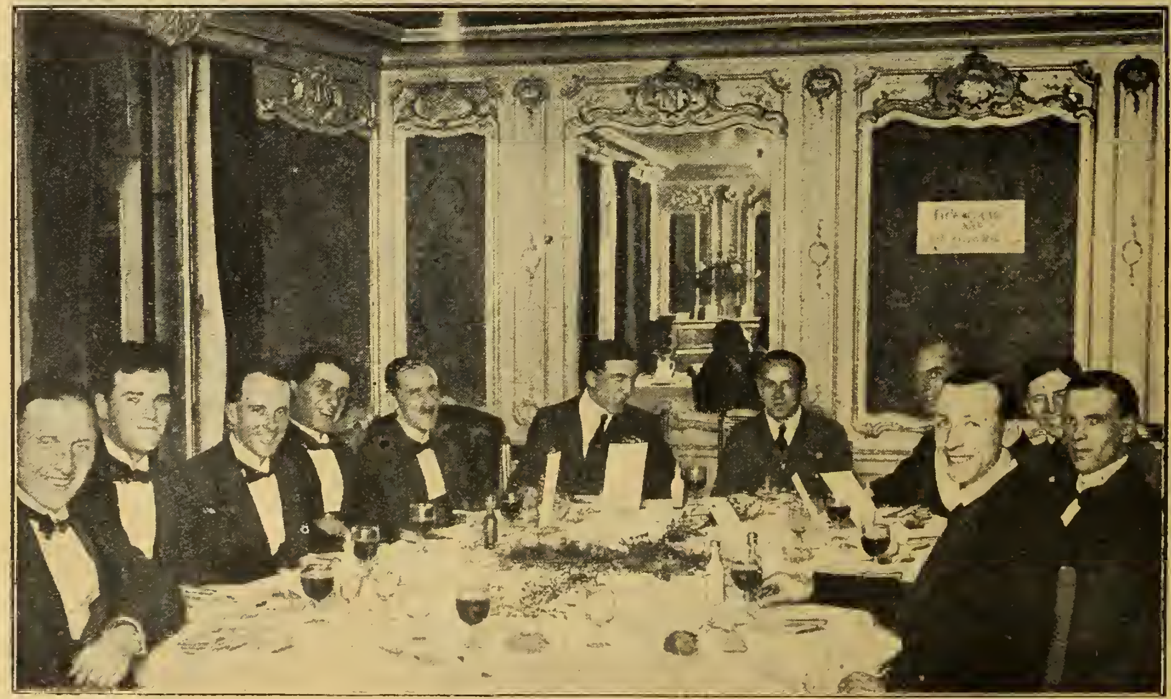
"From the indomitable Sinn Feiners of Ireland, from the Red Flag which in Egypt unites the Crescent and the Cross, all insurrections levelled against the devourers of raw flesh are about to blaze up, lighted by sparks flying from us to them."—D'Annunzio.

- - -

Rescuing by aeroplane is no new war feat. But an attempt by a party of the R.A.F. of quite a novel saving stunt is reported from Winnipeg. It appears that Mr. J. B. Tyrrell, the geologist and explorer, who has been surveying holdings in the Rice Lake district, Ontario, has in consequence of the early start of winter, got snowed in. In consequence, the R.A.F. party has set out to "retrieve" the scientist, and we shall hope in due course to be able to record the success of this little venture.

- - -

In spite of the ravings of Hun-Bolshie sympathisers, Britain is still maintaining her honour by affording material



A TRANSATLANTIC FLIGHT REUNION DINNER: At the Café Royal a "family" dinner took place last month in connection with the flying of the Atlantic. The above snap was then secured, those present being (from left to right): Sir John Alcock, Messrs. Platford, H. G. Hawker, A.F.C., Mason, Fenn, Lieut. C. H. Biddlecombe, Sir A. W. Brown, Lieut.-Com. Mackenzie-Grieve, Messrs. Clements, Muller, F. P. Raynham help, in the form of aeroplanes, tanks, etc., to the real Russian patriots to retrieve their country's disasters. The 90 millions or more which we have paid out to assist in bringing this section of the world into line with Peace would be cheap to civilisation in general if there were another 0 added. The menace of the Bolshie *must* be killed if the world is to continue to exist—whatever the Hun-Bolshies may desire. Admiral Cowan, in the Baltic, is one who is helping along the world's cause, and one form which his help takes is in propaganda work through airmen who have dropped bundles of proclamations from the Admiral, on the *Cronstadt*, which read: "Russian sailors, the British Fleet brings you bread and Peace. Do not fight against us. I guarantee the safety of everyone coming over to me; therefore I call on you to put your ships and guns out of commission. Come under the White Flag to negotiate. I do not want to fight with you. On the contrary, I will give you and your families Peace, security and bread."

- - -

World competition still continues for qualifying to fill Jazz instructor positions at different "Palais de Dance" now coming to the fore. A Frenchman at Madrid appears to be well in the running for securing the next vacancy in one of these fashionable resorts, as he has looped the loop 624 times, as reported last week, in a flight of 169 minutes, close on 4 loops a minute! Looks as if the poor devil who in America previously held the record at a mere 455 loops must now turn his mind to some other less fashionable pursuit than jazzing.

- - -

The writing on the wall:—Edinburgh Town Council has formally approved the tender of Messrs. Brown, Boveri and Co., of Baden, Switzerland, for turbo-alternators for Portobello power station, amounting to £106,618. The nearest British tender was nearly £70,000 higher.

Wm. Bruce Lindsay, of the Town Council, in proposing the acceptance of the Swiss tender, said, in the case of two contractors, they could not reduce their price at all. "A third intimated that as any reduction could not be more than 10 per cent., they had decided to adhere to their original figure." Mr. Lindsay, therefore, said the council could not give a premium of £70,000 for a machine of British manufacture. Sir Charles Parsons, one of the contractors, had stated that assuming he did the work without making any profit he could not look at the foreign offer.

Sir Charles does not, however, propose to let this practical demonstration be lost. He intends to post the particulars of the contract in a prominent place in his works where his workmen can read it.

The writing on the wall.

- - -

So according to Mr. Cecil Harmsworth, Foreign Under-Secretary, the Peace Treaty in all probability will be ratified on November 11, and come into force from that date. But the "End of the War" is not even then. Mr. Harmsworth says it does not mean that the "end of the War," as affecting contracts, will necessarily be on November 11. The "end of the War" for that purpose will be declared by an Order in Council.

To some, however, it may be comforting to know that the first meeting of the Council of the League of Nations must take place within 15 days of the coming into force of the treaty.

So we are getting on by degrees.

- - -

A correspondent from Kensington writes as follows:—"I wonder whether any of your other readers have noticed the resemblance of the dial-springs in the photo. of the B. & P. controls on page 1419 of last week's Flight, to two men's faces. I presume it is the dial-springs, not the face of the photographer." We have asked our photographer, and he says it's a slander action he'll start against anyone accusing those faces of being his.

- - -

An endeavour is being made to divide the responsibility of an epidemic of falling ceilings in Camberwell between air raids and the vibration of motor omnibuses. From experience since the 44's started running through Great Queen Street we'll back the 'bus *every* time.

- - -

Daylight saving will *not* be continued next year in the United States. What about it here?

- - -

Lady Shelley-Rolls sends us an interesting communication in regard to an allusion to an early attempt at flying in the reign of King Harold, son of Earl Godwin, which Lady Shelley-Rolls thinks may interest students of the history o aviation. It is taken from the edition of Milton's History of England published in 1670, and includes the following paragraph:—

"In the meanwhile a blazing star, seven mornings together, about the end of April, was seen to stream terribly, not only over England, but other parts of the World; foretelling heer, as was thought, the great changes approaching: plainliest prognosticated by Elmer a Monk of Malmsbury, who could not foresee, when time was, the breaking of his own legs for soaring too high he in his youth strangely aspiring, had made and fitted Wings to his Hands and Feet; with these on the top of a Tower, spread out to gather air, he flew more than a Furlong; but the wind being too high, came fluttering down, to the maiming of all his Limbs; yet so conceited of his Art, that he attributed the cause of his fall to the want of a Tail, as Birds have, which he forgot to make to his hinder parts. This story, though seeming otherwise too light in the midst of a sad narration, yet for the strangeness thereof, I thought worthy enough the placeing as I found it plac't in my Authour."

- - -

Lady Shelley-Rolls concludes by saying that "this quaint description of a flying experiment in Milton's History has only recently come to my notice. I wonder if many of your readers are already familiar with it?"

Extracted from another work, a reference to this passage has already appeared in Flight, although not in the exact words of the above original. In May, 1915, page 386, Mr. J. T. Towlson drew our attention to an article which had appeared in *The Science of Aerostation*, a tome dating back over one hundred years. In this volume the writer of an article had, amongst other references to early flying efforts, given a *résumé* of the above paragraph from Milton's History of England, but as this was not quoted word for word from the original, it is a point of interest that through Lady Shelley-Rolls we are now able to place the correct version on record.

No, the tree has not grown through the verandah. The "station" at Golders Green, so well known to the aeronautical world, was considerately built around Nature's specimen

AVIATION IN PARLIAMENT

Sales of German Aircraft

Sir F. Hall in the House of Commons on October 29 asked the Under-Secretary of State for Foreign Affairs if the German Government have been required to furnish particulars of all aircraft and air materials sold or exported since the Armistice; and to pay its value by January 31, 1920; if the Allies have any definite information that Germany has sold or exported aircraft or air materials to Sweden contrary to her undertakings; if so, why no practical steps have been taken sooner to prevent such action; and what means will be adopted to ensure that information furnished under this head by Germany in accordance with the requirements of the Allies will be accurate?

Mr. Harmsworth: This question is receiving the consideration of the Peace Conference, who are taking all the necessary measures on the matters raised by the hon. and gallant Member.

Sir F. Hall: Is the hon. gentleman aware that sales of aeronautical material have taken place in Sweden for and on behalf of Germany; who has received the proceeds of those sales; and has the Supreme Council of the Allies declared these sales null and void?

Mr. Harmsworth: Perhaps my hon. and gallant friend will give me notice of that question.

Sir F. Hall: Having put down certain specific questions why, in the circumstances, am I not entitled to get a full reply?

Mr. Harmsworth: My answer gives my hon. and gallant friend all the information I can give him.

Sir F. Hall: Which means none!

Royal Aircraft Factory, Farnborough

Sir W. Joynson-Hicks on October 29 asked the Under-Secretary of State to the Air Ministry how many men are now employed at the Royal Aircraft Factory at Farnborough; and whether any decision has been arrived at as to the future of such factory?

Mr. Hope: I have been asked to answer this question. The present strength of the personnel at the Royal Aircraft Establishment, Farnborough, is 2,339, of whom 237 are trade lads and 356 are women. Reductions in the staff are continuing, and it is anticipated that the strength will eventually be reduced to about 1,200. It is proposed that the factory shall be used in future as an experimental and research establishment for the investigation of aerodynamical and aero-engine problems.

Aircraft Production and Inspection Departments

Sir W. Joynson-Hicks asked the Under-Secretary of State to the Air Ministry whether the Aircraft Production Department and the Aircraft Inspection Department are still in existence; and what is the number of personnel and the cost of such departments, respectively?

Mr. Hope: The Aircraft Production Department, of which the Aircraft Inspection Directorate forms a part, is still in existence. The total headquarters staff is 1,932, the annual cost in salaries being £422,897. These figures include the staffs of the three Directorates of Supply, Research, and Inspection, together with the Accounts Branch and other common services. The staff of the Aircraft Inspection Directorate alone numbers 300, of which the annual cost is £88,507.

The East Fortune Station

Mr. John Hope asked the Under-Secretary of State to the Air Ministry whether he can state the rate of expenditure at East Fortune Air Station since the Armistice; and what will be the estimated saving of money by the removal of this aerodrome?

Maj.-Gen. Seely: I am not clear what information my hon. friend requires. If he refers to capital expenditure, I am informed that the payments made for works, buildings, land, machinery and plant, etc., from the date of the Armistice to September 30 have amounted to £77,000. The cost of maintaining the aerodrome in peace time may be estimated at £29,000, but it is difficult to estimate the saving entailed in giving up the station in other directions, as that would depend on the amount of personnel and material transferred to other airship stations.

The No. 2 Northern Aircraft Depot

Sir W. Joynson-Hicks asked the Under-Secretary of State to the Air Ministry if he will state how many men are still employed at No. 2 Northern Aircraft Depot; and what are they doing?

Maj.-Gen. Seely: This repair depot is being closed down. The strength at present is 894, or 33 per cent. less than it was at the end of September. The strength will be reduced to a care and maintenance party by the middle of next month. Since October 15, when repair work ceased, the staff have been employed in clearing up and concentrating stores for disposal.

The Record Department, Blandford

Sir W. Joynson-Hicks asked the Under-Secretary of State to the Air Ministry if he can state how many girl clerks are now employed at the Royal Air Force record department at Blandford; whether special trains are still run from Bournemouth; and whether greater economy could be exercised in this work?

Maj.-Gen. Seely: In answer to the first part of my hon. friend's question, the number of women clerks and typists employed at Blandford on September 30, 1919, was 669. The reply to the second part is in the affirmative, and to the last part that all economy possible is being secured and the station reduced as rapidly as the needs of demobilisation in the way of records permit.

The Stores Depot, Milton

Maj. D. Davies asked the Under-Secretary of State to the Air Ministry if he will state for what purpose the Didcot depot is being used, and how many persons are employed there?

Maj.-Gen. Seely: No. 3 Stores Depot, Milton, near Didcot, is used for the storage of aeroplane spare parts, raw material, soft goods, and canvas hangars. The strength at the present time is 1,648, and it is intended to reduce this number by December 1 next to 1,221. This is one of the three stores depots which it will be necessary to retain for the R.A.F.

Ordnance Survey and Aerial Photography

Lieut.-Col. Moore-Brabazon asked the Under-Secretary of State to the Air Ministry what steps, if any, have been taken to use the experience obtained during the War in aerial photography for mapping purposes towards revising and helping in ordnance survey work in England, in view of the fact that so many maps are now out of date?

Maj.-Gen. Seely: As my hon. and gallant friend is aware, the Board of Agriculture is responsible for ordnance survey maps. A Committee, with representatives of the War Office, Admiralty, and Air Ministry have been considering the general question of maps, including those specially required for air purposes, for which, undoubtedly, aerial photography will be of the greatest value.

Central House, Kingsway

Sir W. Davison asked the Under-Secretary of State to the Air Ministry when Central House, Kingsway, which was commandeered by the Ministry during the War, will be restored to the various business firms who were previously in occupation, and who are hampered in re-establishing their businesses on a peace basis owing to the inadequacy of the temporary accommodation they have secured; what is the total rental value of the premises; whether less expensive premises could be obtained for the Ministry elsewhere; what is the particular work being carried on on the premises; and what are the number of officials employed thereon?

Mr. J. Parker: Central House, Kingsway, will be vacated completely by the Government staffs now in occupation by the end of the year. The estimated total inclusive rental value is £7,618 per annum. The vacation of the premises will be effected by a reduction of the staff and by the removal of the remainder to less expensive premises. The work being carried on is design, research, and technical work generally in connection with aircraft production under the Ministry of Munitions. As regards the last part, the number of officials at present engaged in the premises is 208.

R.A.F. Stations.

Maj. Lane-Fox on October 30 asked the Under-Secretary of State for Air what is the present staff employed at the aerodromes at Tadcaster and Sherburn-in-Elmet, respectively; what has been the average monthly cost of these aerodromes during the past three months; what useful purpose they have fulfilled; and what is the policy of the Government as to their continued existence?

Maj.-Gen. Seely: At September 30, 1919 (the latest date for which returns are available), the number of staff employed at these stations was as follows: Tadcaster 242, Sherburn-in-Elmet 89. The average monthly cost during the last three months (July to September) has been £5,700 and £1,700 respectively. This has been greatly reduced during the present month. These stations are being utilised as headquarters for the storage of standard aeroplanes, and can be used for civil aviation purposes. They are to be closed down when the valuable stock now stored there has been evacuated.

Mr. R. Gwynne asked the Under-Secretary of State for Air for what purpose the air station at Polegate is still being retained; when the airships were removed; how many men and women were employed there in June last; and how many are employed there at the present time?

Maj.-Gen. Seely: As the responsibility for lighter-than-air craft has now been transferred to the Air Ministry, my right hon. friend the First Lord of the Admiralty has asked me to reply to this question. The airship station at Polegate is being closed down. At the moment it is used for the storage of small airships and stores which are in course of transfer to the Disposal Board. As soon as these have been disposed of the station will be evacuated. The strength at the dates mentioned by my hon. friend was as follows:—

	June 30, 1919.	October 28, 1919.
R.A.F.—Officers	5	2
Other ranks	24	22
W.R.A.F.	15	—
	44	24

Four of the personnel (at October 28) are employed on meteorological duties at Beachy Head.

Route to Egypt Inquiry Committee.

Sir W. Joynson-Hicks asked the Under-Secretary of State for Air who are the officers making inquiry into the recent losses on the Egypt route, and if evidence is being taken on oath?

Maj.-Gen. Seely: The members of the Committee of Inquiry referred to are as follows:—

President: Air Vice-Marshal E. L. Ellington, C.B., C.M.G., C.B.E., Director-General of Supply and Research, Air Ministry.

Mr. G. B. Cockburn, O.B.E., Head of the Accidents Branch of the Department of the Controller-General of Civil Aviation, Air Ministry.

Air Commodore H. R. M. Brooke-Popham, C.B., C.M.G., D.S.O., A.F.C., Director of Research, Ministry of Munitions.

Air Commodore A. R. Borton, C.M.G., D.S.O., A.F.C.

The last-named officer has had great experience of the work to be investigated by the Committee. He has flown in a Handley-Page machine over the route to India and has surveyed part of the route on to Australia. The Committee is not taking evidence on oath.

East Fortune Airship Station

The Earl of Wemyss, in the House of Lords on October 30, asked the Government whether they could explain the reasons which had decided the Government to do away with the East Fortune Air Station; whether they could explain the advantages possessed by the Yorkshire site to which it had been decided to transfer the East Fortune Air Station; whether they could give the total amount of public money which had been spent on this station since its inception; and, further, whether he would state what proportion of the expenditure had been incurred since the Armistice, and at what date the last payment was made or liability incurred for work of any kind on this station; and moved for papers.

The Marquess of Londonderry assured the noble earl that the Air Ministry were fully alive to the necessities of economy, and reminded him that their programme had been most rigidly and, in the matter of airships, most ruthlessly cut down. At the date of the Armistice there were 16 airship stations in the United Kingdom. The Admiralty originally intended to retain four rigid airship stations, but in view of the necessity of greatly reducing the programme it was decided that only one station should be retained. Howden would accommodate two ships of the "R. 38" type and one of the "R. 34" type, whereas East Fortune could accommodate only one ship of the "R. 38" type. Moreover, Howden was more suitable for the airships which they were entitled to contemplate for the future; and the atmospheric conditions for navigation were better at Howden than at East Fortune. The huts and sheds at Howden were of a semi-permanent type. To substitute permanent structures would cost £60,000, while to transport the airship sheds at Howden to East Fortune would cost £250,000. The total amount of public money spent on East Fortune from August, 1916, to September 30, 1919, was £567,700. There were still outstanding liabilities on account of contractors' claims and balances of accounts which were estimated at £35,000. It was anticipated that these claims and balances would be brought to a close at a comparatively early date. Of the total expenditure of £567,700 on East Fortune, the sum of £77,330 had been paid since the Armistice. A certain amount of that payment was due to commitments before the Armistice. All these aerodromes had a potential value for liquidation purposes. No one could say definitely that none of these aerodromes would be made use of for the purpose of commercial aviation or similar undertakings.

Earl Wemyss thanked the noble Marquess for the information he had given the House, and withdrew his motion.

R.A.F. Permanent Buildings

Rear-Admiral Adair on November 3 asked the Under-Secretary of State to the Air Ministry whether any permanent buildings are being, or are to be, erected for the Royal Air Force; and, if so, what expenditure of public money is entailed thereon?

Maj.-Gen. Seely: It will be necessary to erect permanent buildings in substitution for hutting or temporary buildings at such air stations as are retained for the after-War Air Force. The number of stations so to be maintained is now under consideration, and I cannot, therefore, give the estimated cost at present.

THE ROYAL AIR FORCE

London Gazette, October 24

The classification of Maj. H. J. Newton-Clare, O.B.E., is "T," and not "S.O."; of Capt. F. Workman, M.C., "T," and not "A."; of Capt. K. R. Park, M.C., "A," and not "T."; of Capt. W. P. Groves, "S.O.," and not "T."; of Capt. G. L. Huuting, "S.O.," and not "T."; of Capt. A. A. B. Thomson, M.C., "A.," and not "S."; of Lieut. J. M. McEntegart, "S.O.," and not "T."; of Lieut. H. C. Pyper, "S.O.," and not "Ad."; of Leut. H. O. Long, "O.," and not "Ad." as stated in *Gazette* of Aug. 1.

The notification in *Gazette* of Sept. 5 concerning Capt. H. W. G. Jones, M.C. (A.), is cancelled. (The notification in *Gazette* of Aug. 1 is to stand.)

Staff Officer, 3rd Class (P.).—Flight Lieut. H. R. Kavanagh, M.B.E.; Oct. 15, vice Flight-Lieut. H. H. Clarke.

Flying Branch

Llight-Lieut. J. A. Hartcup to be Flight-Lieut. (A.) from (S.O.); Sept. 10.

Flight-Lieut. (actg. Sqdn.-Leader) N. G. Stewart-Dawson, D.S.C., relinquishes the actg. rank of Sqdn.-Leader on ceasing to be employed as Sqnd-. Leader (A. and S.); Oct. 15.

Pilot Officer J. L. Airey to be Flying Officer; Aug. 7.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. C. Maddox (Sec. Lieut., Welsh R.); July 14. Lieut. (Hon. Capt.) O. M. Greg (Capt., R. War. R.); Sept. 18. Lieut. E. J. Dease (Sec. Lieut., Rif. Brig.), Lieut. M. Tod (Lieut., Black Watch), Sec. Lieut. (Hon. Lieut.) C. R. A. Wallis (Lieut., R.G.A.); Oct. 8. Capt. W. McKay (Lieut., Sea. Highrs.), Lieut. F. Coxen (Lieut., R.F.A.); Oct. 13. Lieut. R. S. Butler (E. Surr. R.); Oct. 14. Capt. C. Gordon-Davis (Capt., N. Staff. R.), Maj. A. P. Pargiter, M.C. (Capt., R. Ir. Regt.); Oct. 15.

(Then follow the names of 84 officers who are transfd. to the Unemployed List under various dates.)

Lieut.-Col. Hon. C. M. P. Brabazon, O.B.E. (Maj., Irish Gds.) relinquishes his commn. on account of ill-health contracted on active service; Oct. 22.

Capt. S. H. Long,, D.S.O., M.C. (Lieut., Durh. L.I.) resigns his commn. and is granted the rank of Maj.; July 31 (substituted for notification in *Gazette*, Aug. 6).

Lieut. H. A. Miller relinquishes his commn. on account of ill-health contracted on active service, and is granted rank of Capt.; Aug. 15.

Lieut. (Hon. Capt.) E. Fletcher (R.A.S.C.,) (T.F.) relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain rank of Capt.; Oct. 6.

Lieut. D. Bonnard relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Oct. 14.

Sec. Lieut. (Hon. Lieut.) T. A. Evans relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain rank of Lieut.; Oct. 15.

The following Sec. Lieuts. relinquish their commns, on account of ill-health, and are permitted to retain their rank:—R. L. MacLeod (caused by wounds); Aug. 14. P. Evans (contracted on active service); Oct. 15. L. V. Nicol (contracted on active service); Oct. 16.

The notification in *Gazette* of July 18 concerning Sec. Lieut. H. G. Souchon is cancelled.

The notification in *Gazette* of July 29 concerning Sec. Lieut. R. Blanchard is cancelled.

The notification in *Gazette* of Aug. 12 concerning Sec. Lieut. W. A. Peggs is cancelled.

Administrative

Flying Officer A. Anderson to be Flying Officer, from (O.); Aug. 10

Sec. Lieut. (actg. Capt.) J. W. Jones to be Lieut.; April 2, 1918, and to retain actg. rank of Capt. until April 30 (substituted for notification in *Gazette* of March 7).

Sec. Lieut. C. S. Broughton is graded for purposes of pay and allowances as Lieut. while employed as Lieut.; May 1.

Sec. Lieut. T. F. T. M. Williams (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut.; July 2, 1918.

Sec. Lieut. (Hon. Lieut.) L. A. W. Knight relinquishes his commn. on ceasing to be employed; April 11 (substituted for notification in *Gazette* of June 3, wherein this officer was shown under Flying Branch).

(Then follow the names of 37 officers who are transfd. to the Unemployed List under various dates.)

Lieut. C. W. King relinquishes his commn, on account of ill-health, and is permitted to retain his rank; Sept. 28. Sec. Lieut. A. C. Baldwin relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Oct. 16.

The notification in *Gazette* of April 8, concerning Sec. Lieut. W. Lee is cancelled.

Technical Branch

Capt. (Hon. Maj.) A. Crook is to be actg. Maj. while employed as Maj., Grade (A.); May 1.

Flight Lieut. C. F. Pallott to be Flight Lieut., Grade (A.), from (S.O.); Sept. 29.

Flying Officer L. T. Sanderson to be Flying Officer, Grade (A.), from (S.O.); Oct. 20.

Flying Officer J. W. Gardner relinquishes the grading for pay and allowances of Flight Lieut. on ceasing to be employed as Flight Lieut., Grade (B.); Oct. 13.

Sec. Lieut. F. G. Eckford is graded for purposes of pay and allowances as Lieut. while employed as Lieut., Grade (A.); May 1.

The following Sec. Lieuts. are graded for purposes of pay and allowances as Lieuts. whilst employed as Lieuts., Grade (B.); May 1:—F. Adams, (Hon. Lieut.) H. Allsebrook, R. Fell, H. Haworth, F. Hembley, (Hon. Lieut.) R. Kearton, C. H. N. Nunn, C. G. A. Poole, W. R. Tuddenbam (substituted for the notification in *Gazette* of Aug. 19, wherein the above officers were shown as graded for purposes of pay and allowances as Capts. whilst employed as Capts., Grade (B.)).

Sec. Lieut. G. T. Godfrey to be Lieut.; June 3 (since demobilised).

Pilot Officer (Hon. Flight Lieut.) F. O. Sonderbye relinquishes the grading for pay and allowances as Flying Officer on ceasing to be employed as Flying Officer, Grade (B.); Oct. 11.

Pilot Officers to be Flying Officers, without pay and allowances of that rank:—H. J. Bagge, A. R. Caldicott, W. Morgan, G. V. Russell; Oct. 1.

(Then follow the names of 43 officers who are transfd. to the Unemployed List under various dates.)

Lieut. L. S. Newns relinquishes his comn. on account of ill-health (contracted on active service,) and is granted the rank of Capt.; Oct. 14.

Lieut. R. B. Ashcroft, M.C. (Lieut., Notts and Derby. R.) relinquishes his commn. on account of ill-health (contracted on active service); Oct. 2.

The surname of Sec. Lieut. J. B. Meikle is as now described, and not "Meilke," as stated in *Gazette* of Sept. 12.

The notification in *Gazette* of July 29 concerning Lieut. P. N. Shonc is cancelled.

The notification in *Gazette* of Oct. 21 concerning Sec. Lieut. (Hon. Lieut.) C. A. Assiter is cancelled.

Medical Branch

(Three officers transfd. to the Unemployed List under various dates.)

The initials of G. S. Marshall are as now described and not "G. F.," as stated in *Gazette* of June 3.

The surname of H. B. B. Greene is as now described and not as shown in *Gazette* of Aug. 29.

Dental Branch

Lieut. G. O. Roper to be Lieut., from (K.B.); June 22, 1918 (substituted for the notification in *Gazette* of June 28, 1918, in which he is shown under Medical Branch).

The following are granted temp. commns. as Lieuts.:—C. A. E. Cook; June 10, 1918 (substituted for the notification in *Gazette* of June 25, 1918, in which he is shown under Medical Branch). K. Batten; July 19, 1918, (substituted for the notification in *Gazette* of July 26, 1918, in which he is shown under Medical Branch).

The Christian names of Stanley Gordon Smith are as now described and not as shown in *Gazette* of Aug. 29.

Chaplains' Branch.

Transferred to the Unemployed List:—The Rev. T. L. Beveridge; Sept., 2. The Rev. N. T. Hopkins, B.A.; Sept. 3. The Rev. E. C. Storr, M.A.; Oct. 11.

The notification in *Gazette* of Sept. 26, concerning the Rev. A. J. N. Saunders is cancelled. (*Gazette* of June 27 to stand.)

Memoranda.

The following temp. appointment is made:—Wing Com. R. Gordon, C.M.G., D.S.O., and to be actg. Group Capt. without pay and allowances of that rank whilst specially employed; Oct. 25.

P.F.O. E. Hobbs is granted an hon. commn. as Sec. Lieut.; May 30.

(Ten follow the names of 8 cadets granted hon. commns. as Sec. Lieuts. and 7 officers transfd. to the Unemployed List under various dates.)

The following officers have been granted short service commns, in the ranks stated, with effect from Oct. 24. They will retain their seniority in the substantive rank last held by them prior to the grant of the short service commn.. except that officers gazetted to a rank lower than their previous substantive tank will be placed at the head of the list of officers of the rank to which they are now gazetted, and will retain seniority relative to each other in accordance with their previous position on the gradation list.

In the case of officers now gazetted Flying and Observer Officer from Pilot Officer, seniority will date from the date of *Gazette*.

Squadron Leaders.—H. G. Atkinson, O.B.E. (T.), E. M. Bettington, O.B.E. (T.), H. C. Fuller (A'ship).

Flight Lieutenants (from Squadron Leader).—J. R. Howett (A.).

Flight Lieutenants.—F. R. Alford, M.C. (T.), J. E. M. Atherley (Ad.), J. C. Atkinson (T.), V. H. Baker, M.C., A.F.C. (A.), C. Boumphrey (A. and S.), H. G. Bowen (A.), T. G. Bowler (A.), W. S. Caster, M.C. (A.), F. H. Coleman (A.), N. R. Cook, D.S.C. (A. and S.), E. J. Cooper, D.S.C. (A. and S.), L. G. Le B. Croke (O.), B. C. H. Cross, D.F.C. (S.), C. B. Dalison, A.F.C. (A. and S.), R. E. H. Daniel (T.), G. G. Dawson (T.), E. E. Deans, D.S.C. (A. and S.), J. C. O. Dickson, D.F.C. (A.), J. L. L. Duffus (T.), G. H. Errington (Ad.), E. C. W. Fitzherbert, D.S.C. (T.), A. W. Fletcher, A.F.C. (A. and S.), W. E. C. B. C. Forsyth (S.), M. B. Frew, A.F.C. ,D.S.O., M.C. (A.), S. Frost (T.), W. E. Gardner, D.S.C. (A.), T. R. Hackman (A.), E. St. C. Harnett, O.B.E. (S.O.), H. Hemmin, A.F.C. (A.), L. A. Hervey (A.), T. E. B. Howe, A.F.C. (A.), H. M. Ireland, D.F.C. (A.), H. C. Irwin, A.F.C. (A'ship), C. H. B. Jenner-Parson (A.), J. H. O. Jones (A.), F. C. Lander, A.F.C. (A. and S.), A. Latimer (T.), F. H. Laurence, M.C. (A.), A. S. G. Lee, M.C. (A.), A. L. Lingard (T.), W. H. Mackenzie, A.F.C. (A.), W. Man, D.F.C. (A. and S.), G. J. Monson-FitzJohn (T.), A. D. Newbury (T.), T. H. Newton, D.S.C. (A. and S.), G. M. F. O'Brien, D.S.C. (A. and S.), A. H. Peck, D.S.O., M.C. (A.), A. R. T. Pipon, D.S.C. (S.), W. A. Powell (T.), E. R. Pritchard (A. and S.), A. D. Pryor (A.), P. C. Purser, M.C. (A.), H. G. P. Rees (T.), C. B. Ridley, D.S.C. (A.), A. Roberts (T.), E. P. Roberts, M.C., D.C.M. (A.), A. Roulstone, M.C. (A.), H. P. Rusbfortb, M.C. (A.), L. C. Shoppee, D.S.C. (A. and S.), E. W. Simpson (S.O.), A. C. Snow (T.), R. L. Stevenson, M.B.E. (A.), D. Stewart, A.F.C. (A.), T. Q. Stud, D.F.C. (A.), T. W. Tattersall, M.B.E. (T.), M. Thomas, A.F.C. (A.), T. F. W. Thompson (A.), E. F. Turner (T.), G. H. Walker (A.), W. H. De W. Waller, A.F.C. (A.), D. E. Ward (T.), G. F. P. Warren (T.), L. Whitworth, A.F.C. (A'ship), H. E. P. Wigglesworth, D.S.C. (A.), F. T. Williams, M.B.E. (A.). E. A. E. Wood (T.), W. P. Woodcock (T.), R. A. Young (Ad.).

Flying Officers (from Fligh Lieutenants).—F. J. W. Mellersh, A.F.C. (A.), G. A. H. Pidcock (A.), J. W. Pinder, D.F.C. (A.), W. W. Wakefield (A.).

Flying Officers.—P. E. D. Addis (Ad.), B. C. Akehurst (T.), A. F. Alexander (A.), C. T. Anderson, D.F.C. (A.), M. H. Armstrong (T.), G. Baillie (T.), A. C. Bayley (A.), W. Bentley, D.F.C. (A.), H. C. Black (A.), G. N. Blennerbassett, M.C. (A.), G. H. Boyce (A. and S.), T. Brewin (A.), R. F. Browne, D.F.C. (A.), G. M. Bryer, A.F.C. (A.), J. Burden (T.), V. W. Burgess, A.F.C. (A.), F. O. Burnley (T.), W. J. Burr, M.C., D.C.M., M.M. (A.), M. H. Butler, D.F.C. (A.), S. L. Cannon (A.), R. L. Cantle (T.), D. V. Carnegie, A.F.C. (A. and S.), B. R. Carter (S.), O. E. Carter, M.C. (A.), J. R. Cassidy (T.), T. W. Cave, M.C. (T.), J. S. Chick, M.C. (A.), F. W. Clarke (T.), P. J. Clayson, M.C., D.F.C. (A.), R. Clowes (A.), J. H. Cooper, M.C. (A.), W. R. Cox, M.C., A.F.C. (A.), R. C. Creamer, D.F.C. (A.), P. H. Cummings, D.F.C. (A.), C. C. K. Dagg, A.F.C. (A. and S.), G. D. Daly (T.), A. J. Dawes (Ad.), S. Dawson, D.F.C. (A.), M. C. Dick (A.), H. H. Down, A.F.C. (A.), G. F. Drudge (T.), W. F. Dry (T.), D. L. Evans, M.C., D.F.C. (A.), N. Fitzgerald Eager (A.), S. S. Flook, D.F.C. (A.), A. H. Flower (A.), G. J. Fowler, A.F.C. (A.), G. Fox-Rule, D.F.C. (A.), C. S. Fulton (S.O.), A. V. Gash (Ad.), J. M. Glaisher, D.F.C. (A.), S. Graham, M.C., A.F.C. (A.), E. G. Green, M.C. (A.), L. W. R. Grubb (A.), W. Halford, D.F.C. (A.), R. Hall (T.), J. H. Halliwell (A.), W. Halliwell (Ad.), L. Hamilton, D.F.C. (A.), W. F. Hamilton (A.), H. N. Hampton, D.F.C. (A.), P. Harris (A. and S.), L. G. Harrison (A.), R. Harrison, D.F.C. (A.), J. R. R. Harvey, M.M. (A. and S.), G. H. Havelock-Sutton, M.C. (Ad.), G. S. L. Hayward, M.C. (A.), A. E. Hempel (A.), V. F. R. Hill (T.), G. S. Hodson, A.F.C. (A.), H. L. Holland (A.), R. Hood (A.), G. V. Howard, D.F.C. (A.), G. N. Humphreys (A.), N. W. Hustings (A.), J. W. Hustwaite (Ad.), R. M. Johnson (A. and S.), A. L. Jones (A.), B. C. Jones (A.), O. J. F. Jones-Lloyd (A.), G. Kidd (A. and S.), A. G. Lamplugh (A.), R. H. Latham (T.), A. Leach, M.C. (A.), E. M. Ling (T.), L. J. Lipscomb (T.), H. G. W. Lock (A.), L. W. Lowen (A.), H. T. Lydford, A.F.C. (A.), E. P. Mackay (A.), I.C. R. Mackenzie (A.), J. M. McEntegart (S.O.), J. McFarlane, M.C. (A.), E. C. McKenzie-Martin (T.), J. A. McLaren, M.C. (Ad.), E. J. McLoughlin (A.), F. McQuistan, D.F.C. (A.), P. M. McSwiny (A.), G. H.

Martingell, A.F.C. (A.), W. K. Mercer (A.), G. F. Moody (A. and S.), G. A. Morgan, A.F.C. (A.), C. P. Murchie (T.), W. G. Murray (T.), C. E. Nightingale (T.), M. J. Norton (Ad.), A. J. Packham (T.), L. H. Pakenham-Walsh D.F.C. (A.), M. T. S. Papenfus, D.F.C. (A.), L. F. Peaty (T.), L. F. Pendred, D.F.C. (A.), C. Pilkington, A.F.C. (A.), S. L. G. Pope (A. and S.), W. G. Preston, D.F.C. (A.), S. L. Quiene, M.C. (A.), R. J. Read (A.), A. R. M. Rickards (A.), H. N. C. Robinson, M.C. (A.), R. C. Rodger, M.C., D.C.M. (A.), F. H. Rowan (T.), H. St. C. Roy, M.C. (T.), G. Scarrott (Ad.), H. E. Searson, D.F.C. (A.), F. H. Shales (A.), T. MacM. Shields, D.F.C. (A.), W. Sidebottom, D.F.C. (A.), F. H. Sims (Ad.), W. M. Smith (A. and S.), C. B. S. Spackman, D.F.C. (A.), D. A. Stewart, M.C., D.F.C. (A.), J. S. Stubbs, D.F.C., A.F.C. (A.), S. Symonds (T.), A. R. Thompson (T.), A. C. Townsend, A.F.C. (A.), W. E. Towusend (T.), E. E. Turner, D.F.C., D.S.C. (A.), R. H. Tweedy (T.), E. A. B. Urmston (A.), E. C. Usher (A. and S.), G. O. Venn (A.), T. V. Villiers (T.), L. E. Vine (T.), A. W. S. Wagner (Ad.), H. de W. Waller (A.), J. W. Wallwork, M.C. (A.), E. A. M. Waterton (A.), F. N. Whitcley (A.), G. W. M. Whitton (T.), C. G. Wigglesworth, A.F.C. (A'ship), T. M. Williams, M.C., D.F.C. (A.), H. E. Winch (A.), A. E. Woodbridge (A.), E. C. B. Wright (A. and S.), S. G. Wybrow (T.), W. M. Yool (A.), H. N. Young, D.F.C. (A.), E. L. Zink (A.).

Observer Officers.—P. J. Bradley, C. P. M. B. Caillard, P. A. Cockeram, M.C., E. J. Garner, A.F.C., O. R. Gayford, D.F.C., R. Hamilton, M.C., A. J. Insall, N. H. Jenkins, D.F.C., D.S.M., H. Smith, D.F.C., A. C. Stevens, J. C. Tulock, W. S. Watson.

Flying Officers (from Pilot Officers).—A. J. Adams (T.), F. Adams (T.), L. W. Allen, M.C. (T.), W. Allen (T.), A. T. J. Anderson (A. and S.), W. Bagnall (T.), A. A. W. Barron (T.), E. A. J. Brown (A.), B. G. Bryan (T.), A. C. S. Buist, M.C. (A.), S. D. Carpenter (T.), A. E. Case (T.), P. Christopherson (T.), C. C. Clark (T.), E. H. Colman (A.), F. H. Davis (T.), H. H. Ffrench (Ad.), W. Frederick (T.), W. H. Golder, D.S.M. (T.,) K. C. L. Gorringe (A.), G. A. Gowler (A.), G. R. St. C. Gwynne-Timothy (A.), O. T. Hazell (A.), B. E. Herbert, D.C.M. (A. and S.), S. Herbert (T.), J. F. Herd (T.), O. A. P. Heron, D.F.C. (A.), W. E. Humphreys (T.), J. H. Huxley, D.F.C. (A.), J. D. Jackson (A.), P. J. R. King (A.), F. Kirk (A.), G. Lacey (T.), W. E. Lowrie (T.), F. J. Magee (T.), E. Marsden (T.), M. H. McErlean (A.), R. C. Michaelson (A. and S.). J. W. Mitchell (T.), L. G. Morris (T.), F. C. North (T.), F. A. O'Brien (T.), E. S. Oshorn (T.), J. Owen, D.F.C., M.M. (A.), G. T. H. Pack (T.), L. A. Parker (T.), S. H. Potter (A.), C. Roper (S.), J. Sewell (T.), I. C. Slater (A.), J. H. Slater, M.B.E. (T.), H. A. Smith (T.), G. R. B. Smyth (A.), F. R. Steggall, D.C.M. (A.), H. H. Storrs (A.), F. J. Tadman, C.G.M. (T.), A. J. H. Taylor (A.), E. Taylor (T.), R. M. Thomas (T.), S. Upton (T.), H. Wehh (T.), F. H. Whitmore, D.S.C. (T.), H. B. Williams (A.).

Observer Officers (from Pilot Officers).—A. W. Bloy, H. J. Collins, W. C. Day, M.C., J. H. Gray, T. P. T. Jones, B. J. Paget, F. Thomasson, D.F.C., M.M., G. I. Thomson, D.F.C.

The classification of Flight Lieut. G. W. Robarts, M.C. (S.O.) is as now described, not (A.) as stated in the *Gazette* of Oct. 10.

The second Christian name of Flying Officer Rupert Chandos Bryant (A.) is as now described, not "Charles," as stated in the *Gazette* of Sept. 12.

The notifications appearing in *Gazettes* of the dates indicated below, appointing the following officers to short service commns., are cancelled:—Flying Officer F. L. Barnard (A.), Flying Officer A. Grimshaw (A.), Flying Officer P. D. Robins (A.), Observer Officer J. C. Wallace; Sept. 12. Flight Lieut. J. H. D. M. Campbell (S.O.); Oct. 10.

The following officers are granted short service commns., with effect from, Aug. 1, not Oct. 10, as stated in *Gazette* of th latter date:—Flight Lieut. H. Cooch, A.M.I.E.E. (T.), Flight Lieut. E. L. Johnstone, A.F.C. (A'ship) Flight Lieut. A. J. Osborn (S.O.).

London Gazette, October 28.

Permanent Commissions.

The attention of officers named in this *Gazette* is directed to Air Ministry Weekly Order No. 866 of 1919, relating to the grant of permanent commns. and to the new rates and conditions of pay and other emoluments.

The following are granted permanent commns. in the R.A.F. in the ranks stated with effect from Aug. 1:—

Squadron Leaders.—P. A. Shepherd (S.), G. F. H. Faithfull, O.B.E. (S.), M. E. A. Wright, A.P. (T.), J. C. M. Lowe, A.P. (T.).

Flight Lieutenants.—C. J. McKay, M.C., D.F.C. (A.), J. Pearce, O.B.E. (T.), H. K. Thorold, D.S.C., A.F.C. (A.), A. Coningham, D.S.O., M.C., D.F.C. (A.), N. C. Spratt (A.), J. O. Andrews, D.S.O., M.C. (A.), A. Lees (A.), D. O. Mulholland, A.F.C. (A.), W. A. C. Morgan, M.C. (A.), F. H. M. Maynard, A.F.C. (A.), B. G. A. Baker, M.C. (A.), E. J. D. Routh (A.), R. H. M. S. Saundby, M.C., A.F.C. (A.), J. K. Summers, M.C. (A.), N. B. Fuller, M.B.E. (A.), M. R. N. Jennings, M.C., A.F.C. (A.), G. E. Godsave (T.), R. S. Aitken, M.C., A.F.C. (A.), J. A. Slater, M.C., D.F.C. (A.), R. W. Chappel, M.C. (A.), J. F. A. Day, A.F.C. (A.), J. B. Walmesley, D.F.C. (A.), R. G. E. Fulljames, M.C. (A.), N. Keeble, D.S.C. (A.), W. D. Thom, D.F.C. (A.), F. St. J. Woollard, A.F.C. (A.), A. H. Orlebar (A.), A. B. Shearer (A.), H. W. Evens (S.), L. M. Bailey, A.F.C. (A.), L. O. Brown, D.S.C., A.F.C. (A. and S.), P. D. Robertson, A.M. (T.), A. R. Mackenzie, A.P. (T.), D. S. Don (A.), C. K. Chandler, M.B.E. (T.), G. W. Biles, D.F.C. (A. and S.), V. R. Scriven, A.F.C. (S.), W. S. Magrath (A.), P. E. Gwyer, M.B.E. (T.), D. Colyer, D.F.C. (A.), M. A. J. Orde (T.).

Flying and Observer Officers.—H. M. Massey, M.C. (S.O.), C. O. B. Beale, D.S.O. (A.), C. A. Stevens, M.C. (A. and S.), C. R. Steele, D.F.C. (A.), W. A. K. Dalzell (A.), S. M. Kinhcad, D.S.C., D.F.C. (A.), P. H. Mackworth, D.F.C. (A. and S.), W. H. Park, M.C., D.F.C. (A.), A. L. Chick, A.F.C. (A.), C. T. Black (A.), E. R. C. Scholefield, D.C.M., (A.), F. Williams, M.C., D.F.C. (A.), I. Cullen, A.F.C. (A.), E. W. Broadberry, M.C. (A.), N. S. Dougall, D.F.C. (O.), A. M. Wray, M.C., A.F.C. (A.), E. E. F. Loyd (A.), J. W. Mullen (O.), W. Sharpe A.F.C. (A.), I. H. P. McEwen (A.), H. S. P. Walmsley, M.C. (A.), C. H. Arnison, M.C. (A.), H. E. Walker, M.C., D.F.C. (A.), G. C. O'Donnell, D.F.C. (A.), H. L. Rough, D.F.C. (A.), H. H. Sharp (T.), J. J. Ll. Williams, M.C. (A.), C. L. King, M.C., D.F.C. (A.), T. S. Horry, D.F.C. (A.), C. H. H. Bilney (A. and S.), G. A. Pennington (A. and S.), J. Ll. Findlay, M.C. (A.), S. T. B. Cripps (A.), E. B. Jones (A.), J. R. F. Randell, D.F.C. (A.), G. Y. Tyrrell, M.C. (A.), J. W. Turton-Jones (O.), W. H. Poole, A.F.C., M.M. (A.), C. Rapley (T.), F. G. Brockman (T.), H. Nelson (T.), F. G. Porter (O.), P. J. Parry (A.).

Captain.—E. C. Emmett, M.C., D.F.C. (A.).

The notification appearing in *Gazette*, Sept. 16, appointing Flying Officer P. H. Mackworth, D.F.C. to a shortservice commn., is cancelled.

The following temp. appointments are made at the Air Ministry:—

Staff Officer, 1st Class (Medical).—Wing Com. H. Cooper, D.S.O.; Sept. 6.

Staff Officers, 2nd Class (Medical).—Flight Lieut. (actg. Sqdn. Leader) J. A. Giles, Flight Lieut. (actg. Sqdn. Leader) H. A. Treadgold; Sept. 6.

Flying Branch.

Sec. Lieuts. to be Lieuts.—L. Radford; Sept. 15, 1918. T. Q. Harvey, G. G. Ross-Smith; Nov. 2. F. H. Solomon; Jan. 29. J. R. McL. Keil; May 17.

Sec. Lieut. R. Boyle to be Sec. Lieut. (O.), from (Ad.); May 27, 1918.

6564 Flight Cadet C. Goatcher is granted a temp. commn. as Sec. Lieut. (O.); Sept. 9, 1918.

Flight Cadet G. A. Vincent is granted a temp. commn. as Sec. Lieut. (A. and S.); Nov. 8, 1918.

The following Flight Cadets are granted temp. commns, as Sec. Lieuts. (O.):—175516 A. S. Farquhar, 173527 W. Porter; Oct. 20, 1918 (substituted for the notification in the *Gazette* of Feb. 14, wherein the above Cadets were appointed, with effect from Oct. 25, 1918).

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. H. D. Giblett; May 19. Lieut. W. R. McCoo; July 18 (substituted for notification in the *Gazette* of June 3). Lieut. W. A. Peggs (Lieut., Sherwood For.); July 24. Sec. Lieut. (Hon. Lieut.) H. B. Kennedy (Lieut., Can. Field Art.); Aug 1. Lieut. (Hon. Capt.) C. O. Lilly, D.S.O. (Capt., Dorset R.); Aug. 28. Lieut. P. J. Long (Capt., R.A.S.C.); Sept. 1. Lieut. G. D. A. Heys (Lieut., R.G.A.); Sept. 19. Capt. A. D. Gaye (Capt., Hereford R.); Sept. 20. Lieut. (Hon. Capt.) P. A. Smith (Capt., Dur. L.I.); Sept. 22. Sec. Lieut. F. Haveland (Lieut., R.G.A.); Oct. 9) Lieut.-Col. G. F. Montague (Com., R.N.); Oct. 12. Lieut. (Hon. Capt.) R. S. B. Beckett (Capt., Gurkha Rif.); Oct. 13. Lieut. H. R. Eycott-Martin, M.C. (Lieut., R.E.), Lieut. S. G. Glover, D.C.M. (Lieut., R. Ir. Fus.); Oct. 14. Lieut. A. W. Hawkins (Lieut., Yorks R.); Oct. 17. Sec. Lieut. B. Bear, M.M. (Lieut., E. Yorks R.); Oct. 18. Lieut. H. V. Saunderson (Lieut., R.F.A.); Oct. 20. Sec. Lieut. (Hon. Lieut.) A. J. R. Napier (Lieut., Ches. R.), Lieut. T. H. J. Wright (Lieut., Seaf. Highrs.); Oct. 21. Sec. Lieut. (Hon. Lieut.) G. E. Clavey (Lieut., R.F.A.); Oct. 24.

(Then follow the names of 172 officers who are transfd. to the Unemployed List under various dates.)

Lieut. (actg. Capt.) L. J. Mann, M.C. (Lieut., R.A.S.C.), relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Capt.; Feb. 8 (substituted for notification in the *Gazette* of Feb. 7).

Lieut. A. C. E. Gregory relinquishes his commn, on account of ill-health contracted on active service, and is permitted to retain his rank; Oct. 18.

Lieut. W. J. H. Courtis (Lieut., Devon R.) resigns his commn.; Oct. 24.

Sec. Lieut. H. P. Brumell relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; July 12 (substituted for notification in the *Gazette* of Sept. 30).

Sec. Lieut. (Hon. Lieut.) C. C. Loretto is antedated in his appointment as Sec. Lieut. (Hon. Lieut.) (O.); Aug. 8, 1918.

The initials of Lieut. L. A. Tapper are as now described, and not "L. J. A.," as stated in the *Gazette* of Sept. 5.

The notification in the *Gazette* of Oct. 10 concerning P. F. O. A. J. Mantle, D.F.C., is cancelled.

The notification in the *Gazette* of April 29 concerning Sec. Lieut. F. H. Snoxell is cancelled. (*Gazette* notice of May 30 to stand.)

The notification in the *Gazette* of May 2 concerning Sec. Lieut. S. Pile is cancelled.

The notification in the *Gazette* of July 18 concerning Sec. Lieut. N. Sillars is cancelled.

The notification in the *Gazette* of Aug. 12 concerning Sec. Lieut. (Hon. Lieut.) H. B. Kennedy, is cancelled.

The notification in the *Gazette* of Sept. 5 concerning Lieut. S. Hill is cancelled.

The notification in the *Gazette* of Sept. 16 concerning Lieut. A. McD. Dunlop is cancelled.

The notification in the *Gazette* of Oct. 3 concerning Lieut. C. H. Archer is cancelled.

The notification in the *Gazette* of Oct. 15, 1918, concerning Flight Cadet R. S. Nicholl is cancelled.

The notification in the *Gazette* of May 21, 1918, concerning Sec. Lieut. E. H. Bullen is cancelled.

The notification in the *Gazette* of June 24 concerning Lieut. E. L. Sutcliffe is cancelled.

The notification in the *Gazette* of Oct. 17 concerning Sec. Lieut. W. W. Smith, is cancelled.

Administrative Branch.

Sec. Lieut. T. F. T. M. Williams to be Lieut.; June 13.

(Then follow the names of 33 officers who are transfd. to the Unemployed List under various dates.)

Lieut. D. H. Rudd relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Oct. 2.

Sec. Lieut. F. Nicholls relinquishes his commn. on account of ill-health; May 20 (substituted for notification in *Gazette* of Jan 31).

The following Sec. Lieuts. relinquish their commns, on account of ill-health, and are permitted to retain their rank:—I. C. Bannister; July 1 (substituted for notification in *Gazette* of July 1). G. B. Blake (contracted on active service); Sept. 28.

The surname of Flight Lieut. F. F. Loyd is as now described, and not as "Lloyd," as stated in *Gazette* of Sept. 26.

The notification in *Gazette* of Sept. 19 concerning Sec. Lieut. G. B. Blake is cancelled.

Technical Branch.

Pilot Officers to be Flying Officers, without the pay and allowances of that rank:—H. E. Davies, F. W. Todd; Oct. 1.

Lieut. C. L. Cleburne (Lieut., Hampshire Aircraft Park, T.F.), relinquishes his commn. on ceasing to be employed; March 9.

(Then follow the names of 59 officers who are transfd. to the Unemployed List under various dates.)

Lieut. E. A. B. Carter (Midd'x R., T.F.), relinquishes his commn. on account of ill-health (contracted on active service), and is granted the rank of Capt.; Jan 25 (substituted for notification in the *Gazette* of Jan. 24).

The initials of Lieut. R. J. Murchison are as now described and not "R. T." as shown in *Gazette* of Sept. 30.

Medical Branch.

(One officer transfd. to the Unemployed List.)

Memoranda.

(Then follow the names of 2 Overseas Cadets granted temp. commns. as Sec. Lieuts.)

The following temp. Hon. Lieuts. relinquish their commns, on ceasing t be employed:—J. A. Foster; Sept. 2. G. G. Bradshaw, H. R. Fulford; Sept. 16. E. Johnson, C. F. Woodgate; Oct. 16. T. Kimpton; Oct. 18.

Lieut. (actg. Capt.) W. J. C. Kendall, M.C., is transfd. to Unemployed List, from (S.O.); Oct. 9.

Lieut.-Col. C. F. de S. Murphy, D.S.O., M.C. (Maj., R. Berks. R.) resigns hi commn., and is granted the hon. rank of Brig.-Gen.; Sept. 17 (substitute for notification in the *Gazette* of Sept. 16).

Capt. (actg. Maj.) W. T. Blake (Oxon and Bucks L.I.) relinquishes his comn. on account of ill-health, and is granted the rank of Maj.; May 13 (substituted for notification in the *Gazette* of May 27).

London Gazette, October 31.

The following promotions are made:—

Air Commodores.—Group Capt. H. R. M. Brooke-Popham, C.B., C.M.G. D.S.O., A.F.C.; Group Capt. E. M. Maitland, C.M.G., D.S.O., A.F.C.; Aug 4. Air Commodore A. V. Vyvyan, C.B., D.S.O., to be Air Vice-Marshal Oct. 10.

Air Commodores.—Group Capt. (actg. Air Commodore) B. H. H. Cooke, C.M.G., C.B.E., D.S.O., relinquishes the grading for pay and allowances a Air Vice-Marshal; Oct. 18.

Flying Branch.

Lieut.-Col. C. F. de S. Murphy, D.S.O., M.C., to be Lieut.-Col. (A.), fro Group Commander; June 5.

Flight-Lieut. H. A. Tweedie to be Flight-Lieut. (A. and S.), from (S.O.) Sept. 15.

Lieut. C. G. Ferrell is graded for purposes of pay and allowances as Capt. whilst employed as Capt. (A. and S.); June 21.

Lieut. I. L. Roy to be Lieut. (A.), from (T.); June 1, 1918.

Sec. Lieuts. to be Lieuts.:—J. H. Manicom, M.C.; Nov. 30, 1918 (since demobilised). W. C. Treen, M.C., D.F.C.; April 1 (since relinquished commn.).

Pilot Officers to be Flying Officers:—W. Smith; Oct. 1. W. G. Freel; Oct. 24.

P.F.O., C. E. Usher-Somers (late R.N.S.A.) is granted a temp. commn. as Sec. Lieut. (A.); Aug. 14, 1918. 305019 Flight-Cadet A. Wilson is granted a temp. commn. as Sec. Lieut. (O.); Aug. 26, 1918.

The following relinquish their commns. on ceasing to be employed:—Lieut. S. C. P. Slattery (Lieut., Ox. and Bucks. L.I.); Sept. 11. Sec. Lieut. J. L. Fletcher (Sec. Lieut., Dorset R.); Oct. 13. Lieut. H. Kirby (Lieut., E. Kent R.); Oct. 15. Lieut.-Col. A. C. E. Marsh (Maj., R.F.A.), Capt. C. C. Waddington (Capt., Hamp. R.), Lieut. (Hon. Capt.) T. R. Wells, M.C. (Capt., Punjabis); Oct. 16. Maj. R. G. H. Murray, M.C. (Maj., Gurkha Rifs.); Oct. 21. Capt. R. H. Shears (Capt., Shrops. L.I.), Lieut. C. E. Jessell (Lieut., Wilts. R.); Oct. 22. Maj. J. E. Hume, D.S.O. (Capt., Conn. Rangs.); Oct. 23. Lieut. E. P. Manson, M.C. (Lieut., Midd'x. R.); Oct. 25.

(Then follow the names of 132 officers who are transfd. to the Unemployed List under various dates.)

The following Capts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank:—D. G. Young; Oct. 24. J. M. Heap; Oct. 27.

Capt. H. Hemming, A.F.C. (Lieut., Worc. R.), resigns his commn.; Nov. 1.

Lieut. D. E. P. Chaplin (Lieut., R.H., R.F.A.), resigns his commn.; Sept. 10 (substituted for notification in *Gazette* of Sept. 9).

Lieut. O. C. Holleran relinquishes his commn. on account of ill-health caused by wounds, and is granted the rank of Capt.; Sept. 26.

Lieut. J. C. Wilson, D.F.C., relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Oct. 23.

Sec. Lieut. F. B. A. Punnett relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Sept. 28.

Sec. Lieut. (Hon. Lieut.) C. J. Swatridge (Lieut., Notts. and Derby. R.), resigns his commn.; Oct. 25.

The initials and rank of Lieut. W. E. B. Holland are as now described, and not "Lieut. (actg. Capt.) W. E. Holland," as stated in *Gazette* of May 6.

The notification in *Gazette* of April 1, concerning Sec. Lieut. (Hon. Lieut.) G. J. Williams, is cancelled (notification in *Gazette* of April 4 to stand).

The notification in *Gazette* of April 8, concerning Lieut. W. J. Goddard, is cancelled.

The notification in *Gazette* of June 6, concerning Sec. Lieut. R. J. Palmer, is cancelled (notification in *Gazette* of Aug. 29 to stand).

The notification in *Gazette* of July 29, concerning Lieut. W. Adamson, is cancelled.

Administrative Branch

Wing Com. A. C. H. MacLean to be Wing Com., from (S.O.); Oct. 7.

Lieut. J. B. V. Clements, D.F.C., to be Lieut., from (O.); Nov. 23, 1918 (substituted for notification in *Gazette* of Feb. 4).

Sec. Lieut. I. Holliday to be Lieut. (since demobilised); May 8.

Pilot Officer (Hon. Flying Officer) L. Miller to be Pilot Officer (Hon. Flying Officer), from (S.O.); Sept. 24.

(Then follow the names of 42 officers who are transfd. to the Unemployed List under various dates.)

Capt. (actg. Maj.) W. J. King (R. Muns. Fus.) relinquishes his commn. on account of ill-health (caused by wounds); May 16.

Capt. P. G. Pullon (Ches. R., T.F.) relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; Oct. 20.

Sec. Lieut. T. Collins relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Oct. 23.

The initials of Lieut. F. W. Alderton are as now described, and not "W. F." as stated in *Gazette* of Feb. 14.

The notification in *Gazette* of Oct. 3 concerning Lieut. J. R. M. Tweddell, is cancelled (*Gazette* of July 29 to stand).

Technical Branch

Lieut. M. P. Mullery to be actg. Capt. whilst employed as Capt., Grade (A.); from Aug. 28, 1918, to April 30.

The following Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capt., Grade (A):—

M. P. Mullery; from May 1 to May 15.

H. A. Adams, from (S.O.); May 13 (substituted for notification in the *Gazette* of May 30 and July 15).

Lieut. I. L. Roy to be Lieut., Grade (B), from (A); April 4, 1918 (substituted for notification in the *Gazette* of May 7, 1918).

Lieut. F. C. Rayson to be Lieut., Grade (B), from A'ship; July 17 (substituted for notification in the *Gazette* of Sept. 5).

Sec. Lieuts. to be Lieuts.:—P. S. Riach; April 15, 1918 (without pay and allowances of that rank prior to May 1, 1918). C. C. Parrott; Jan. 29 (without pay and allowances of that rank prior to March 13) (substituted for notification in the *Gazette* of April 4). Sec. Lieut. (Hon. Lieut.) C. J. Poole is graded for purposes of pay and allowances as Lieut. whilst employed as Lieut., Grade (B), from May 1 to July 31.

Sec. Lieuts. to be Lieuts. without the pay and allowances of that rank:—J. Butcher, G. G. Hargrave; April 2, 1918.

Sec. Lieut. S. Graves to be Sec. Lieut., Grade (B), from (Ad.); June 7.

(Then follow the names of 59 officers who are transfd. to the Unemployed List. under various dates.)

Capt. H. Lancaster (Norf. R.) relinquishes his commn. on account of ill-health; Oct. 20.

The notification in *Gazette* of April 29 concerning Sec. Lieut. (Hon. Lieut.) R. W. V. Midlane, is cancelled.

The notification in *Gazette* of June 3 concerning Sec. Lieut. (Hon. Lieut.) R. W. V. Midland, is cancelled.

The notification in *Gazette* of May 30 concerning Sec. Lieut. G. R. Wills, is cancelled.

Medical Branch

(4 officers transfd. to the Unemployed List.)

Memoranda

The following temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed:—J. B. Mitchell, R. K. Roberts, J. P. Tweedy; Sept. 16. E. D. Burley, H. E. Portsmouth, H. E. G. Rowley, R. G. Sharp; Oct. 16.

(9 officers transfd. to the Unemployed List.)

Sec. Lieut. G. P. Pinney relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Oct. 8.

The notification in the *Gazette* of Oct. 10 concerning Temp. Hon. Lieut. (Hon. Capt.) W. S. Kellar, is cancelled.

VARNISHES FOR AIRCRAFT WORK

THE selection of a varnish for use on aeroplanes is not an easy matter, for the conditions under which it is called upon to do its work are onerous, to say the least, while it is all too seldom that it is possible to give the time necessary to ensure the coating being thoroughly dry, so that it may give its maximum efficiency. It is, therefore, with pride that Llewellyn Ryland, Ltd., look back to 1916, when their Rylard varnish was adopted by the Air Ministry for use on the doped fabric of aeroplanes as being the most suitable for the purpose. So satisfactory did it prove that in order to meet the demands of the Service it became necessary not only to concentrate all the energies of the works at Balsall Heath, Birmingham, upon its production, but also to greatly increase the plant for its manufacture, and in 1918 over 100,000 gallons were supplied to the Air Ministry.

Among the characteristics of Rylard varnish which render it specially adapted for aero work, may be mentioned the fact that it dries rapidly—in from five to six hours—forming a thin film, which weighs less than 1 oz. to the square yard. This film is highly elastic, and yet is very hard and durable; it resists the action of a mixture of hot castor and mineral oil, is especially impermeable to moisture, and withstands the action of petrol, while it protects metal, wood or aero fabric with equal reliability. For years before the manufacture of Rylard varnish was commenced on a large scale in 1913, the firm had conducted experiments in various climates and situations all over the world. Even now, in spite of the success which has been attained, the firm is continuing its research and experimental work in a persistent endeavour to improve the qualities of the varnish, and to ensure that it is the best material for its purpose in aviation work.

For use on propellers, Messrs. Llewellyn Ryland have devised a scheme of varnishing, and the method of applying its coat together with its subsequent treatment are dealt with in a pamphlet of which they will gladly send copies to anyone really interested.

The firm has had an unique experience in the preparation of protective coverings. How far the record goes back it is not possible to ascertain precisely, but it is definitely known to have originated, over a century ago, with ancestors of the present proprietors and the family succession in the control of its affairs has been uninterruptedly maintained. In 1898, a limited liability company was formed, under the style of Llewellyn Ryland, Ltd., of which Mr. J. W. Ryland and Capt. L. M. Ryland are the directors, Mr. J. W. Ryland being the chairman and managing director.

Prior to the War, the company was mainly engaged in the export of varnishes for railways, coach and motor body builders, decorators, etc., and lacquer for the brass trade, to North and South America, South Africa and Australia. They have a branch company in Chicago, and offices and agents in Rio de Janeiro, Cape Town, Sydney, Oporto, Lisbon, Bilbao, Brussels, and Bombay, while agents have recently been appointed in the Near East, Poland, Scandinavia, Mexico, etc.

SIDE-WINDS

IN order to put the business of Lodge sparking-plugs on a basis rendered necessary by its present scope, and to allow for factory developments to meet the world-wide demand for Lodge plugs, a new company is being formed (and will be registered on November 19, 1919) with a capital of £300,000, to take over and carry on the business of the Lodge Sparking-Plug Co., Ltd. Opportunity will be taken of this reconstruction to shorten the name of the company, which will in future be known simply as "Lodge Plugs, Ltd." There will be no change in either its ownership, management or general policy, and the quality of the Lodge plugs will be maintained at their traditional high level. They will continue to be produced in the same up-to-date and extensive factory near Rugby.

* * *

THE Airco service has, with Saturday's scheduled flights, completed its tenth week of daily operation, and the record of the service now stands as follows:—**Flights scheduled, 154; flights accomplished, 147;** prevented by weather, 1; interrupted by weather, 3; interrupted by mechanical defects, 3; number of miles flown, 37,750; average speed (miles per hour), 105; The following is a summary from official reports of the weather flown through during these ten weeks:—Days favourable for flying, 17; days unfavourable, 30; days noted officially as "unfit" for flying, 13.

* * *

During the week ending October 29, 1919, the Handley Page London-Paris service carried 38 passengers and 2,172 lbs. of freight. The London-Paris flights were carried out to scheduled time, despite high winds, rain and fog. During the same period 21 passengers were carried on the London-Brussels service, and 630 lbs. of luggage. Freight had to be refused, owing to the present restrictions preventing merchandise from being carried by air to Belgium. On October 28, two ladies, aged respectively 75 and 73, were flown from London to Brussels during a gale.

* * *

A Handley Page is to be exhibited at the sixth International Aircraft Exhibition which will open at the Grand Palais, Paris, on December 19.

* * *

The four-engined Handley Page machine, which was exhibited at the E.L.T.A. Exhibition, Amsterdam, returned by air on October 30, and landed at Hounslow. When the machine left the aerodrome in Holland, the locality was in so flooded a condition that sea-gulls were floating on the water in the vicinity of the machine. Passengers were carried and their bicycles were stored in the machine to enable the owners to return by road from Vrieswick, where a landing was made. The final stage of the journey was a non-stop flight to Hounslow in two and a half hours.

* * *

Capt. Hinchcliffe and Mr. Shanks are still over in Holland with their Avros, but the weather has been too bad of late to permit of much flying. In the intervals, Capt. Hinchcliffe finds occupation and amusement in negotiations with the Customs authorities over the valuation of material. The duels on this question are fierce and furious. The officials' estimate of value is usually about one million guelders. The Avro pilot replies with a valuation of about 9*d.* Then begins the battle, and they fight it out inch by inch, or rather guelder by guelder, until eventually they arrive at a figure considered fair by both sides. Then an armistice is signed until fresh goods arrive from England. They are still using the E.L.T.A. aerodrome, which is now a most deserted place, overshadowed by the presence of Herr Fokker, who has purchased all the exhibition buildings and the fencing surrounding the aerodrome. The rivalry of commercial aeroplanes seems to be no less keen than were the contests of the War. Well, the British won the first event and they have no cause to be doubtful about the result of the sequel, if merit counts for anything.

* * * *

COMPANY MATTERS

British Internal Combustion Engines, Ltd.

Presiding at the first annual general meeting of the above company, Mr. R. Henry Wheeler, said:—

"I would remind you that the company was only registered in April, 1918, and I think you will agree that it has already given a very good account of itself. As the company pays the income-tax up to 5*s.* in the £ on the dividends, they are equivalent to £9 7*s.* 6*d.* per cent. on the preference, and £6 5*s.* per cent. on the ordinary shares.

"As you are aware, the Green Engine Co., Ltd., is the proprietor of the British, Foreign and Colonial patents under which the Green engine is designed and manufactured. This engine was famous as the winner of the Naval and Military Aeroplane Engine Competition, winning the first prize of £5,000 for the best aeroplane engine immediately prior to the War, and it is very significant that in the first race after the War its 35 h.p. engine beat all competitors in the Aerial Derby Handicap at Hendon in Messrs. A. V. Roe and Co.'s new 'Baby Avro' aeroplane. As a result of its recent remarkable performances, many inquiries have been received and some very satisfactory business has already been concluded, justifying the forecast made at out statutory meeting that the Green engine would again take a foremost place in the great future of aircraft of all kinds for Naval, Military and commercial purposes. These engines are now standardised in five sizes, viz., 35, 100, 160, 275 and 450 h.p., and, in addition, an engine of 1,000 h.p. is in course of completion. You will be pleased to know that Green engines were fitted into many of the submarine chaser coastal motor-boats for the Admiralty, and proved a great success in the Zeebrugge and Ostend raids. Mr. G. Green, the designer of these engines, is a successful inventor who is always at work exclusively in our interests, and he may well be proud of the results obtained. Further developments are pending in connection with Green engines which should prove to be a source of considerable additional profit to this company.

"The position of the Aster Engineering Co., Ltd., may be judged from the fact that since we became interested its dividend has been doubled. The Aster company's works are being enlarged as rapidly as possible, and additional machinery is being installed. Our associated companies are pioneers in the development of the internal combustion engine for aviation, road transport, and the generation of electricity, and we are, therefore, in a position to take full advantage of the great future before this industry. The energy and foresight of Mr. Sydney D. Begbie and Mr. Fred May, the managing directors of the Aster Engineering Co., Ltd., and the Green Engine Co., Ltd., respectively, are mainly responsible for the present satisfactory position. The enthusiasm and keenness of these gentlemen are reflected in the attitude of their staffs and workmen, with whom they are in constant and direct touch, and the results speak for themselves."

Rolls-Royce, Ltd.

The directors announce that, after paying or providing for all trade expenses, suitable depreciation of buildings, machinery and plant, and after charging repairs and replacements to revenue and writing down additions thereto to estimated post-War value, the trading for the year to October 31, 1918, resulted in a net profit of £153,262, after making provision for estimated excess profits tax. The dividends for such period have already been paid. The balance-sheet takes no account of the manufactures for War purposes in the United States of America which were financed by the Government.

NEW COMPANY REGISTERED

SAX-WEARS, LTD., George Street Works, George Street, Coventry.—Capital £5,000, in £1 shares (2,500 8 per cent. cumulative preference). Manufacturers of and dealers in tools and accessories for aeromotor and cycle trades, and motor vehicles, etc. Under agreement with F. A. Saxelby and J. H. Wears, trading as "Sax-Wears and Co." First directors: F. A. Saxelby and J. H. Wears.

* * * *

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl.=cylinder; I.C.=internal combustion; m.=motors

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published November 6, 1919

10,597, 10,599, 10,600 and 10,601. A. J. Macy. Controlling and stabilising of aeroplanes. (133,330, 133,331, 133,332 and 133,333.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published November 6, 1919

6,739 and 6,402. E. Prassone and L. Avorio. Kite balloons. (133,348 and 133,349.)

14,622. C. J. Lake. Controlling and supporting surfaces for aeroplanes. (133,399.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xliii, xliv, xlv, and xlvi).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates*:—

United Kingdom	s.	d.	Abroad*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "Flight" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 568 (No. 46, Vol. XI.) NOVEMBER 13, 1919 [Weekly. Price 6d. Post Free, 7d.

Flight
The Aircraft Engineer and Airships
Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**
These rates are subject to any alteration found necessary under abnormal conditions
**European subscriptions must be remitted in British currency.*

CONTENTS

Editorial Comment PAGE
The King and the Flying Services Fund 1465
Mails by Air at Last 1465
The Future of Aviation in the United States 1466
Points for American Government Consideration 1466
Commercial Flying 1468
Other Recommendations 1468
Flight—and the Men: Mr. A M. Ramsay 1467
The Flight to Australia 1470
Royal Aero Club: Official Notices 1473
Airships. By J. C. Hunsaker 1474
Report of the American Aviation Mission 1478
Airisms from the Four Winds 1483
The Royal Air Force.. 1486
In Parliament 1487
Personals 1489
Side-Winds 1489

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Nov. ...	Entrance Examination for R.A.F. College.
Dec. 3 ...	"The Air Force." Lecture by Air-Commodore H. R. Brooke-Popham before R.U.S.I.
Dec. 19 to... Jan. 4, 1920.	Paris Aero Show.
July, 1920	S.B.A.C. International Aero Exhibition at Olympia
1920	
Mar. 1 ...	Air Ministry Competition (Small Type Aeroplanes)
Aug. 1 ...	Air Ministry Competition (Seaplanes)
Sept. 1 ...	Air Ministry Competition (Large Type Aeroplanes)

EDITORIAL COMMENT

The King and the Flying Services Fund

HIS MAJESTY THE KING has, in response to the appeal by Prince Albert, to which we referred last week, sent a donation of £100 to the Flying Services Fund, which is administered by the Royal Aero Club. We feel that it is hardly necessary again to emphasise the good work which is being done, and which remains to do, by the Fund. Nevertheless, we would again draw the attention of our readers to the urgent need which exists for immediate support if the Fund is to be able to carry out in its entirety the great task set for it to do. Money and more money is required for the maintenance of the dependents of those who laid down their lives in the struggle for freedom; for the support or assistance of the disabled; and for the education of the children left fatherless through the War. We beg once again for a generous response to Prince Albert's appeal for the Fund. The King's lead, and the example of Mr. Patrick Alexander's generous support with £1,000, might well find followers.

◆ ◆ ◆

Mails by Air at Last

It has been officially announced that the Postmaster-General has made arrangements for the establishment of an air mail service between London and Paris. The service extends to Paris and the whole of France, Italy, Spain, Switzerland, etc., and was to have begun on Monday last, but bad weather postponed the opening until the following day. It is notified that registered and unregistered letters, postcards, packets of printed papers and commercial papers, and samples will be accepted for transmission. Parcels and insured correspondence will not be accepted. A special fee of 2*s.* 6*d.* per ounce is charged, in addition to the ordinary rates of foreign postage and the registration fee, where payable. The official notice gives particulars of the various London post-offices at which correspondence will be accepted for transmission by aerial mail service and the times up to which letters can be posted. These include most of the district offices, the G.P.O. and such central offices as Charing Cross, Parliament Street, Lombard Street, and Threadneedle Street. The times of posting vary slightly, from 10.45 a.m. to 11.10 a.m.

It is further announced that arrangements are being made at certain provincial post-offices for acceptance of mail matter intended for aerial transmission. Such correspondence will be forwarded to London as "express" letters, and will be forwarded by aeroplane on the following morning. It will normally arrive in Paris in time for delivery during business hours on the same day. Correspondence addressed to Paris will thus be accelerated by about sixteen hours, while that for countries beyond France will be accelerated by as much as twenty-four hours.

In the inward direction, correspondence posted in Paris in the morning will normally reach London in time for delivery in the central districts during business hours on the same day, and will be delivered on arrival by express messengers without additional charge. Correspondence for provincial towns is forwarded by the next despatch from London, and will usually gain twenty-four hours in delivery. If it is known in advance that flight will be impossible on any day, a notice to that effect will be exhibited in the offices where correspondence is accepted for aerial transmission. Responsibility for registered correspondence will be admitted under the usual conditions, otherwise correspondence will be accepted at sender's risk.

These points cover all the essential conditions of the new service, and, belated as the decision seems to be, we congratulate the Postmaster-General on having at last realised the potential value of an aerial service as an aid to the quicker transaction of business. There is one point, however, on which we are by no means in accord with the official conditions of the service. Why half-a-crown an ounce, in addition to the amount of the foreign postage? It seems to us that this will militate very greatly against the success of the venture. If it were necessary we should be content to accept it as one of the disabilities inseparable from pioneering a new mode of transport. But it is not necessary, because it has been shown by figures which are beyond dispute that such a service can be made in due time to pay its way and show a profit at sixpence per ounce. Far better to charge the latter figure and carry, let us say, fifteen hundred sixpenny letters than one hundred at half-a-crown. Even if it were not possible to make an immediate profit on such a basis, surely it is up to the Post Office to run the service anyway as an encouragement to civil aviation. We have heard a great deal about the amount of such encouragement the Government intends to give the new movement, but when it comes to the test it seems that the departments with the best opportunity of affording it adopt the rule of Shylock, and will do nothing except in return for their pound of flesh.

◆ ◆ ◆

The Future of Aviation in the United States

A most interesting document was issued as a Parliamentary Paper at the end of last week, in the shape of the Report to the United States Secretary for War of the American Aviation Mission which visited Europe last July. The Mission consulted, in England, France and Italy, Ministers, naval, military and Air Force authorities and other experts, and after a complete study of all the forms of organisation adopted by the three countries, seem to have returned to America with a deep-seated conviction that aviation must be encouraged by all possible means. They report that: "Immediate action is necessary to safeguard the interests of the United States, to preserve for the Government some benefit of the great aviation expenditures made during the period of the War, and to prevent a vitally necessary industry from entirely disappearing. Ninety per cent. of the industry created during the War has been liquidated. Unless some definite policy is adopted by the Government, it is inevitable that the remaining ten per cent. will also disappear."

This might just as well have been written about the state of the aviation industry in this country and of the urgent need for the formulation of some concrete and definite policy by our own Government. That, however, in passing. The Mission recommends the "concentration of the air activities of the United States, military, naval and civilian, within the direction of a single Government agency created for the purpose, co-equal in importance with the Departments of War, Navy and of Commerce, called, for the purposes of identification, the National Air Service."

It is not a little significant that the American Mission should recommend thus definitely the adoption of a scheme of organisation of the United States Air Service exactly on the general lines of our own. It is axiomatic that the looker-on sees most of the game, and these American officers and officials who constituted the Mission, acute observers all of them, have manifestly studied very closely the organisations existing in the three countries to which they were accredited, and have deliberately arrived at the conclusion that our own Air Ministry organisation, faulty as it may be in certain details, is basically the one and only proper way of dealing with the matter they had under review. We need hardly say that this is a point of view in which we most wholly concur. Indeed, when it is remembered that it was this journal which took the lead in urging upon the Government the separation of the Air Service from the Navy and Army and its organisation under a single authority, it will be clear that we could do nothing else but agree. More especially is this the case when it is further remembered how the separate organisation justified itself during the last year of the War after dual control had well-nigh ruined our chances of victory in the air.

◆ ◆ ◆

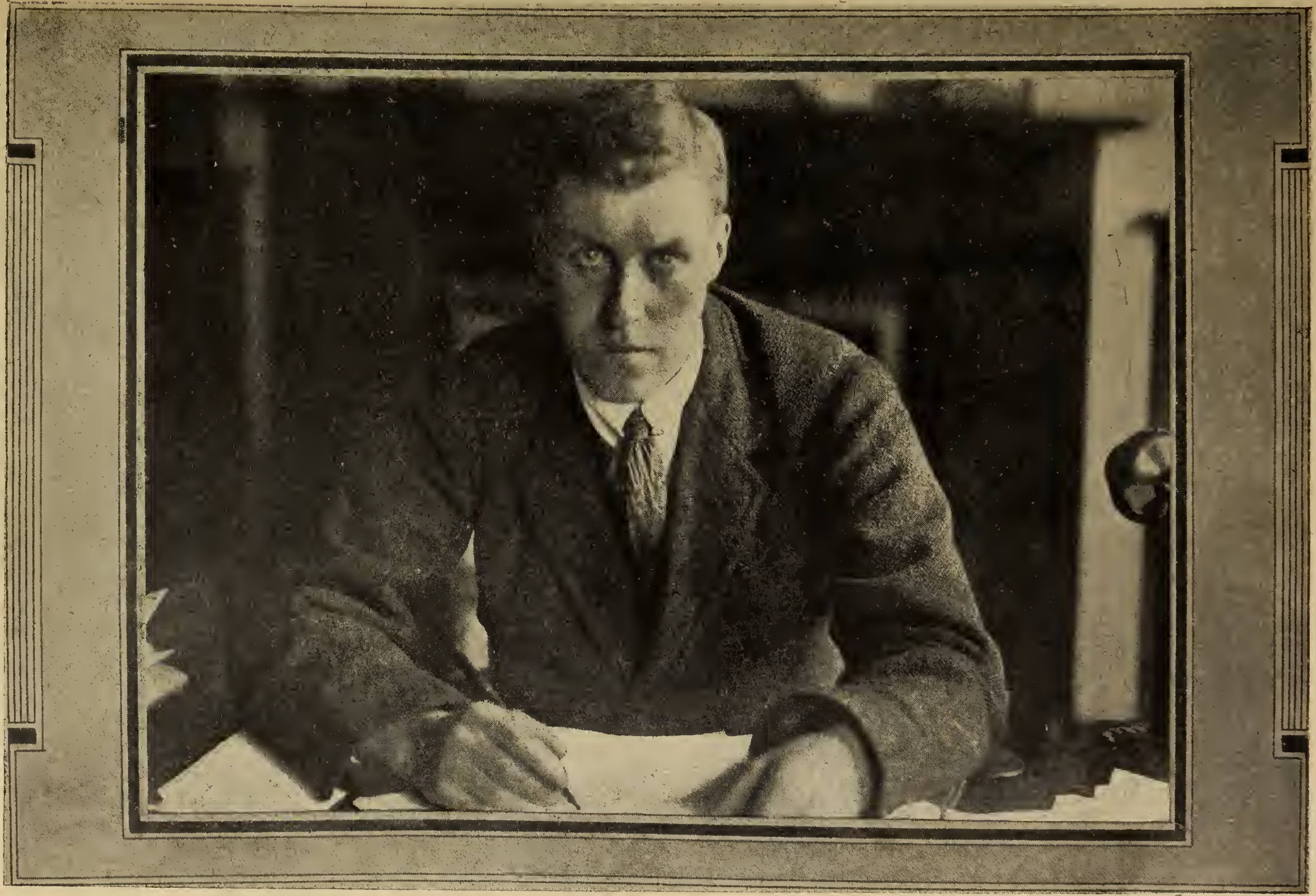
Points for American Government Consideration

The Mission seems to have been greatly impressed by the view taken here of the future of air power, and its influence on the course of the wars of the time to come. In their Report they say:—

> Great Britain considers the dominance of the air as important as that of the seas, and is avowedly planning a definite policy of aerial development to that end. Owing to the co-ordination for more than two years of her aircraft activities, she is well in the lead in practically every phase of aerial development.
>
> In any future war victory must incline to the belligerent able first to achieve and later to maintain supremacy in the air.
>
> In England, France and Italy sentiment is undoubtedly in favour of the centralisation of aircraft development under one authoritative head. Difference of opinion has been encountered only in the matter of Army and Navy *personnel* and in the question of the independent fighting force. England holds the initiative, and is building her Royal Air Force co-equal with the Army and Navy.
>
> With proper Governmental encouragement, rapid progress in the development of aircraft seems inevitable. There is vital need for the United States to formulate a definite, comprehensive, and continuing policy for its development in every phase.
>
> Great Britain's plan of organisation is not perfect, but undoubtedly it stands today the most comprehensive Governmental mechanism yet set up by any nation for the encouragement, upbuilding, direction, and control of its air resources. This organisation has been born of five bitter years of trial, mistake, experience, and progress. It is the product of the best brains in the British Empire focussed under the spur of national need and the demand of the British people. America may well study it carefully.

In so far as concerns the first paragraph of this quotation, we sincerely trust that the impression made upon the Mission was conveyed by responsible Ministers of the Crown. We are fully aware that it represents the opinions of the bulk of the officers of

Flight—And the Men



MR. A. M. RAMSAY, Director and General Manager, British Caudron Co., Ltd.

"Flight" Copyright

the Air Service and of the civilian observers who have given thought to the problems of the future of aviation, civil and military. Whether these opinions coincide with those of the Government, which is responsible for finding the wherewithal to ensure the requisite margin of air-power, we are not so sure when we regard what is taking place today. The R.A.F. is being ruthlessly cut down, and the encouragement of civil aviation, of which so much was said a few months ago, seems tardy in materialising.

Still, it is flattering to our national pride to find that the Mission acknowledges that Britain possesses the pattern organisation on which others will do well to mould their own. After all, it would seem that in the eyes of others we are not the laggards we sometimes think ourselves.

The Secretary for War, Mr. Newton Baker, does not agree with the Mission in the matter of the single centralised Air Service. He thinks that army and navy aviators are specialists in the art of flying, and that the pilots required are of a different type from those needed in civilian undertakings. Moreover, he contends that they need to be trained upon a different theory. It seems to us to be fairly clear that Mr. Baker has come under the influence of the same types of reactionary officers with whom we have been afflicted here, and who would, if they could have their way, revert our own Air Service to the separate controls from which it suffered during nearly four years of war. He should remember that we have been through the experience, and that it did not work out. We changed it in the middle of a great war, and it succeeded. Surely that must count for a great deal. Further, the conclusions of the Mission were arrived at after a close study of the conditions obtaining in three countries, while Mr. Baker's views are simply expressions of opinion gathered at second hand. We have no desire to commit the impertinence of criticising the views of a foreign authority on domestic matters, and we have only registered these remarks for the reason that the views in question are certain to be seized upon at some convenient season by our own reactionaries.

◆ ◆ ◆

Commercial Flying

In that part of the Report dealing with commercial flying the Mission points out that adequate support cannot be expected from private enterprise alone, and if no Government aid is given ten years will probably see the industry in America struggling for a foothold and far behind its state-aided competitors in Europe. Its remarks on the best manner of development for all purposes are worth quoting, since they might be addressed to ourselves equally with the United States. On this the Mission says :—

> That the single Government agency proposed above (consisting of a civilian Secretary for Air, a civilian Assistant Secretary, five or more divisional heads, and an advisory Air Council) be charged with full responsibility for placing and maintaining the country in the front rank among nations in the development and utilisation of aircraft for the national security, and in the advancement of the civil aerial transportation and communication arts.
>
> The adoption of a system whereby Army, Navy, and civil *personnel* can be circulated in proper proportion through the National Air Service. This *personnel* would, unless permanently assigned to air work, be automatically returned to the military and naval sources, or to civil life as an Air Service Reserve, after the educational and service periods in the National Air Service have expired.

In a word, what the Mission urges is that the best and most economical method of providing for aerial defence is in the building up of just such a Flying Reserve as we have insisted upon as being the best line of policy to be pursued in this country. Comment would be superfluous.

◆ ◆ ◆

Other Recommendations

Not less interesting are the recommendations as to the detailed manner in which the Government should undertake the work of encouragement. It is sufficiently clear that these recommendations have been based on our own suggested organisation, altered a little in detail to suit the different conditions existing in America. These again are well worth quoting, so we need make no apology for so doing. The text of these recommendations is as follows :—

> Airships are now building in England which will be able to carry from 5 to 10 tons of mail, in addition to the necessary fuel and crew, and cross the Atlantic from London to New York in one-half the time made by the fastest steamships.
>
> England is already desirous of organising with the United States a Transatlantic airship line for mail service which would give a five-day mail service from London to San Francisco. Such a service is entirely possible at this time, and its inauguration depends only upon adequate encouragement and financial support.
>
> The risks involved in these ventures, due to unknown conditions of the atmosphere, imperfections of equipment, etc., are still so great as to make them impracticable from the point of view of private enterprise undertaken for a profit.
>
> The most economical way to develop a strong air service for national defence is to encourage, by every means possible, the use of aircraft for commercial purposes, and thereby build up a commercial fleet at relatively small expense to the Government, which would effectively supplement its strictly military equipment in time of need. Aircraft facilities and *personnel*, and particularly production facilities and technical *personnel*, cannot be obtained upon short notice, but only by long and continued experience and at great expense.
>
> America's production industry does not require a large volume of business to keep it alive and healthy, but it does require a steady and dependable demand, otherwise private capital and enterprise will not long remain interested.

Here again these recommendations are so clear and speak so well for themselves that they call for no comment. We need only repeat that their general lines follow, in most places, the suggestions which have been made for the conduct of civil aviation here, and where they do not they are none the less admirable and worthy of careful consideration by our own authorities.

◇ ◇

◇ ◇

Resignation of General Seely

It was announced on Tuesday that Major-General J. E. B. Seely, the Under-Secretary of State for Air, had resigned, and that he was going over to the ranks of the Opposition. It is understood that he intends to make a big fight for the future position of civil and military aviation in this country.

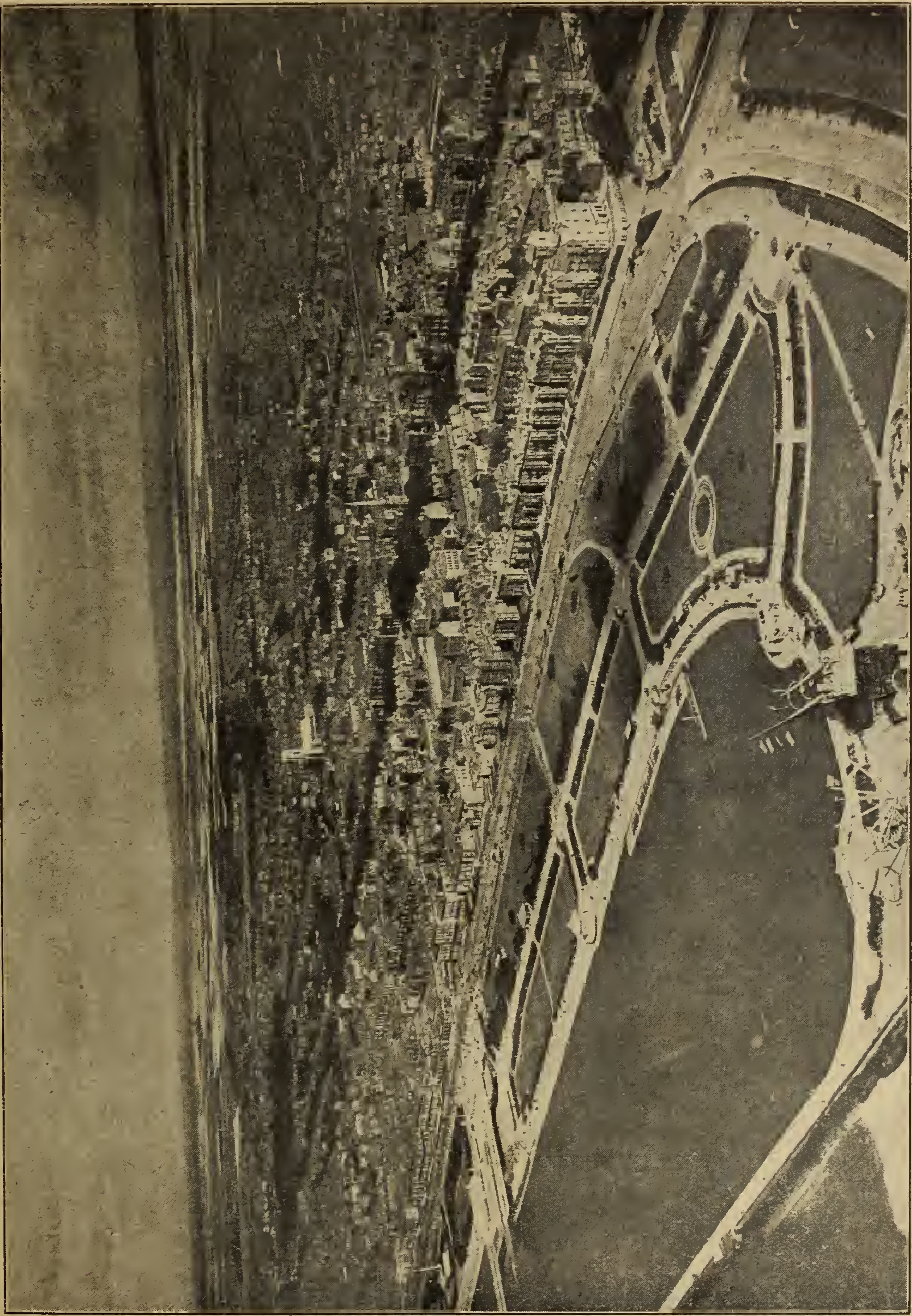
In a statement in the House on Wednesday General Seely said he found the dual control of the Air Service would not work. He asked to be relieved of his office before the end of the War, but was asked to remain.

In the end, added General Seely, the Prime Minister said he had decided to maintain the existing plan and did not propose to vary it.

The Controller-General of Civil Aviation

The rumour which found its way into some of the Sunday papers that Maj.-Gen. Sir Frederick Sykes had resigned his position as Controller-General of Civil Aviation was promptly followed by an official announcement that there was no truth in the statement. It is added that he has no intention of resigning, but that he is leaving this week for America on official Air Ministry business.

The Camera and the 'Plane



"Flight" Copyright

Southport, taken from a Sopwith "GNU" 'plane

THE FLIGHT TO AUSTRALIA

In our last issue we published scale drawings and brief descriptions of the machines entered by Messrs. Vickers, Ltd., and by Messrs. Martinsyde, Ltd., for the flight to Australia. Also a brief description of the Alliance machine. Scale drawings and a description of the Sopwith machine were published in our issue of October 16, 1919. This week we are able to complete the list by giving particulars and scale drawings of the remaining machine—the Blackburn "Kangaroo." The only machine to start so far is the Sopwith "Wallaby," which left Hounslow on October 21. This machine had to descend at Cologne, from which town a start was made again on October 31. Since then no news has been received from Capt. Matthews, but it is thought that he is weatherbound somewhere, far from any telegraph office, and no anxiety is felt for his safety.

Of the five machines entered for this flight three are of the single-engined tractor biplane type, while the other two are twin-engined machines. Whether or not any of the machines succeed in winning the £10,000 prize offered by the Australian Government—the conditions for which stipulate that the flight must be completed inside a month—some very valuable data should result, and it will be interesting to see which type of machine aquits itself the better, the single-engine or the twin-engined type. Both have their champions, who are convinced of the superiority of their own class of machine. The "twin-engineites" consider that two engines tend to more reliability, since in the case of one breaking down it only means one-half of the power plant out of commission. The other faction contends that a twin-engined machine cannot fly satisfactorily on one engine only, and that therefore no such safeguard is provided by fitting two engines, while they claim greater efficiency for the single-engined type. Time will show which side is right, although there is such a great element of luck in a flight like this that failure on the part of one type and the success of another will not necessarily be conclusive proof of the superiority of one type over the other.

The Blackburn "Kangaroo."

Except in a few minor respects the Blackburn "Kangaroo" entered for the Australia flight is similar to the standard machine of that name. The tankage has been increased so as to give the machine a greater range of flight. This has been made possible by the fact that whereas the standard machine (commercial) carries eight passengers with its normal complement of tanks, the Australian machine carries a crew of four. The petrol system has been redesigned for gravity feed so as to minimise the risk of engine trouble arising out of failure of the petrol system.

The two 275 h.p. Rolls-Royce Falcon engines are mounted on the lower plane, each driving a four-bladed tractor airscrew. The large petrol tanks are mounted inside the main *fuselage*, in the space ordinarily occupied by the passengers in the cabin type of machine. The landing wheels are exceptionally well sprung by telescopic struts and rubber buffers, and the machine is expected to be able to alight safely on grounds none too suitable for the purpose. Certainly, at the E.L.T.A. aerodrome at Amsterdam, on the occasion of the recent aero show there, the Blackburn "Kangaroo" made light of the soft condition of the ground, which was such as to worry much lighter machines.

Needless to say, a number of smaller spare parts are being carried on board, and the machine is not altogether unarmed, should natives show signs of hostility.

No actual figures as to range, speed, etc., are available, but the passenger type of machine has a speed range of 97 to 51 m.p.h., a flight range, with normal tanks, of 580 miles, and carries a load of eight passengers or 1,540 lbs. By decreasing the number of passengers to four, and increasing the tank capacity, the flight range can, of course, be very materially increased.

The Route

The route followed will probably be as follows, although should conditions demand this may be deviated from: Hounslow to Paris, Marseilles, Nice and Pisa to Rome. Thence to Cattania, Malta, Benghazi and Sollum to Aboukir. Ramleh, Bagdad, Basra, Bushire to Bandao-Abbas. Charbah, Karachi, Nasrabad, Allahabad to Calcutta. Rangoon, Don-Muang, Sengora, Penang, Kuala-Lumpur to Singapore. Bandoeng, Bima, Kupang to Port Darwin. Thence *via* Brisbane and Sydney to Melbourne. Petrol supplies are being arranged for by the Air Ministry and foreign Governments as far as Calcutta—thereafter the arrangements are in the hands of the Asiatic Petroleum Co.

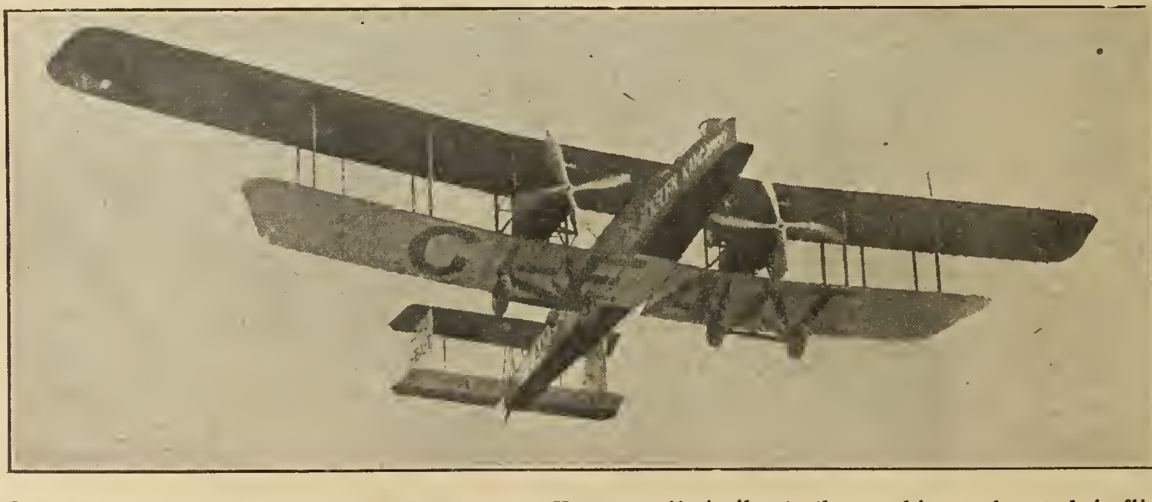
The Crew

Capt. Geo. H. Wilkins, M.C. and bar:—Commanding officer and navigator. Second in command of the Stefanson Arctic expedition, 1913-1917. Engaged with Historical Section, Australian War Records, as official photographer, A.I.F., France, Gallipoli and Palestine from 1917. War correspondent with Turks in Balkan War, 1912-13. Three years as Temp. Commander, Canadian Naval Service. Is under agreement as Chief of Scientific Staff of the Cope British Imperial Antarctic expedition, which will leave England about the middle of 1920. Has personal knowledge of practically every country in the world.

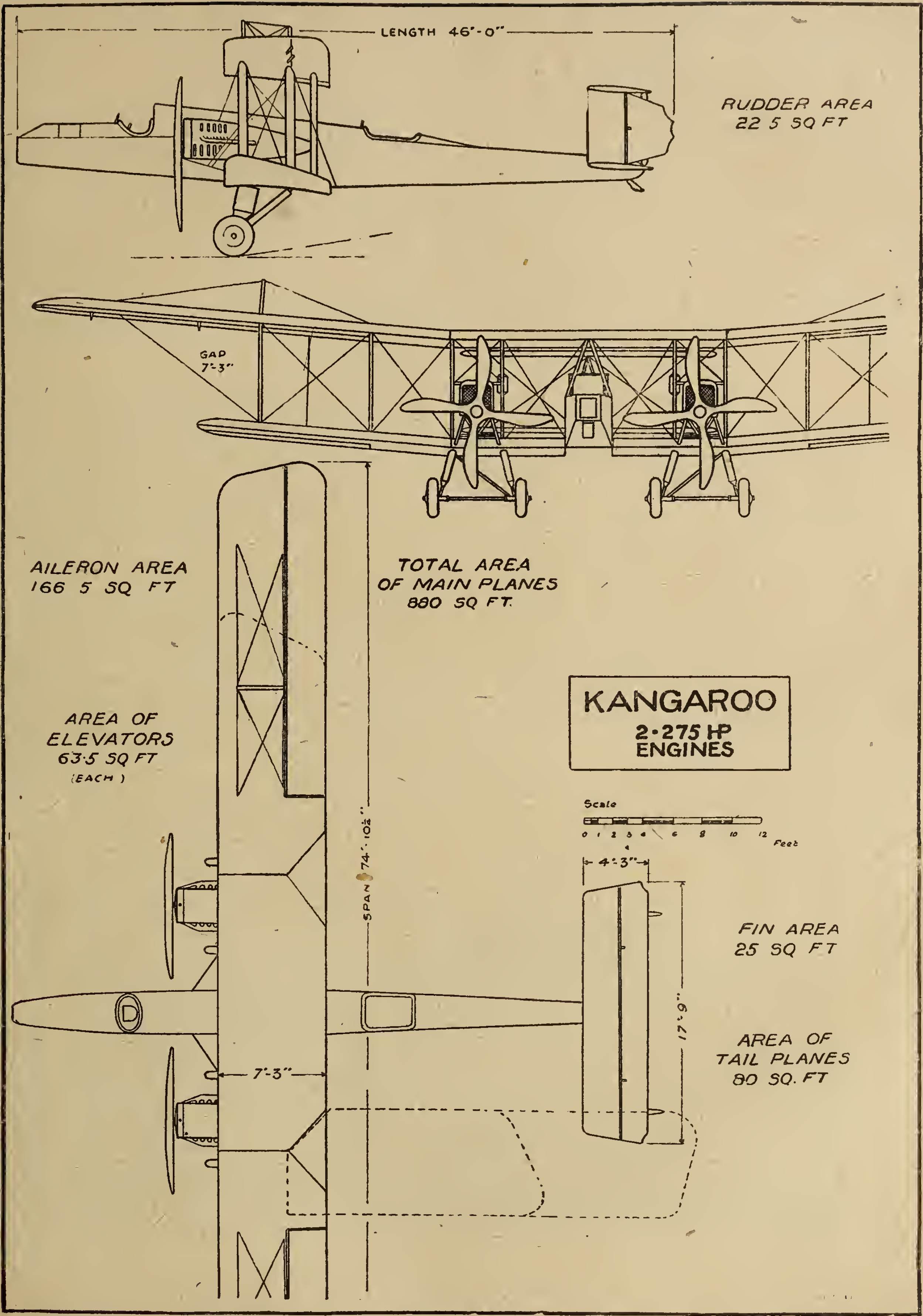
Lieut. D. R. Williams:—Second pilot. Fourteen years' experience as automobile engineer in N.S.W. Instructor at the flying school at Richmond, N.S.W. Ferry pilot and instructor with A.F.C.

Lieut. G. H. Potts:—Engineer officer. Son of the Principal, Hawkesbury Agricultural College, Richmond, N.S.W. Electrical engineer with the Australian General Electric Co., Sydney. Gunnery officer, A.F.C., served with No. 3 Squadron, A.F.C. in France.

Lieut. Val. Rendle:—First pilot. Son of Richard Rendler, F.R.C.S. (Eng.), of Brisbane. Assistant electrical engineer with the Australian Meat Export Co., Balmain, Brisbane, Joined Queensland Volunteer Flying Corps, founded by T. Macleod in 1915. Came to England and enlisted (March, 1916) as air-mechanic, R.F.C. Commissioned to R.F.C. in 1917, and served in England and France as instructor test pilot and ferry pilot.



THE FLIGHT TO AUSTRALIA: A Blackburn "Kangaroo," similar to the machine to be used, in flight.



THE FLIGHT TO AUSTRALIA: The Blackburn "Kangaroo." Plan, side and front elevations, to scale

AERODROMES AND LANDING GROUNDS

The Air Ministry announces that the following lists of aerodromes are issued as an addition to or amendment of the lists recently published:—

List C.—*Aerodromes temporarily retained for Service purposes. Amendments.*

The following aerodromes have been transferred to List E, and are now published in that list:

Aerodrome.	Nearest Station.	Nearest Town.
Leighterton..	.. Tetbury ..	.. Stroud.
Lopcombe Corner ..	Grateley	.. Salisbury.
Rendcomb ..	.. Foss Cross	.. Cirencester.

List D. (*a*) *Aerodromes licenced for all types of aircraft.*

Aerodrome.	Location	Nearest Town.
Cricklewood	.. Cricklewood	.. London.

List D. (*b*) *Aerodromes licenced as "Suitable for Avro (504 K) and similar types of aircraft" only. Except in very few instances accommodation does not exist. The licences have also in the majority of cases been issued for limited periods.*

Aerodrome.	Location	Nearest Town.
Billesley ..	.. Yardley Wood Rd.	Birmingham.
Altrincham	.. Woodlands Park	Altrincham.
Rugby ..	.. Polo Grd.: Spring Hill Farm	Rugby.
Chester ..	.. Race Course	.. Chester.

List E.—*Stations no longer in use by R.A.F.*

These stations have been passed to the Government Property Disposal Board. They will be relinquished as soon as the Government property thereon has been disposed of. In many cases the aerodromes are now under cultivation, but it is probable that the sites still form the best emergency landing-grounds in the immediate neighbourhood.

Aerodrome.	Nearest Railway Station.	Nearest Large Town.
Leighterton ..	Tetbury ..	.. Stroud.
Lopcombe Corner ..	Grateley ..	.. Salisbury.
Rendcomb ..	Foss Cross	.. Cirencester.
Southport ..	.. Hesketh Park	.. Southport.
Turnhouse ..	.. Turnhouse	.. Edinburgh.

◆ ◆ ◆ ◆

THE BRITISH AIRCRAFT COMPETITIONS, 1920

In connection with the British Aircraft Competitions for prizes amounting to £64,000, the following list of engines for use by competitors has been approved by the Air Council. It will be left to the discretion of the judges to decide whether any new engine not included in this list fulfills the conditions of the competition:—

A.B.C. (all types).
Beardmore (160 h.p.)
B.H.P.
B.R. 1.
B.R. 2.
Cosmos (all types).
Galloway Adriatic.
Galloway Atlantic.
Galloway Pacific.
Green (all types).
Napier Lion.
R.A.F. (all types).
Rolls-Royce (all types).
Siddeley Puma.
Sunbeam (all types).
Wolseley Viper.

The competitions will be held commencing on the following dates:—

Aeroplanes, small type ..	.. March 1, 1920.
Aeroplanes, large type ..	.. September 1, 1920.
Seaplanes (amphibians) ..	.. August 1, 1920.

The places at which the competitions will be held will be announced later.

Competitors must enter machines on or before the following dates:—

Aeroplanes, small type ..	.. December 31, 1919.
Aeroplanes, large type ..	.. May 1, 1920.
Seaplanes (amphibians) ..	.. April 1, 1920.

The following publications in connection with these competitions will be available for issue towards the end of the month:—

British Aircraft Competitions, 1920, Aeroplanes, Conditions and Tests (B.A.C. Form A).

British Aircraft Competitions, 1920, Seaplanes (Amphibians), Conditions and Tests (B.A.C. Form B).

British Aircraft Competitions, 1920, Notice to Competitors (B.A.C. Form C).

British Aircraft Competitions, 1920, Rules and Regulations (B.A.C. Form D).

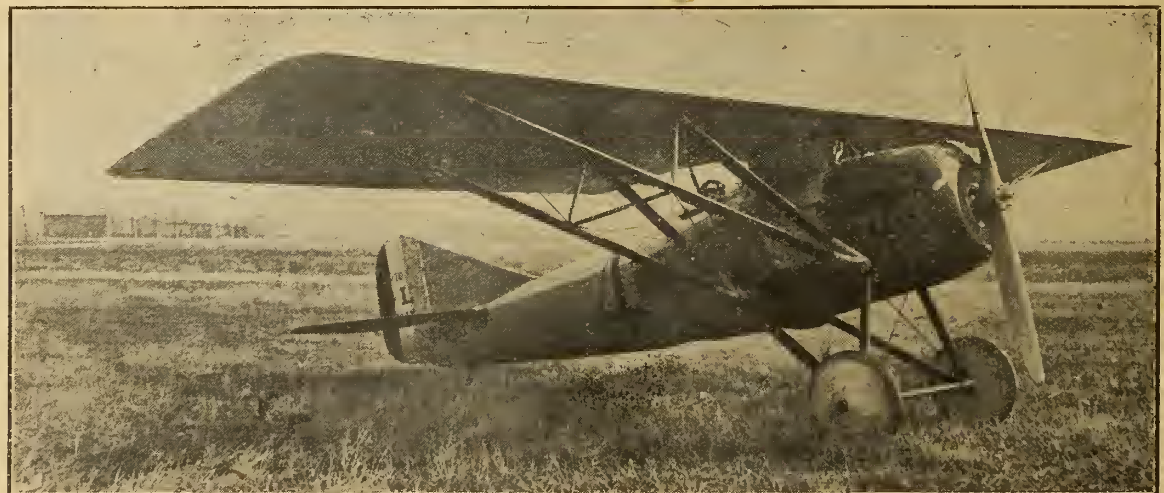
British Aircraft Competitions, 1920, Entry Form (B.A.C. Form E).

These papers will be obtainable from H.M. Stationery Office or from the Secretary (C.A.L.), Air Ministry.

◆ ◆ ◆ ◆

The London-Australia Flight

The Vickers-Vimy machine, fitted with two 250 h.p. Rolls-Royce Eagle 8 engines, which has been entered for the £10,000 prize offered by the Australian Government for a flight to Australia, left Hounslow at 9.10 on Tuesday morning. The pilot was Capt. Ross Smith, and he was accompanied by Lieut. K. M. Smith, Sergt. J. M. Bennett and Sergt. W. H. Shiers. The marking of the machine was carried out on behalf of the Royal Aero Club by Maj. R. H. Mayo and Lieut.-Comdr. H. E. Perrin.



An Interesting French Parasol Monoplane: Although the Parasol type of monoplane had a comparatively short vogue during the War, the type has many advantages, and it is more than probable that it will be revived for civilian flying. Our photograph shows the French Gourdon-Leseurre, fitted with 180 h.p. Hispano-Suiza engine. It will be noted that the wing bracing is unusual, struts being employed instead of the usual lift wires. This obviates the necessity for anti-lift wires above the wing. The speed of this machine is said to be 260 kilometres per hour (about 135 m.p.h.)

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

"Daily Express" £10,000 Prize

A Meeting of the Advisory Committee on the *Daily Express* £10,000 Prize was held at the Club on Tuesday, November 4, 1919, at 3 p.m.

Present :—

Royal Aero Club : Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair ; Lieut.-Col. F. K. McClean.

Society of British Aircraft Constructors : Capt. P. D. Acland.

Air Ministry : Lieut.-Col. W. O. Raikes.

Daily Express : Maj. W. E. G. Murray.

Lieut.-Com. H. E. Perrin, Secretary (Royal Aero Club).

The main features of the Competition were decided, and the drawing up of the Regulations was referred to the Technical and Competitions Committee.

SPECIAL COMMITTEE MEETING

A Special Meeting of The Committee was held on Wednesday, November 5, 1919, when there were present :—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair ; Mr. Ernest C. Bucknall, Squadron-Leader T. O'B. Hubbard, M.C., R.A.F., Lieut.-Col. F. K. McClean, Lieut.-Col. Alec Ogilvie, and the Secretary.

Election of Members.—The following New Members were elected :—

Lieut. Harold William Russell Banting.
Cecil Thomas Chandless Chandless.
Geoffrey Kitchin.
John Frederick William Lennard (late Major R.F.A.).
Arthur Newman (late Captain R.A.F.).
Flight-Lieut. Sydney Gerald Nicholson, R.A.F.

Temporary Honorary Membership.—Maj. Melvin Adams Hall, D.S.O., Air Attaché, American Embassy, was elected a temporary Honorary Member of the Club.

Fédération Aéronautique Internationale.—Lieut.-Col. Mervyn O'Gorman attended and presented a report of the Conference of the Fédération Aéronautique Internationale held at Brussels on October 22, 23 and 24, 1919.

On the motion of the Chairman, seconded by Mr. Ernest C. Bucknall, a unanimous vote of thanks was passed to the delegates who attended the Conference on behalf of the Club.

Presentation to Sr. Janello.—It was decided to make a presentation to Sr. Janello, in recognition of his performance in the Schneider Race at Bournemouth, and the form of the presentation was to be considered at the next Meeting of The Committee.

Log Books for Pilots and Aircraft.—Letter was read from the Air Ministry asking for a representative of the Royal Aero Club to attend a Meeting to discuss the proposed new log books for pilots and aircraft, and the Secretary was instructed to represent the Club.

FÉDÉRATION AÉRONAUTIQUE INTERNATIONALE

Report of the Conference at Brussels on October 22, 23 and 24, 1919

A Conference of the Fédération Aéronautique Internationale was held at Brussels on October 22, 23 and 24, 1919.

In the absence of Prince Roland Bonaparte, who was ill in Paris, M. Jacobs, President of the Aero Club of Belgium, was voted to the Chair.

The following countries were represented at the Conference : America, Belgium: Brazil, Denmark, France, Great Britain, Holland, Italy, Japan, Norway, Portugal, Sweden, Switzerland.

The delegates who attended on behalf of Great Britain were : Lieut.-Col. F. K. McClean, Lieut.-Col. Alec Ogilvie, Lieut.-Col. Mervyn O'Gorman, C.B., Mr. Harold E. Perrin (Secretary).

The principal business of the Conference was the revision of the Statutes and Regulations of the Federation.

The revision of the Statutes and Regulations had been under the consideration of a Special Committee under M. Surcouf. The report of this Committee which was presented to the Conference had been fully considered by the Royal Aero Club, and the suggestions put forward by the Club were in nearly every case accepted.

As regards the Schneider Cup, the decision of the Stewards of the Meeting in not awarding the Trophy to Italy was upheld. The British delegates, on behalf of the Royal Aero Club, agreed to a suggestion that the Race for 1920 should be held in Italy, and, with the sanction of the Aero Club de France, this was approved by the Conference. The Royal Aero Club also agreed to loan the Schneider Trophy to the Aero Club of Italy for exhibition on the occasion of the Race.

Six Commissions were appointed, viz. :—

1. International Review of the Fédération Aéronautique Internationale. Secretary : M. Blondel la Rougery.
2. Medical. Secretary : Dr. Van Kulften Galthe.
3. Aerial Touring. President : M. Mercanti.
4. Technical. President : Lieut.-Col. Mervyn O'Gorman, C.B. Secretary : Lieut.-Col. Alec Ogilvie.
5. Aerological. President : M. Jacobs. Secretary : M. Jaumotte.
6. Aeronautical Laws. President : M. Clunet. Secretary : M. Imbrecq.

The question of international records was fully considered by the Conference and the revised Regulations to take effect on January 1, 1920, will be issued shortly.

THE FLYING SERVICES FUND

(*Registered under the War Charities Act,* 1916)

Administered by the Royal Aero Club

For the benefit of *Officers, Non-Commissioned Officers and Men* of the Royal Air Force who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

Honorary Treasurer :
The Right Hon. Lord Kinnaird.

Committee :
H.R.H. Prince Albert, K.G. (*Chairman*).
Mr. Chester Fox.
Squad. Leader T. O'B. Hubbard, M.C., R.A.F.
Squad. Leader C. E. Maude, R.A.F.
Group Capt. C. R. Samson, C.M.G., D.S.O., R.A.F.

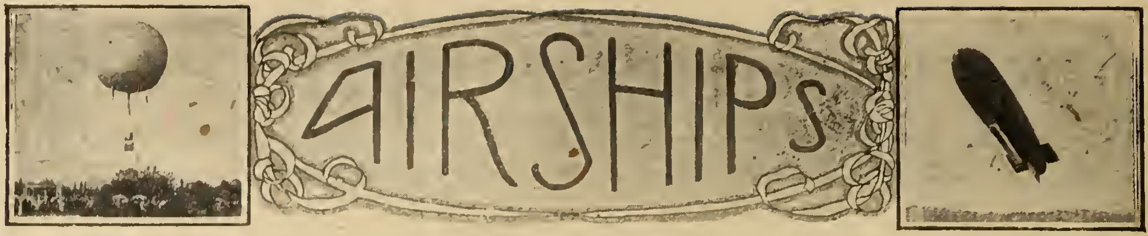
Secretary :
H. E. Perrin.

Bankers :
Messrs. Barclays Bank, Ltd., 4, Pall Mall East, London, S.W. 1.

Subscriptions :	£	*s.*	*d.*
Total subscriptions received to Sept. 16, 1919	15,124	12	1
His Majesty The King	100	0	0
H.R.H. Prince Albert, K.G.	21	0	0
Patrick Y. Alexander	1,000	0	0
Louis Coen	10	10	0
Mrs. Huntington and Miss Studholme ..	85	0	0
Miss W. Hudson	0	2	6
Sec. Lieut. C. H. J. Evershed	2	2	0
A. F. Brodie James	5	0	0
Received by Rev. J. R. Walkey for War Charities	2	0	0
George E. Miles	0	10	6
Royal Air Force Station, Isle of Grain ..	1	0	0
John S. Gibb	3	0	0
James Hillier	1	1	0
F. E. Simpson	5	5	0
Capt. J. P. Gurdon	5	0	0
J. Entwisle	5	0	0
H. Williams	5	5	0
Lord Foley	20	0	0
Maj.-Gen. Brooking	10	0	0
Japp Hatch and Co.	5	5	0
Rev. and Hon. E. R. Lindsay	1	0	0
Westland Aircraft Works	10	10	0
C. R. B. Caldwell	10	0	0
From the estate of the late Lieut. Owen Vincent Le Bas, R.F.C...	92	0	0
Arthur H. Leslie Melville	5	5	0
Total, November 10, 1919	16,530	8	1

Offices : THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.



AIRSHIP ENGINEERING PROGRESS IN THE UNITED STATES

By J. C. HUNSAKER, Eng. D., Commander, Construction Corps, U.S. Navy

(Continued from page 1456.)

C Class Airships

After the completion of the B class ships, there was an almost complete stop to airship work in the United States, and an improved single-engine type which was designed in the winter of 1917-18 was not built. The reason for this was a discouraging report from abroad as to the effectiveness of airships on anti-submarine patrols. But the conclusions drawn from airship operations abroad in the bad winter weather proved to be premature, and as the good weather of the spring of 1918 permitted English and French airships to operate more freely, it became apparent that we should proceed immediately with a larger and faster type. Using this time all of the practical experience gained at home with B class ships and detailed information from abroad with regard to British, French and Italian airships, the Bureau of Construction and Repair undertook to take a step in advance and to design a ship of maximum performance. Full use was made of all available sources of information. In the initial stages of the design, the data regarding the performance of British airships, obtained from the British Admiralty through Lieut.-Comdr. P. L. Teed, R.N.V.R.—attached to the office of the British Naval Attaché at Washington—was especially helpful.

Experience showed the advantages of high speed to cope with winds, great endurance to follow convoys long distances, and a duplicated power plant to lessen chances of complete breakdown at sea. The C class was designed with these ends in view.

To obtain high speed, a new form of envelope and a car of very low resistance were developed from wind tunnel experiments. The speed was to be obtained by a combination of high power with the utmost refinement in design to keep down resistance. Twin engines were used, giving a total of 250 b.h.p. The actual speed on trial was 60 m.p.h., making probably the fastest airship of its size ever built.

The principal dimensions and characteristics of the C 5, as weighed off before her start for Newfoundland, were as follows :—

Length	192 ft.	
Diameter	41 ft. 9 ins.	
Volume	182,000 cub. ft.	
Purity	98·6 per cent.	Total lift 12,700 lbs.
Temperature	65° Fahr.	
Barometer	30 ins.	

Weight empty	7,940 lbs.
Weight carried—	
Crew (six men)	1,015 lbs.
Fuel	3,250 lbs.
Oil	120 lbs.
Navigating equipment	25 lbs.
Radio	250 lbs.
Food	15 lbs.
Water for drinking	85 lbs.
Ballast	0 lb.
Useful load	4,760 lbs.
Endurance at 45 m.p.h., 47 hours, or	2,150 miles.
Endurance at 55 m.p.h., 28 hours, or	1,540 miles.

During 1918 contracts were placed with Goodyear and Goodrich for 30 airships, the cars to be supplied from the Burgess Co., Marblehead, Mass. After the Armistice contracts were reduced to 15 ships.

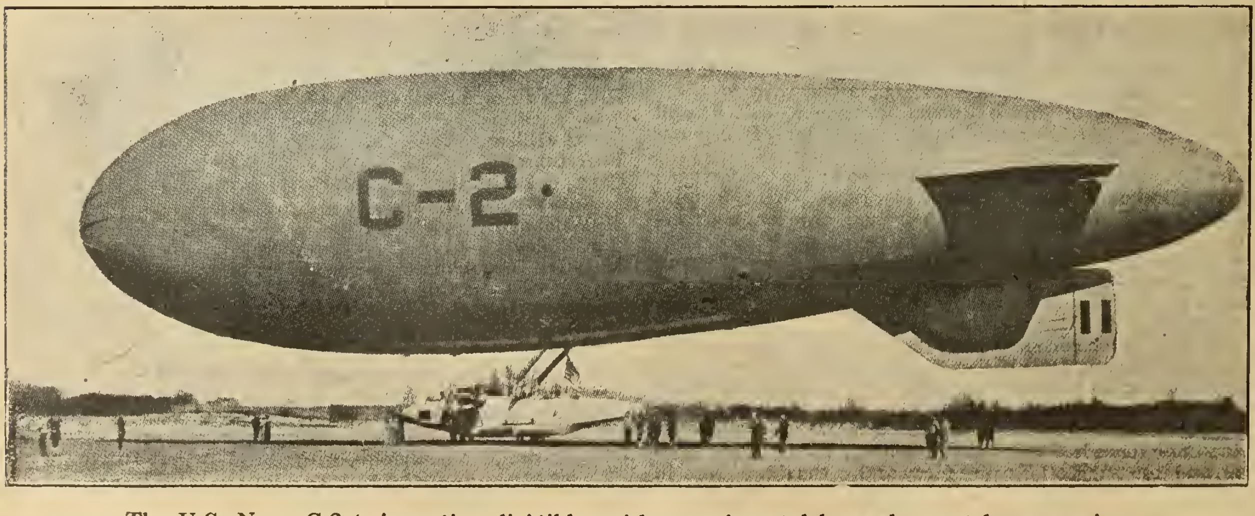
C 1, the first ship, was completed in September, 1918, and on October 22, 1918, flew 400 miles from Akron to Washington in 8¾ hours. It flew over the Navy Department building, and landed at Anacostia to permit an inspection by officers of the department. It then proceeded to Rockaway, Long Island. Later in the year, the C 1 was ordered to Key West, and flew down the coast, stopping at intermediate air stations.

The C 5 on May 14, 1919, flew from Montauk to Newfoundland with six men in 25 hours 50 mins., a distance of 1,022 nautical miles on chart without stop. This flight will remain for a long time as a notable achievement. The distance actually flown (not being in a straight line) was about 1,200 nautical miles, or very nearly the distance from Newfoundland to the Azores.

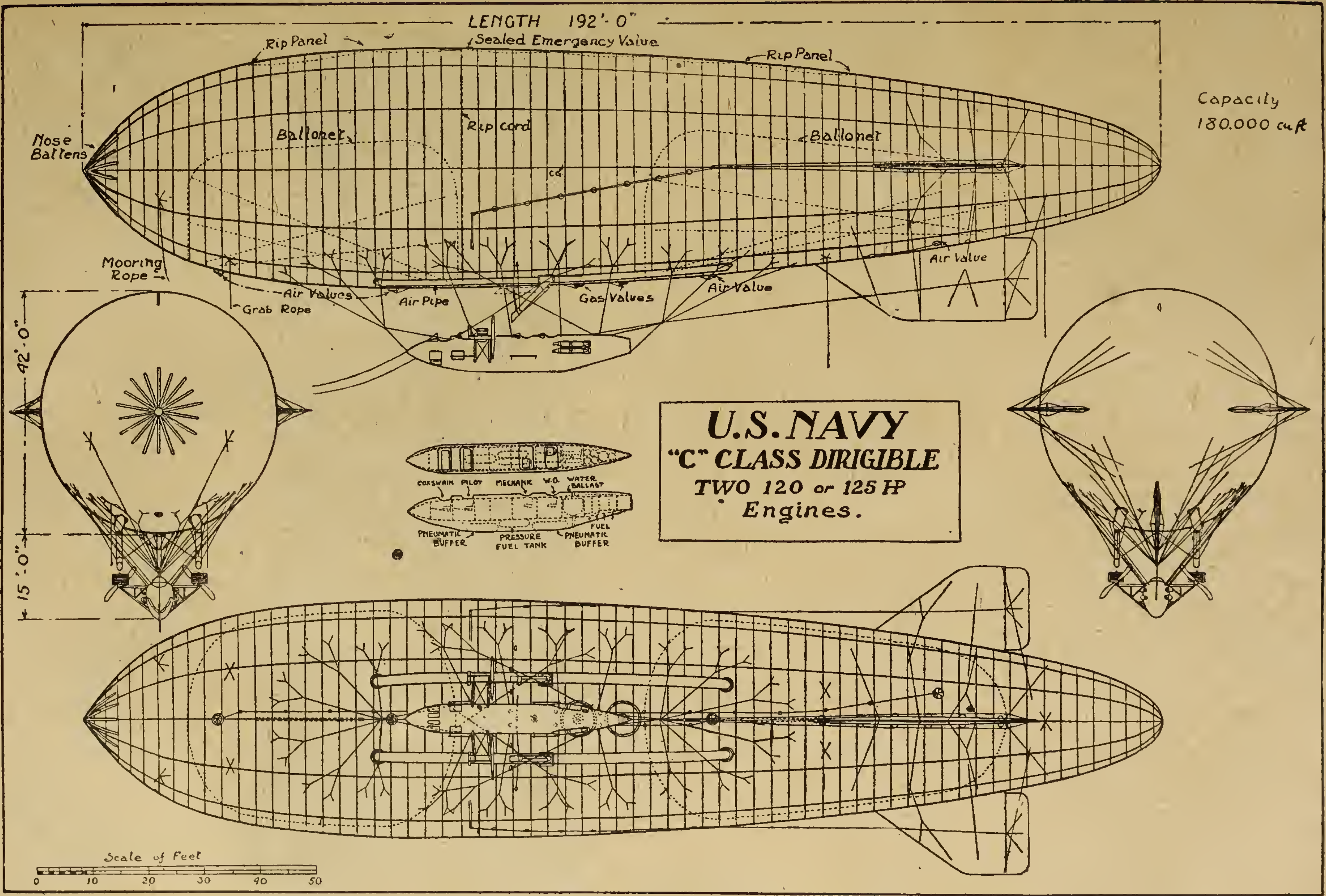
The C 5 was unfortunately lost at Newfoundland in a gale while moored out in a field, and was, therefore, unable to attempt the Transatlantic flight, which was within her designed endurance.

The power plant of the C 1 consists of twin Hispano-Suiza engines fitted with propellers to hold the engine down to 125 b.h.p. This is done to increase reliability, and because the envelope pressure is not sufficient for speeds over 60 m.p.h. The C 5 had twin Union 120 b.h.p. engines. Each engine has an electric self-starter and the usual equipment.

The tanks are arranged in the rear of the car under the centre of buoyancy of the envelope, so that balance is not



The U.S. Navy C-2 twin-engine dirigible, with experimental horseshoe patch suspension



THE U.S. NAVY "C" CLASS TWIN-ENGINE DIRIGIBLE: Plan, side and end elevations to scale affected when they become empty. The gasoline drains from these tanks to a pair of pressure tanks under the floor of the car. Each pressure tank contains fuel for an hour's run under air pressure from an engine-driven air pump. Gasoline under pressure feeds from the pressure tank direct to the engines. The engineer shifts over from one pressure tank to the other every hour. This system was adopted to keep pressure off the main tanks, which are of light metal, and to eliminate the head resistance of an overhead gravity tank. It works well.

The car is protected from bumps against the ground by two pneumatic cylinders of rubberised fabric, which fit in cradles under the floor. Parachutes for the crew are carried in aluminium buckets let into the bottom of the car so as to be out of the wind. To save resistance, the drag rope which is to be let down to the landing party is coiled up in the bow compartment. The bottom of this compartment opens down like the lower jaw of a fish, and permits the coil of rope to fall out. The pilot has only to step on a pedal to throw down his drag rope.

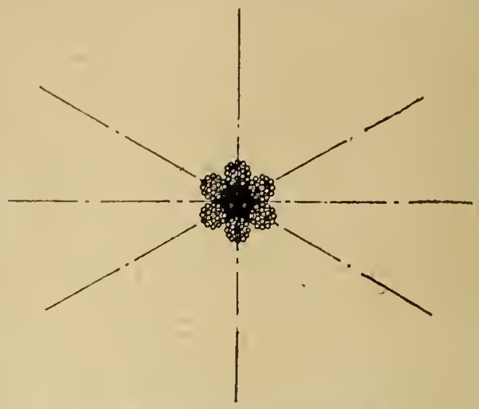
The controls are separated. The direction pilot sits in the front seat and steers the ship by compass, having nothing else to do, while the altitude pilot sits in the rear seat and controls the course in a vertical plane. He has the elevator controls to look after, and, in addition, all valves, ballast and pressure-regulating devices on the envelope. His duty is the more exacting, and requires experience. He controls the pressure of the gas in the envelope by letting air into the ballonets. For this purpose scoops can be let down into the slipstream of either engine, and there are valves to permit discharge of air into either the forward or after ballonet or to both. The mechanician in the next compartment handles the engines on the signal and looks after the fuel supply.

The operation of the ship is, therefore, divided among three men, who form the minimum crew. The fourth compartment is for the radio operator. The usual radio apparatus is carried, including radio telephone and direction finder.

The C 5, in its flight from Cape May to Newfoundland *via* Montauk, for the first time carried its radio antennæ inside the envelope. The installation was successful in every way. Even when the airship was moored close to the ground at Cape May, messages were sent for nearly 100 miles, and were received from the naval air station, Coco Solo, Panama. The C 5 on this trip also carried a hydrogen carburettor, a development of the British Admiralty. By means of this device when it would normally be desired to valve hydrogen during the course of the airship's flight in order to control altitude, instead of valving hydrogen into the atmosphere, hydrogen gas from the envelope is burned as fuel in the engines, thereby effecting a saving of gasoline and increasing the radius of action of the airship.

Kite Balloon Progress

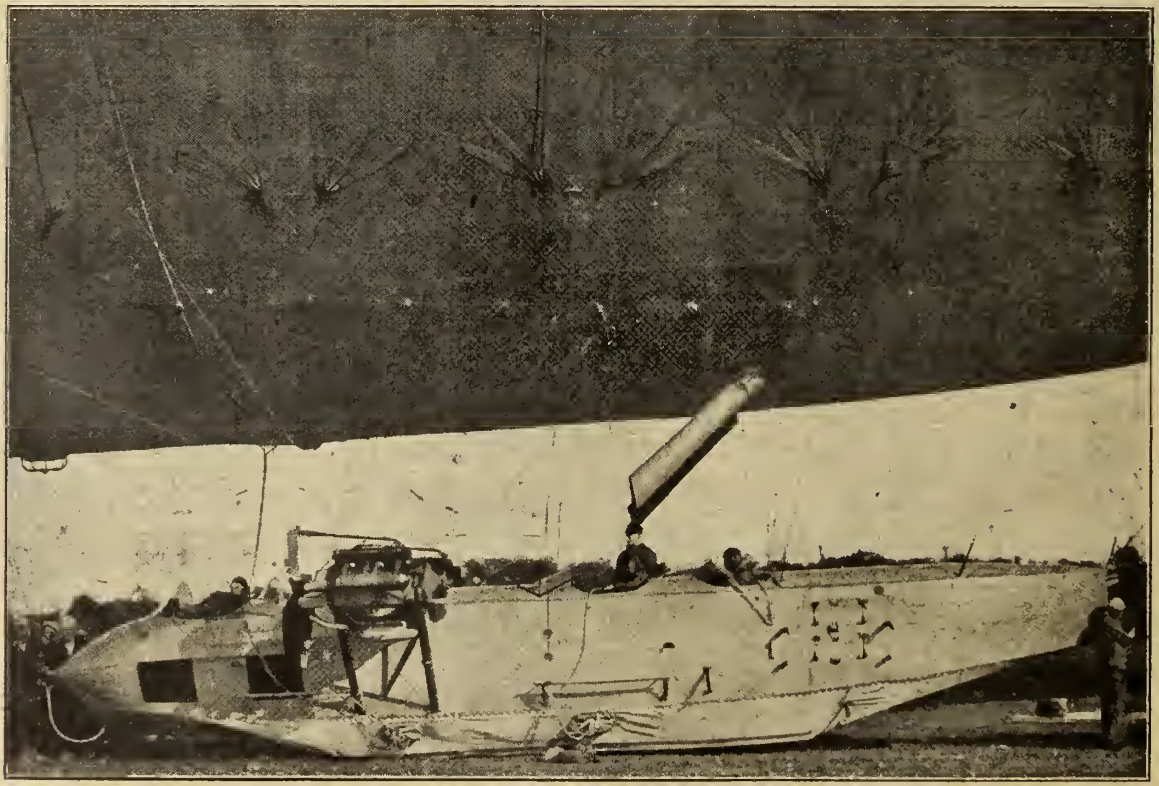
In discussing progress in lighter-than-air craft, I should not omit the kite balloon. While the kite balloon is not a self-propelled airship, it is a very pretty engineering job, and has caused us first and last a lot of trouble. The kite balloon as a design we took bodily from the British, and our troubles came in reproducing it with our materials and in attempts to improve some admittedly weak points. The work done in that connection is not, however, different in kind from what I have already gone into.



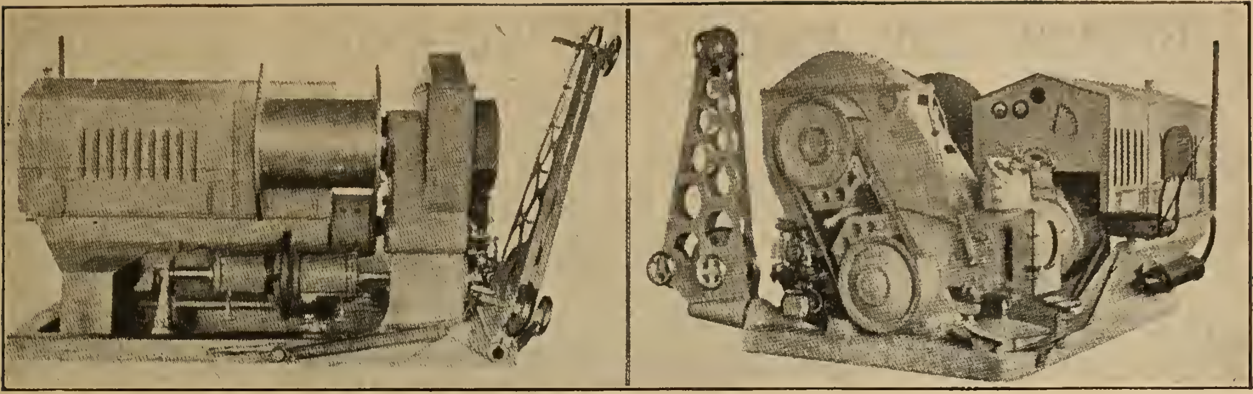
A section of a kite-balloon cable, showing internal core for telephone cable

The telephone-cored cable is a typical feature. The great advantage of the kite balloon, and in fact its only reason to exist, is the facility and certainty of communication by telephone to the ground. Other aircraft use radio, and are subject to all sorts of interference and uncertainty.

In the early days of the War telephone communication from a ship's deck with kite balloons was held by means of a twisted pair of conductors independent of the holding cable, let down on a reel from the basket. Subsequently,



A close-up view of the car of the C-type twin-engine dirigible, showing finger patch suspension



A petrol engine-driven winch for kite-balloons

it developed that a cable with a core of telephone wires was greatly desired to replace the outfit of cable and separate conductors, and that such a telephone-core cable was being used successfully by the British and French. The British cable consisted of three single conductors each enamelled, silk-covered, twisted, and then covered with a thin insulation of rubber around which was spirally wrapped a brass strip to serve as protection between the delicate core and the strands of the cable proper. Equipment for producing the thin supplementary rubber insulation required by the British cable was hard to find in this country. Consequently, a cable was developed by the American Steel and Wire Co., with a telephone core of three copper conductors, each enamelled, silk-covered, twisted and covered with a single layer of cotton, and finally insulated with high-grade rubber of thickness equal to the combined thickness of the supplementary rubber insulation and the brass strip of the British cable. This cable has proved satisfactory without the brass armour on the core, and from the results of service is believed to be as rugged as the foreign cable.

In the fall of 1917 steps were taken to develop suitable winches for handling kite balloons—a steam winch for use on small towing vessels, a gasoline-engine-driven winch for use on shore stations, and later an electric winch for use on capital ships of the fleet. The principle of the single drum cargo winch with slipping frictions was tried, and was found unsuccessful on account of the compression strain on the cable due to the superimposed layers on the drum crushing the telephone wire core. We next tried a "surge drum" winch equipped with one or more winding of "surge" drums on which the cable is laid in grooves in a single layer, and a storage drum, independent of the winding drum. The winding drums exert all the pull on the cable which is stored on the storage drum under light tension. By this method the cable on the storage drum is not subjected to the severe crushing stress which would result from superimposed layers of cable put on under high tension. The gasoline-engine-driven winch of the N-C-L Engineering Corporation was the first one developed, and a notable improvement over former experiments was the use of the Entz magnetic transmission, such as is used on the Owen magnetic automobile, for transmitting power from an eight-cylindered Herschell-Spillman engine to the winch unit. This afforded a very wide and flexible range of speed control.

In the spring of 1918 the first of the electrically-operated winches was worked out for use on capital ships. The winding unit of these winches was identical with the gasoline-engine-driven type, and the Standard Electric Co. crane motor with appropriate controller replaced the gasoline engine and magnetic transmission.

A successful steam engine-driven winch was completed about the time of the Armistice. The usual slow-speed steam winch engine had to be discarded as not giving the necessary flexibility in control of the winch nor the speed desired in quick hauling down, and a small radial-cylinder sleeve-valve high-speed steam engine was successfully worked out by the N-C-L Engineering Corp., which solves the difficulties of a proper steam power plant. With the completion of this steam unit the Department has now reached a point where satisfactory kite balloon handling winches are furnished, using a standard winding unit with any one of three different power plants (gasoline, electricity or steam) for use on various type of vessels and on shore stations.

Lightning has always been one of the chief enemies of kite balloons, and at the beginning of the spring, 1918, a large-size strain insulator was regularly interposed between the bridle of the kite balloon and the top of the towing cable. This, of course, added a good deal to the weight of the kite balloon, but was believed to be a sure protection against destruction of the balloon by lightning. Balloons so equipped gave excellent service until August, 1918, when the U.S.S. *Gloucester*, towing a large 35,000 cu. ft. type R Caquot kite balloon at 500 ft. altitude, anchored off the Section Base opposite Naval Air Station, Rockaway, L.I., during a heavy storm. Lightning struck the balloon, completely destroyed it, and, coming down through the bridle cables, exploded the strain insulator, and a theory which had held true many months through good luck.

(*To be concluded.*)

◆ ◆ ◆ ◆

Italian Airship to Cross Atlantic

Arrangements are now being completed for the trip across the Atlantic from Rome to Rio de Janeiro of the Italian airship P 34, which is nearing completion in the sheds at Ciampino.

This ship, designed by Signor Usuelli, is of the semi-rigid type, 144 m. long, 28 high, and 22 in diameter, with a cubic capacity of 34,000 cub. m. It is said to be able to carry 100 passengers.

Italy's Present to Sweden

Two Italian seaplanes, presumably of the Savoi type, have been presented to the Swedish Government by the Italian fliers who have been paying a visit to Stockholm.

Poulet's Progress

Last week Etienne Poulet, on his Caudron, succeeded in covering one or two more stages on his journey from Paris to Australia. On the 5th inst. he made the journey from Constantinople to Konia, and on the 6th he was reported at Baghdad. The following day he reached Bushire, on the Persian Gulf, after a trip across the desert. On November 8, he was at Bundar Abbas, and left at 5 a.m. the next day for Karachi.

A Michelin Prize for Helicopters

M. Michelin has written to the Aero Club of France placing a sum of 500,000 francs at the disposition of the aviator who first succeeds in rising vertically from the ground, attaining a horizontal speed of 200 kilometres an hour, and landing vertically in a radius of 5 metres.

French Aeroplanes for Spain

Last week three Breguet (300 h.p. Renault) bombing machines were delivered, by way of the air, at Madrid. The machines, which are destined for active service in Morocco, were piloted from Paris to Madrid by de Romanet, Walbaum and Massot.

Air Services in Poland

A company, in which Prince Stanislas Lubomirski is interested, is being formed at Warsaw with the object of organising aerial services between Warsaw and the principal centres in Poland. A start has been made with a service between Dantzig and Warsaw, and others will follow as soon as arrangements can be completed.

REPORT OF AMERICAN AVIATION MISSION

The report, dated July 19 last, of the Mission sent to France, Italy and England by the U.S. Secretary of War, has now been issued as a White Paper.

We publish below the material portions of the report, which is addressed to the U.S. Secretary of War, Mr. Newton, who, as will be seen, has written a memorandum to it.

A thorough study and investigation was made by your Mission of all forms of organisation, production and development. As a result of these studies, your Mission desires to emphasise the universal opinion of its members that immediate action is necessary to safeguard the air interests of the United States, to preserve for the Government some benefit of the great aviation expenditures made during the period of the War, and to prevent a vitally necessary industry from entirely disappearing. Ninety per cent. of the industry created during the War has been liquidated. Unless some definite policy is adopted by the Government, it is inevitable that the remaining 10 per cent. will also disappear.

In placing this matter before you, the subject falls into three important heads: (1) General organisation; (2) development, commercial; (3) development, technical.

The findings of the American Aviation Mission and its recommendations are submitted after a careful review of the situation in the allied countries mentioned, but always keeping in mind the situation in the United States. Under the above sub-heads the results of these investigations are presented to you, which, in the opinion of the Mission, demand the most earnest and immediate consideration along the broadest lines, with a view to establishing some fixed policy which will save the aircraft situation in the United States and give the United States an equal place with the great powers of Europe in this great new commercial development.

The American Aviation Mission therefore recommends: The concentration of the air activities of the United States, military, naval and civilian, within the direction of a single government agency created for the purpose, co-equal in importance with the Departments of War, Navy and of Commerce, to be called in this report, for purposes of identification, the National Air Service.

In making the above recommendations, the following views and data of the Mission are presented:—

Visits were made by the Mission to England, France, Italy, and conferences have been held with those largely responsible for the successful prosecution of the War, and especially with those men most experienced in the aerial development within these countries. (The committee then give a list of persons interviewed.)

In all countries visited, and in the minds of all persons met in conference, appears an extraordinary similarity in condition and in conclusions drawn from the experiences of the five difficult years of mistake and achievement in the prosecution of the War. Perhaps no stronger or more simple presentation of the regard in which the future of aviation is held in Allied countries can be given than by quotation from two letters of M. Clemenceau, copies of which were obtained in France. The first is addressed to the President of the United States, urging upon him the immediate consideration of matters aeronautical and in connection with the Peace Conference. The second is addressed to the President of the Republic of France, submitting the draft of a decree creating a separate department of Aeronautics placed transitorily under the Ministry of War—an intermediate step possible without legislation and looking to the early creation of an independent Ministry of the Air:

"Copy.

"February 16, 1919.

"Mr. President:

"I have the honour to acknowledge the receipt of your answer of February 7, to my letter of January 24. I enclose herewith, copies of the letters which I have received from Lord Milner and from Monsieur Orlando, as well as my replies.

"I am pleased to note that you agree in principle with my proposition to create an Aviation Committee for after the War. I take the liberty of insisting on the necessity of creating this Committee without delay, in order to be able to utilise it as an advisory organ for the Peace Conference. Indeed, the clauses for aerial protection seem to me to have at least an importance equal to the clauses for military and naval protection; and it is of the greatest interest to have a study made by competent personalities of the measures to take against the eventual constitution of a German military fleet. I cannot insist too strongly on the imperious necessity of this study, on account of the proximity of Germany to London, Brussels, Paris and Rome.

"Likewise, I adhere entirely to the British proposition which seems to me practical and effective, and I request you likewise to give it attention. In case it seems acceptable to you, I wish you would let me know if you could delegate two representatives to the next meeting of the new Inter-allied Committee, which will take place on Thursday, March, 6, at 10 o'clock, at the Directory of Aeronautics, 260, Boulevard St. Germain.

"Please accept, Mr. President, the assurance of my highest consideration, etc.

"(Signed) CLEMENCEAU."

"Copy.

"REPORT TO THE PRESIDENT OF THE FRENCH REPUBLIC.

"Paris, June 6, 1919.

"Mr. President:

"Aircraft has developed considerably during the War. It should, at this time, adapt itself to a no less important part in Peace time. But because of the many initiatives which co-operate in its new use and development, the efforts and means are dispersed in various ministerial departments.

"The future of aviation in France will only be assured by the co-ordination of all efforts and the unification of the general services. Also, it will give the advantage of better work from the personnel and credits which are actually effected to similar objects in different ministries.

"With this object in view, and according to the propositions of an interministerial conference which I am able to assemble, I have the honour to submit for your signature the following decree creating an organ of general co-ordination of aviation.

"This should not be confused with any of the particular aviations of the various ministerial departments. At its origin, it will be attached transitorily to the Ministry of War.

"I am, Sir, yours respectfully,
"GEORGES CLEMENCEAU,
"President of the Council, War Ministry."

Even before the report of this Mission can be given consideration, a step similar to that proposed by France will have been taken by Italy. Here, however, the Department of Aeronautics is being placed under the Ministry of Transportation—a make-shift arrangement frankly acknowledged transitory and immediately possible without the legislation needed to create the clearly foreseen ultimate—the Italian Ministry of Air.

England more than two years ago began the co-ordination of her aircraft activities—an effort which has resulted in placing her well in the lead in practically every phase of aerial development, and which has resulted in bringing her months ago to the establishment of a Ministry of Air, co-equal with her Ministries of War and of the Navy. That the present Ministries both for war and for air are centred in the same individual has no significance other than that of momentary expediency.

The whole trend of events touching the art of aeronautics in its broad relation to world progress, the experience in all Allied countries (including the United States) during the five years past, the frankly discussed future plans under present consideration in foreign quarters and the views everywhere encountered by us, leave your Mission impressed with these unescapable conclusions:—

1. That Italy, France and England realise fully the importance of aircraft in the military-naval and civil-commercial aspects, and propose to encourage the general development of the art through Governmental aid to commercial industry.

2. That Great Britain has come to consider the dominance of the air as at least of equal importance with that of the seas, and is frankly and avowedly planning a definite policy of Aerial development to that end.

3. That any future war will inevitably open with great aerial activity far in advance of contact either upon land or sea, and that victory cannot but incline to that belligerent able to first achieve and later maintain its supremacy in the air.

4. That for economic reasons, no nation can hope in time of peace to maintain air forces adequate to its defensive need except through the creation of a great reserve in personnel, material and producing industry through the encouragement of Civil Aeronautics. Commercial Aviation and Transportation development must be made to carry the financial load.

5. That no sudden creation of aerial equipment to meet a national emergency already at hand is possible. It has been proven within the experience of every nation engaged in the War that two years or more of high pressure effort have been needed to achieve the quantity production of aircraft, aircraft engines, and accessory equipment. The training of personnel, including engineering, production, inspection, maintenance and operating forces—covering some fifty distinct trades and some seventy-five industries, has proved in itself a stupendous task when undertaken upon the basis of the war emergency alone.

6. That the rapid adaptation of aircraft to the commercial uses of peace is everywhere being studied and planned. Under the forced draft of war, this newest and fastest agency of Transportation has been brought to a high state of development. It must now be redesigned to meet the progressive demands of a civilisation at Peace.

7. That because of its great speed and range of operation, oceans, states and even countries are being passed over with a greater facility than are townships and counties traversed by the motor car. The need for International agreements governing the construction, operation and safety of aerial apparatus of all kinds is immediately before us.

8. That for the first time in the world's history the stage is set for a close International co-operation in the development of a great art at the very threshold of its era of commercial utility. Great Britain, France, Italy and Japan not only invite but urge the United States to share in this work.

9. That just as we now have National, International and Interstate regulations, laws and agreements covering rail and steamship travel, and the safety and navigation of the seas, so must we have similar regulations governing aircraft and the uses of aerial navigation throughout the world. The International Convention drawn by the International Committee sitting in Paris, under the Peace conference, gives the first long step in this direction.

10. That the need in each country for a single authoritative point of contact for the conduct of all International aviation affairs, legal, operational, technical and political, is imperative. Such agencies have already been set up in England, France and Italy. The United States has, under the terms of the International Convention, no option but to follow these leads.

11. That in England, France and Italy sentiment is undoubtedly in favour of the centralisation of aircraft development under one authoritative head. Difference of opinion has been encountered only in the matter of Army and Navy personnel and in the question of the independent fighting force.

England holds the initiative and is building her R.A.F. co-equal with the Army and Navy. France and Italy follow England's lead, but seem inclined to leave questions of operating personnel for the present to War and Navy Departments, and to debate the need of an Independent Fighting Air Service. In all cases, forces operating in conjunction with Military and Naval units, function under the Military or Naval High Commands.

12. That among the many considerations of early moment requiring governmental direction may be mentioned the following:—

(*a*) Federal and International laws governing the use of air routes.

(*b*) Federal and International control of pilots' licences; examination and tests required.

(*c*) Federal inspection of all commercial aircraft for airworthiness, or suitability for service.

(*d*) Customs and other regulations for crossing State and National boundaries.

(*e*) International standards for methods of communication and signalling.

(*f*) International standards covering the marking or charting of air routes and of landing places for both day and night use.

(*g*) International specifications and rules governing the construction, equipment and operation of standard airodromes, landing stations, signal towers and other aids to aerial navigation.

(*h*) Port regulations and fees covering seaplanes.

(*i*) Federation taxation of aircraft and licence for its use.

(*j*) Safety measures and devices; legislation forcing adoption.

(*k*) Fire underwriter standards, regulations and safeguards; insurance of machines, of material and of persons in transit (property and life).

(*l*) The legal status of privately-owned aircraft; the property rights of the air; liability for damage inflicted and incurred.

(*m*) International standards and specifications covering accepted practice in quality of materials, in factor of safety, and in methods of construction; an engineering literature of this new art must be created by International approval.

(*n*) Maps and navigation charts of the United States and its territories.

13. That we of to-day are conceivably no more qualified to judge as to the scale and development of the aircraft of ten years hence than were we of even five years ago able to foretell the achievements of to-day. We must bear in mind always that for every one mind focussed upon things aero-

nautical in this earlier period, some thousands of keen minds are now versed in the aircraft art. With proper governmental encouragement, rapid progress seems inevitable.

14. That the broadest consideration for the ultimate welfare of American aviation must be given in the constitution of any organisation set up for the co-ordination and control of aeronautics within the United States. The prerogatives and ambitions of governmental departments and of individuals must be assayed at true value.

15. That past experience and every economic consideration point to the vital need for the formulation by the United States of a definite, comprehensive and continuing policy for the development of every phase of the aircraft art. Our Government is now faced with the task of nursing and actively encouraging a new transportation industry, whose healthy growth is vital to the future progress and defence of the nation.

Because of the lack of a definite, intelligent and sympathetic policy in our governmental aircraft organisation since the armistice, our American aeronautical industry, built up at such great expense of money and of effort, is rapidly disappearing. No sensible business man is justified in keeping money invested in the aircraft industry under the conditions which have maintained in the United States since November 11.

16. That the closest possible relations must continually exist between the aircraft agency of the Government and the production and commercial industry engaged in aircraft development.

17. That the industries involved in the production and commercial use of aircraft must be given recognition and representation in connection with all national and international activities bearing upon the direction and control of aeronautics.

In the foregoing brief presentation of its conclusions, your Mission has touched upon the aeronautical policies already in effect or under present discussion in England, France and Italy. Great Britain's plan of organisation certainly warrants our most careful consideration. Its salient points are clearly set forth in the chart herewith attached. It is not argued that the British method is perfect, but it can be stated without fear of contradiction in any quarter, that it stands to-day the most comprehensive governmental mechanism yet set up by any nation in the world for the encouragement, upbuilding, direction and control of its Air resources. This organisation has been born of five bitter years of trial, mistake, experience and progress. It is the product of the best brains in the British Empire focussed under the spur of national need and the demand of the British people. We in America may well study it carefully.

Your Mission, in presenting its recommendations, desires to emphasise the view everywhere encountered that the future of aerial navigation and of aerial development generally, is in only a limited sense a function of military and naval establishments. The air is a medium for commerce and communication and its direction to the peaceful uses of civilisation must be unhampered by the necessarily restricted views of these specialised departments.

Recommendations.

A. The concentration of the Air activities of the United States, civilian, naval and military, within the direction of a single governmental agency, created for the purpose co-equal in importance and in representation with the Departments of the War, Navy, and of Commerce.

B. That the agency thus created be charged with full responsibility for placing and maintaining our country in the front rank among nations, in the development and utilisation of aircraft for the national security, and in the advancement of the civil aerial transportation and communication arts.

C. That this governmental organisation be formed in general as follows :—

1st.—A Civilian Secretary for Air.

2nd.—An Assistant Secretary, a civilian, responsible directly to the Secretary for Air for the management and operation of the Department.

3rd.—Five or more Divisional Heads acting as chief of the sub-departments of (*a*) Civil Aeronautics ; (*b*) Military Aeronautics ; (*c*) Naval Aeronautics ; (*d*) Supply and Research ; (*e*) Finance, etc.

4th.—An Air Council, advisory in character, which shall be constituted by the Secretary of Air, including the Assistant Secretary of Air, the chiefs of the several sub-departments, and such other personnel as may be deemed advisable.

We desire especially to invite attention to the complexity and newness of the whole development of the aviation art, and to urge the broadest possible treatment of the subject during this formative period. We suggest that the lesser details of organisation may well be left to the judgment and initiative of those called to assume the responsibility of directing this work. We desire also, in this connection, to call attention to the aircraft interests of the Allied Governments, and to emphasise the necessity for careful discrimination in the selection of men of industrial experience and broad vision.

D. The establishment of governmental institutions of education and training, including an air college, all open alike, under proper restriction, to military, civilian and naval personnel.

E. Such curricula and such arrangement of promotion in the National Air Service, and such assignment and pay, as to insure to the young man an attractive career whether he elects to remain permanently in the "National Air Service" or return to Army or Navy, or to civil life.

F. The adoption of a system whereby Army, Navy and civil personnel can be circulated in proper proportion through the National Air Service. This personnel would, unless permanently assigned to air work, be automatically returned to the military and naval sources, or to civil life as an Air Service Reserve, after the educational and service periods in the National Air Service have expired.

It is felt that such a circulating system is vital to the co-ordination and ultimate efficiency of the three services, and to the desired dissemination of a knowledge of and interest in the art among our people. The young officers of to-day will command the military and naval forces of to-morrow, and will carry with them into the highest ranks an intimate knowledge of aircraft, and of the strategy of its varied uses, in connection with operations on land or sea. The direction of civilian and commercial activities of all kinds will be made possible, and the closest contact and co-operation between the Government and the aeronautical industries assured.

All international relations touching aerial matters fall naturally within the jurisdiction of the Secretary for Air.

All responsibility for the supply of aircraft material and equipment of all kinds, and for the training of personnel for all branches of the service, is, in accordance with these recommendations of your Mission, placed with the Secretary for Air. As some 27,000 items are involved in the equipment and maintenance of each Air Squadron on active duty, the need for a single responsible direction seems undebatable.

Under this plan of organisation here recommended, all squadrons and all equipment assigned by the National Air Service to meet the stated requirement of the military and naval establishments pass automatically under Army or Navy command. Under National Air Service operational direction remain only those independent projects unrelated to the activities of the military and naval fighting fronts and such personnel and equipment as forms a surplus to the needs of the sea and land fighting arms.

The question of governmental organisation for the development and utilisation of our country's air resources has been given consideration by your Mission, seemingly from every angle. The recommendations made are general. No report could be made effective if burdened with the mass of details involved in the setting up of any governmental mechanism such as proposed.

There have been, and will continue to be, advanced many objections to the establishment of a Department of the Air. We believe none of them will prove insurmountable. We believe the advantage gained to be such as to entirely overshadow any temporary difficulties.

Always in the past, in war by land or by sea, and in the transportation activities of peace, we have thought in two dimensions only. We must now readjust our minds to think for all future time in three.

When this Mission left the United States in May, its members were hoping the Altantic Ocean might be crossed before January 1, 1920. Within the two months of our absence four successful crossings have been made, and without the loss of a single life.

There must be no over-optimism. There are years of development and experimentation ahead. As in the case of all the other great agencies of civilisation, the commercial and financially profitable use will come slowly. But here the immediate welfare and safety of our nation is involved, and an intelligent and efficient direction of our aeronautical affairs will be demanded by the American people. American genius has given to the world the aeroplane, a new instrument of commerce and of war. But America has left its development to other nations, and, too late, realised the mistake of this neglect. She has paid the price. America now again has the opportunity if not to lead, at least to take her place in the front rank and to gain to herself the full benefit which will surely accrue from an active and sincere co-operation in the engineering activities and in the scientific and commercial aircraft developments of those nations associated with us in the war.

But this will be impossible, in the future as in the past, if our aircraft activities remain dispersed among the several governmental departments, and impossible of co-ordination for decisive action.

Upon the breadth of view and the vision of those in control of America's policies depends our future as an Air Power.

Commercial Development.

With reference to the commercial development of aviation, your Mission makes its recommendation based upon the following conclusions, which have been formed, first, through knowledge of conditions existing at present in America, and, second, the knowledge gained by its investigations abroad.

The investigations in England included visits to a number of factories, aerodromes and other points of particular interest, and interviews with the following gentlemen. (The Mission give a list of the works visited and the officials interviewed in England, France and Italy.)

1. One of the most important problems to be considered in the rehabilitation of the world's commerce, following the close of the war, is the development of aerial transportation for commercial purposes. Its one invaluable service, and that in which it surpasses all other means of transportation, is speed, that time-saving element which the world has always striven for, and for which America, with its great distances, has such serious need. Reliability, safety, economy and those other qualities of transportation service which are of value, will steadily improve as the use of aircraft increases and experience accumulates.

2. It is as impossible to forecast the future of this new medium of transportation as it would have been to describe the speed, comfort and safety of the modern steamship at the time the first steamship crossed the Altantic. It is safe to say, however, that in time it will become one of the great transportation mediums of the world and will continue to offer the fastest and most direct means of transportation for persons, mail and light freight, known to civilisation. Its development is limited only by the perfection of the mechanical devices used, with which we are constantly becoming more familiar, and by the extent of our knowledge of the atmosphere which is becoming more thoroughly understood each year.

3. It is equally difficult to determine the speed with which this development will take place. In fact, this will be determined largely by the opportunities afforded to employ the brains of the engineer and the scientist on the problems involved, which in turn will be controlled by the financial resources available for such work. It is thought by some well-informed authorities that the next five or ten years will see this new industry through its initial stages, and established on a self-supporting basis, providing it is encouraged at this time. Adequate support cannot be expected from private enterprise alone and if no outside aid is given, ten years will probably see this industry in America still struggling for a foothold, and far behind its European competitors who will receive substantial aid of many kind.

4. History has shown repeatedly that no nation can afford to neglect the highest possible development of its transportation mediums regardless of the opportunities existing for immediate profit to the private enterprise concerned. This is particularly true of aerial transportation, which is not local in its nature, but which is essentially of a national and international character, due to the great distances covered, and to the speed with which it links together far distant points. This principle has been so clearly understood that an international agreement has been established between the Allies and their associates, by which international flight of aircraft has been provided for in a far-sighted manner, thus making immediately possible the flight of private craft from one country to another on a basis as clearly defined by law

as that governing the movement of steamships, except, of course, that the practice of ages of ship travel is missing in the case of aircraft.

5. The development of aviation is progressing so rapidly at this time that it is difficult even for those in close touch with it to keep up with its progress. During the past two months the Atlantic has been crossed four times by aircraft; first, by a seaplane of the American Navy; second, by an airplane of Great Britain, and finally, by an airship of Great Britain which has twice demonstrated its ability to fly between England and America. All of this has been accomplished without the loss of a single life. Airships are now building in England which will be able to carry from five to ten tons of mail, in addition to the necessary fuel and crew, and cross the Atlantic from London to New York, in one half the time made by the fastest steamships. Who can say such transportation facilities will not greatly serve civilisation, and be of immeasurable value to our own country if properly developed and used?

6. Already lines of aerial transportation are being used in England and France in a small way for commercial purposes, but the distances in these countries are so short that relatively little advantage can be gained, so such ventures will develop slowly. A daily service from London to Paris has been in operation for some time, and promises to be quite serviceable as soon as it can be relieved of its war-time military supervision. Other lines now in operation are from Paris to Lille and Brussels, and from Paris to various points in Alsace-Lorraine and German occupied territory. Among other plans English private interests are projecting airplane lines from Cairo to the Cape and Cairo to Bombay, and French interests are planning to run a line to Algeria and Morocco. These lines will carry mail, passengers and express, and it is expected that they will materially shorten the time between European centres and their far distant terminals. The United States-Post Office Department has carried mail by airplane from New York to Washington for over a year with a record of nearly 100 per cent. delivery at each end every day. It is now inaugurating a line from New York to Chicago which will shorten the mail time between these two points to about one half. It is also projecting a two-day service from New York to San Francisco. England is already desirous of organising with the United States a trans-Altantic airship line for mail service which would give a five-day mail service from London to San Francisco. Such a service is entirely possible at this time, and its inauguration depends only upon adequate encouragement and financial support.

7. The risks involved in these ventures, due to unknown conditions of the atmosphere, imperfections of equipment, etc., are still so great as to make them impracticable from the point of view of private enterprise, undertaken for a profit. It left entirely to such private enterprise, aerial transportation will develop slowly and with many losses and backward steps, as did the steamship, the railroad, and the automobile, each of which, however, has ultimately become a vital factor in our civilisation.

8. One of the striking features of our investigation in Europe was the unanimous belief that the use of aircraft in warfare and for national defence would continue to increase and that in the next war, whenever it might come, aircraft would be a far more vital factor even than it has been in this War. One of the greatest military authorities in Europe stated that in his opinion the first battle of the next great war would be in the air, and would very nearly decide which side would win, in that the side winning in the air would immediately have access to all of its enemy's sources of supply and production, and would quickly cripple them by air raids upon an enormous scale. The opinion was everywhere expressed that the development of aircraft for purposes of national defence must continue, and that sufficient flying and production facilities and personnel must be maintained at all times to ensure an adequate supply in case of need. Due to the complicated and delicate nature of such equipment, to its rapid depreciation in use, and to its constant obsolescence, the expense involved in such a programme would be very great, in fact, almost prohibitive in peace times.

9. The existence of an aerial transportation industry with a great commercial air fleet and of a strong production industry would greatly decrease the need for strictly military equipment and resources, in that practically all of the aircraft and landing field facilities and personnel, and the manufacturing and maintenance facilities and personnel employed by such commercial activities, would be available as a reserve in time of war. It is evident, therefore, that the most economical way to develop a strong air service for national defence is to encourage, by every means possible, the use of aircraft for commercial purposes, and thereby build up a commercial fleet at relatively small expense to the Government, which would effectively supplement its strictly military equipment in time of need. America's experience during the war has proven conclusively that aircraft facilities and personnel, and particularly production facilities and technical personnel, cannot be obtained upon short notice, but only by long and continued experience and at great expense.

10. America's production industry reached large proportions during the War, but since the signing of the Armistice it has shrunken to a very small volume. Unless immediate attention is given to its conservation it will practically disappear, and a considerable portion of the great sums expended in its development will have been spent fruitlessly. This industry does not require a large volume of business to keep it alive and healthy, but it does require a steady and dependable demand, otherwise private capital and enterprise will not long remain interested.

Recommendations.

Upon the basis of these conclusions, we offer the following plan for stimulating the development of commercial aviation as an aid to national defence, and as a response to the demand that is already developing for improved commercial transportation through the use of aircraft.

A. The Civil Aviation Division of the National Air Service should establish, with the advice of the Army and Navy and the Divisions of Military and Naval Aeronautics, a series of flying routes throughout the United States and its possessions and to contiguous foreign countries, which will be of military and commercial value. It should also prepare and publish maps and descriptions of each of these routes suitable for the use of fliers.

B. There should be provided at national expense certain flying fields in strategic locations and suitable for military purposes, and encouragement should be given to the various States and Municipalities to provide flying fields upon all flying routes at points found desirable, thus eliminating the necessity for private ownership of flying fields except for strictly private use. Hangars should be provided at each flying field by the Governmental authority owning the field (that is, Federal, State or Municipal), or, where such fields are used constantly by private interests, they should be permitted to provide their own hangars immediately adjacent to and opening upon such flying fields.

The operation and use of such flying fields should be controlled by Federal Law, so as to obtain uniformity throughout the nation and conformity with international regulations.

C. All flying routes and flying fields should be equipped at national expense with signalling and communication systems, including wireless telegraphy, wireless telephony and searchlights, to thoroughly safeguard and guide aircraft in flight. The Government's attitude in this matter should be the same as that maintained towards shipping in its lighthouse and coast patrol service. The operation of signalling and communication equipment should be controlled by Federal law for the reasons indicated under item "B."

D. A meteorological service should be developed to provide fliers and other aviation interests with accurate weather reports and other atmospheric data necessary to govern their activities intelligently. The value of this service to commercial aviation cannot be over-estimated, as it will go far towards establishing reliability and safety of service, just as weather reports are of immeasurable value to ocean and lake transportation.

E. Training facilities should be provided at various localities throughout the country, either at Government expense or by private enterprise under Government regulation, with guarantees from the Government of a sufficient number of students to cover expenses. Such guarantees could be given by the Government without undue expense if it used such schools for the preliminary training of its military personnel. Such a plan would encourage private enterprise to provide facilities for the training of the personnel needed for commercial requirements, which personnel in turn should become a permanent reserve for military requirements in time of need. There should be established at least one school for the teaching of aerodynamics and other branches of the science of aeronautics, as recommended under the heading "Organisation." Encouragement should be offered to universities throughout the country to establish departments of aeronautical science.

F. The Government should encourage the development of new design and aeronautical technique for commercial purposes along the lines recommended under the heading "Technical Department."

G. The Department of Aeronautics should maintain the closest possible relations with all civilised nations in determining and applying the rules and regulations which will govern the international use of aircraft, and there should be developed, as rapidly as is consistent with proper consideration, a body of Federal law governing the use and airworthiness of aircraft for commercial purposes which will safeguard life and property and promote the commercial usage of aerial transportation.

In order that commercial aviation may be helped and not hindered by such legal restrictions, it is of vital importance that aerial transportation be recognised at once as an element of inter-State commerce and be made subject to one body of *Federal* law applying uniformly throughout all of the United States. It will thereby avoid the complications of individual State control which have proven to be such a handicap to railroad and automobile operation.

H. Insurance of aircraft and its personnel against all kinds of hazards and risks involved should be encouraged in every way. The cost of such insurance should be kept as low as is consistent with the risks involved.

I. Encouragement should be given to the organisation of private enterprises for carrying on aerial transportation. This encouragement might well be in the form of payment for the carrying of mail and expressage, and of guarantees as to the volume of such business. Compensation might be paid to such enterprises for keeping their facilities available for use in time of war.

Guarantees of this kind, coupled with opportunity to insure against loss by accident, should make privately operated transportation lines a commercial possibility, but if it is found that private enterprise does not respond to such encouragement, then the Government should undertake certain transportation ventures on its own account, and should continue to operate such lines until they are proven commercially successful. Ultimately they should be sold to private enterprises on such terms as would permit of successful operation, as it is not believed that commercial aviation will ever be successfully developed entirely under Government control.

J. The remaining aircraft production industry should be conserved and kept in a healthy condition by a well-defined and continuing programme of production for military purposes over a period of years. This policy should be continued until the commercial demand is adequate to support an industry of sufficient proportions to form an effective nucleus upon which can be built a war-time production in case of need.

Technical Development

With reference to technical development, your Mission, in submitting its recommendations, bases the following conclusions on a knowledge of conditions existing in the United States and upon extensive investigations conducted abroad. (Again, the Mission give a list of persons interviewed and establishments visited.)

2. The form of technical organisation and control recommended by our Mission differs materially from the controlling organisations in Italy, France or England. Inasmuch as, for some time at least, military, naval and departmental flying seems likely to lead in the development of the art, your Mission desire to lay emphasis upon the necessity of having these departments strongly represented in the operations of the Technical Division so that they shall be materially helped and not hindered in their research, experiment and development. To the same end, we are of the opinion that lighter-than-air, which in England and France, due to the closeness of the War, the Technical Division is at present dominated by military personnel, but the opinion is unanimous that, as times goes on, civil personnel will supersede military in this Division. General Ellington, England, expressed this opinion flatly, and General Brooke-Popham, Director of Research, England, holds the same belief. In the Royal Aircraft Factory, at Farnborough, civilian requirements are already overtaking military and naval. It has therefore been deemed wise to take the ultimate step at the outset in America, and a civilian head, of the type now earnestly sought in France and England, is recommended for America.

3. In equipment and personnel, England and France and Italy are maintaining their War strength in the Technical Division. At Farnborough, we found a complete experimental plant, employing about 3,000 men and women, and carrying on actively nearly every line of research, experiment and development in motors, planes and accessories. More than a score of planes, rigged with apparatus for aero-dynamic experiment, were in the hangars and in the field. Physical and chemical laboratories seemed busy and fully-manned. Estimating the lighter-than-air and the naval experimental and research personnel, it seems probable that the plant and the personnel engaged in the division in England is nearly, if not quite, equal to the entire trade in America at the present time. Obviously, this branch of aeronautics lies at the very foundation of the future, both military and civil, and to fail to bring it up to the standard of the world cannot help but mean dependence and mediocrity, or worse, in aeronautics in America.

4. The inclusion of such topics as armament (Ordnance), wireless (Signal Corps), instruments (Admiralty), photography (Signal Corps), design and bombs, (Ordnance), etc., has been found necessary in all countries. In reality, the design and supply of such appurtenances is left to the departments or bureaux specialising in them, but research and experiment and development in methods of installation and use is essentially a function of the Air Service Technical Division, and must be carried on by this Division, both in the laboratory, on the factory floor and especially in the air, in the tank and on the field.

5. In all the European countries visited we found that access to and use of the Government-owned facilities for development is established. The basis of such use varies, and can be adapted to the circumstances. In all countries, however, the principle is the same, namely, that private interests must obtain access to Government facilities through the officers of the Division, so that new inventions, etc., shall pas the scrutiny and criticism of the Division heads before going into actual experimentation. In England an attempt has been made to furnish facilities at cost, but to save overhead a schedule of flat prices is being worked out.

6. In England and France the question whether or not to design complete motors and machines no longer exists. France was forced to design aeroplanes in 1916, due to the failure of her private firms to meet the crisis created by the Fokker; but the immediate result appears to have been a quick return to the safer measures for encouraging the private designers to design and build, under the direction and assistance of the State. In England, the complete design of aeroplanes ceased with the S.E. 5; and both Government officials and industrial officials offered ample testimony that the making of complete designs was a mistake and would not be repeated, due to its effect upon the private design departments. Without exception, the manufacturers appear to take the view that it would be idle to compete by private efforts, if one division of the Government was designing and another division buying, as the Government would inevitably favour its own designers, even though not quite so good. The result of such a policy, therefore, would be to limit the number of sources from which useful designs can be obtained, and also to lower the standard of personnel in the design departments of private firms.

7. In 1918 Sir Arthur Duckham, then Director of Aircraft Supply for England, said :—

"As we all know, changes in design, unless they are actually for new types, may be absolutely against production; most of our delays in production in this country, and in the countries other than ours, have been due to the effort to obtain too great perfection at too early a time."

Having this in mind, and having in mind also the disastrous effects upon production of similar causes in the United States your Mission asked explicit questions concerning the plan used by the Technical Division in England to minimise the result of such changes. The method is outlined as follows :—

"All changes made necessary by the fact that a machine or motor is dangerous to the flier or to the public are classed as Number I. These are imperative, and are ordered by the Director of Design, without delay. No machine is allowed to be accepted or flown without such changes having been made.

"Important changes involving improvement in performance, etc., are classed as Number II. Such changes are made by order of the Modification Board described below, and became effective only at such time as not to interfere unduly with production.

"Improvements and additions, not vital but often valuable, are classed as Number III. They are made when convenient, both to Government and to contractor, and are not allowed to interfere with production or greatly increase price."

A Modification Board shall pass on changes and classify them. This board consists of five members, one from the Technical Division, one from Production, one from Operations, one from Finance, and one from Supply. In the case of Number I changes, the Director merely reports that such and such changes have been ordered. All other changes are ordered by the Modification Board at regular meetings.

Your Mission is of the opinion that the establishment of some such uniform practice, covering not only such changes but also the method of paying for them, is essential to production, and should be a responsibility of the Technical Division.

Recommendations.

(*a*) That all technical functions of the Government in respect to aeronautics be centralised in a single Technical Division which shall perform the work for the Army, Navy and Civil aviation; and which shall be headed by, preferably, a civilian of wide executive experience. Such a division should include as assistants to the director, experienced representatives of Army, Navy and other Government departments interested in aviation, who shall be nominated by the departments, and shall act as advisors upon the special needs of the Service they represent.

(*b*) That steps be taken forthwith to secure for the United States the most advanced equipment for research, experimental and development work, and for the testing of motors, planes, balloons, etc., for the testing of materials; for the examination and testing of aeronautical appliances, including armament and instruments; and that such an organisation shall be established as shall assure at all times that the research, experimental and development activities of the Government shall be second to none.

(*c*) That the research, experimental and development facilities and equipment now used in aviation by the Army, Navy and other Government departments be inventoried immediately and put, as far as practicable, under the control of the Technical Division, retaining such of same as may seem suitable and bringing them under a central control to make a complete and efficient equipment, and discarding such of them as unnecessarily duplicate others or are out of date. In making this change, great care should be exercised to guard against measures which might tend to interfere with suggestions for improvements and advances in aviation, material and methods, coming from the operating aviation branches of the Army, Navy and Postal Departments. Experience has proved that the initiative in the advance of motors, planes and accessories often comes from practical experience in the flying field rather than from the scientific department of aeronautics. The Technical Division will, in co-operation with the operating forces, study, work out and apply all such suggestions. Care should be taken also to avoid duplicating facilities already in existence, such as water tanks, armament testing grounds, and many other items operated by existing departments. Arrangements should be made whereby the existing plants of this sort can be used, on a proper payment basis, by the Technical Division.

(*d*) That extreme care be taken in such a process of adjustment to provide ample means whereby the special technical needs of the: (*a*) Army; (*b*) Navy and (*c*) Civilian flying shall receive attention. Moors should also be provided whereby military and naval experiments of a secret nature can be carried forward.

(*e*) That the organisation of the Technical Division cover by means of adequate personnel and equipment, all branches of aeronautical research, experiment and development, including the application and aerial use of instruments, armaments and munitions, wireless telephone and telegraph, bombs and fittings, sights, fire-fighting apparatus, parachutes, air bags and other safety devices, motor appliances for air service, propellers and photography.

(*f*) That all the technical facilities of the Technical Division for aviation, whether now existent or to be created, shall be available to private inventors and designers, upon proper and reasonable terms.

(*g*) That in view of the experience of England and France, it is dangerous to allow the Technical Division to operate under normal war conditions a department of complete design in heavier-than-air machines or in motors, as such competition results immediately in stopping private departments of design. The Technical Division, therefore, should be a critic of, and supplementary to, private design rather than aim at design on its own account. The policy of the Technical Division should be to maintain and encourage a considerable number of well-manned and well-equipped private design plants and to co-operate with these plants in all undertakings that meet with the approval of the Technical Division, and to place orders with these plants, at fair prices, for design and for experimental construction of motors, planes and appliances. Competition of the Government with the industry should be avoided, the only allowable exception being cases where, either on account of expense or for other cause, the Technical Division cannot obtain needed material or design from existing sources.

(*h*) That careful thought shall be given to the establishment of competition in motor, plane, balloons and accessory design, and encouragement be offered in every reasonable way to the promotion of competitive events and the establishment of standard records.

(*i*) That the Technical Division shall publish regularly and under competent management all the technical facts and data developed by the Division that may be helpful to the industry, reserving at the same time to itself the right to preserve secrecy in all matters that are deemed to be in the nature of Naval or Military secrets.

(*j*) That such a Technical Division shall maintain at all times as close touch as possible with the development abroad, and shall maintain representatives in Europe charged with the duty of liaison between the American and European technical organisations.

(*k*) That a definite method of payment for independent design, experimental production, changes in design, alterations and adjustments be worked out by the Government as quickly as possible, to the end that the design and improvement of motors, planes, balloons and appliances may be stimulated and not stifled.

(*l*) That the Technical Division shall include an Inspection and Testing Department, which shall carry on all inspections and tests of experimental construction and revision, and which shall issue certificates of air-worthiness for all machines for private and commercial use, and shall from time to time inspect all machines and appliances, including landing fields, signals, etc., used by public. In co-operation with the Civilian Division, this department shall have power to limit and control all types of air machines used in commerce, and to test such machines before they become production models. This department should have power to examine the inspection methods of all private concerns building aircraft, and to pass upon the quality of such methods from time to time.

(*m*) That close co-operation be maintained at all times with the purely technical aeronautical bodies, and also with the industrial bodies engaged in aeronautics, so that standardisation of materials and practices may be carried forward as rapidly as can be done without hindering the development of the art or entailing undue losses upon the trade.

The report is signed by Messrs. Benedict Crowell, The Assistant Secretary of War; Howard C. Coffin, Member of Council of National Defence, Capt. Henry C. Mustin*, U.S. Navy; Col. Halsey Dunwoody, Air Service, U.S.A., Assistant Chief, Air Service, A.E.F.: Lieut.-Col. James A. Blair, Jr., General Staff, U.S.A.; George H. Houston, Pres., Wright-Martin Aeroplane Corporation; Charles M. Keys, Pres., Curtis Aeroplane and Motor Corporation; and S. S. Bradley, Manager, Manufacturers' Aircraft Association.

Capt. Mustin makes the following reservations :—

Memorandum No. 1.

1. I concur with the report of the Organisation Committee of the American Aviation Mission, to which I have affixed my signature, with the following reservations :—

(*a*) Provided that the personnel employed in Naval Aviation operations shall be composed exclusively of officers and enlisted men of the Navy, Marine Corps, Naval Aviation Reserve, and where required for shore establishments, of civilians under the employ of the Navy.

(*b*) Provided that all advanced training of Naval Aviation personnel excepting advanced aviation engineering courses, shall be under the direct control and supervision of the Navy.

(*c*) Provided that when officers and enlisted men of the Navy, Marine Corps or Naval Aviation Reserve are detailed for duty with the proposed Air Department, they shall retain their Naval or Marine Corps ranks and ratings.

(*d*) Provided that administration and operation of all Naval Aviation forces shall be under the direct control of the Navy.

(*e*) It is recommended that the question of including in the proposed Air Department an offensive Air Force independent of the Army and Navy be left open, pending further investigation of this subject; and that the subject be investigated without delay by the Mission in conference with Army and Navy Reprensentatives, who have made a special study of military and naval strategy.

Memorandum No. 2.

1. I concur with the report of the Development Committee, to which I have affixed my signature, with the following reservation :—

(*f*) Provided that nothing in the organisation of the proposed Air Department shall restrict the Navy in the following activities :

(*a*) Maintenance of an organisation adequate for the preparation of general specifications, general plans and characteristics of the aviation mechanisms, accessories and equipment required for Naval purposes.

(*b*) Maintenance of an organisation and facilities adequate for carrying on experimental aviation work of a class that is exclusively of a Naval character, and that does not involve duplication of efforts and facilities in the proposed Air Department that are common to other aviation branches.

(*c*) Maintenance of an organisation and facilities for conducting the acceptance and tactical tests of complete aviation mechanisms and accessories.

MEMORANDUM BY U.S. SECRETARY OF WAR.

August 11, 1919.

In making public the report submitted to me by Mr. Crowell and his associates on the American Aviation Mission, I desire to emphasise the thoroughness and value of the studies made in England, France and Italy with regard to the importance of aircraft and the essential dependence of the art for its development upon a sympathetic attitude in the Government. Those best informed throughout the world are in accord in believing that this new agency of transportation has possibilities upon which it is now quite impossible to set limits. They are further agreed that we face a period, more or less brief, in which the prospect of commercial return is not sufficiently sure to justify private enterprise in developing the aeroplane industry into a self-sustaining position.

The importance of aircraft as a military arm is obviously so great that we must leave nothing undone both to develop the art in its scientific and practical aspects and to provide facilities for rapid quantity production in the event of emergency.

From these considerations it is clear that the ingenuity and ability of American engineers and inventors must be co-ordinated and our national effort freed from wastefulness and duplication.

The mission has, in my judgment, gone too far in suggesting a single centralised air service. Army and Navy aviators are specialists in the art; both the airplanes and the pilots needed are of a different type from those needed in civil undertakings. The pilots particularly need to be trained upon a different theory. Military pilots are trained to fight singly or in formation and to operate in co-ordination with other branches of the military service, so that their training must be military. Their own efficiency and that of the other branches of the service depends upon the most intense and constant associated training, and a separation of the Air Service from the Army or the Navy would require co-ordination of their activities in time of War, whereas effectiveness in military operation rests upon the concentration and singleness of authority, command and purpose.

The point emphasised by the mission is the importance of maintaining adequate production facilities in this country. This, it is believed, can be brought about best by the establishment of a Government agency which will lay down the necessary rules, national and international, for aircraft operation, prevent discouraging lack of uniformity in State regulation and generally stimulate private and public enterprise in perfecting and using commercially this mode of transportation, and by centralising the placing of orders on Government account so as to have the incidental effect of making them contribute to the maintenance of aircraft production as an industry. It is not proposed, as I understand it, that great appropriations of public funds should be made for the establishment of uneconomic commercial air service routes, but obviously an extension of our air mail service could be made and it could be further extended as the perfection of machines advances and their reliability of service is more and more established. Such encouragement as the Government may find it wise to give can be accomplished without sacrificing the science of military aeronautics. The Joint Board of the Army and Navy is already eliminating duplication and producing co-operation in developing the air service of those departments, and should Congress decide to extend its aid to the commercial development of aircraft, complete co-operation will be easy in all matters of invention, design and production where the different aspects of the problem meet on a common ground.

NEWTON D. BAKER,
Secretary of War.

◆ ◆ ◆ ◆

THE OLYMPIA SHOW

Although the Motor Show, which opened at Olympia last Friday, is not directly concerned with aviation, visitors will be interested to note how that the wartime development of the aeromotor has influenced, in several directions, the design of engines for motor cars, notably in the more general adoption of overhead valves, the extended use of aluminium, and in some cases steel cylinders, and, further, in the adoption of air-cooled radial engines. Not only has aviation played a part on the engineering side, but the coachbuilder has also learnt some lessons, although many will come to the conclusion that he has still a long way to go before he secures the full advantage of modern research with regard to wind resistance, etc.

It is impossible in the space at our disposal to attempt to adequately deal with the exhibits, and we would refer our readers to our sister journal, *Auto.*, which in its current issue reviews the whole of the car exhibits, profusely illustrated with a very large number of photographs and detail sketches. *Auto.* is now on sale at all newsagents and booksellers, price one penny.

---

* Subject to Memoranda 1 and 2, July 19, 1919.

AIRISMS FROM THE FOUR WINDS.

ANOTHER of the martyred towns of the North of France has received "Mention" in an Order of the Day. Boulogne receives this distinguished honour. The "Mention" runs: "Boulogne sustained violent and murderous aerial bombardments for many months. In spite of the losses she suffered, the town kept her *moral* intact, and continued her activities without flinching."

– – –

"NEWS by Air and Wire" is the up-to-date and suggestive heading of the Far and Near news column of the *Daily Mail.* With the regular Royal mail in operation, the title is now officially endorsed and justified.

– – –

FOR four years anyway the Imperial War Museum is to find its home at the Crystal Palace, a lease for that period having been secured by the Museum authorities. It is true the Crystal Palace is not as convenient as Piccadilly, but the building and grounds are in many ways unique in their suitability for the purpose in view. Possibly under stress of war the facilities for reaching this somewhat God-forsaken point may have been improved. It is to be hoped they have, as the "exhibits," when sorted out, should be a very wonderful collection, containing interest of sorts for every man, woman and child. Aircraft and its side-issues, needless to say, will be a feature of the Show.

– – –

BY the time the four years' lease is up, the authorities are of opinion that it will be possible to determine whether the interest displayed in the comprehensive collection of war relics is sufficient to warrant its transfer to a permanent home more centrally situated. Possession of the Palace will not be obtained until next March, and it is hoped to complete the arrangement of exhibits in time to allow of the opening of the museum in June. In order that there may be no avoidable delay after the building has been handed over to the organisers of the museum, exhibits are already being transferred to the Crystal Palace and stored in the grounds.

– – –

Some R.A.F. Impressions

Wing-Comdr. Meyler, D.S.O., M.C., commanding II Brigade R.A.F., Cologne, formerly Wing-Comdr. II Balloon Wing. He is an excellent revolver shot

UNDER the heading of "A Swarm of Aircraft" another letter from Lord Fisher appeared in *The Times* last week, in which he again emphasises the vital importance of our future in the air. Lord Fisher writes:—

"By land and sea the approaching prodigious aircraft development knocks out the present Fleet, makes invasion practicable, cancels our country being an island, and transforms the atmosphere into the battle-ground of the future.

"I say to the Prime Minister there is only one thing to do to the ostriches who are spending these vast millions ('which no man can number') on what is as useful for the next war as bows and arrows!—'Sack the lot.'"

– – –

THEN follows a characteristic postscript, longer than the letter itself, as under:—

"Postscript.—As the locusts swarmed over Egypt, so will the aircraft swarm in the heavens, carrying (some of them) inconceivable cargoes of men and bombs, some fast, some slow. Some will act like battle cruisers, others as destroyers. All cheap and (this is the gist of it) requiring only a few men as the crew.

"No one's imagination can as yet depict it all. If I essayed it now I should be called a lunatic. I gently forecast it in January, 1915, and more vividly on July 11, 1918. We have the star guiding us, if only we will follow it.

"Time and the Ocean and
some fostering star—
In high cabal—have made
us what we are!

"On Friday last the presiding genius at the 'Marine Engineers' said, 'The day of oil fuel and the oil engine had arrived.' In 1885 I was called an 'oil maniac.'—*Nunc Dimittis.*"

– – –

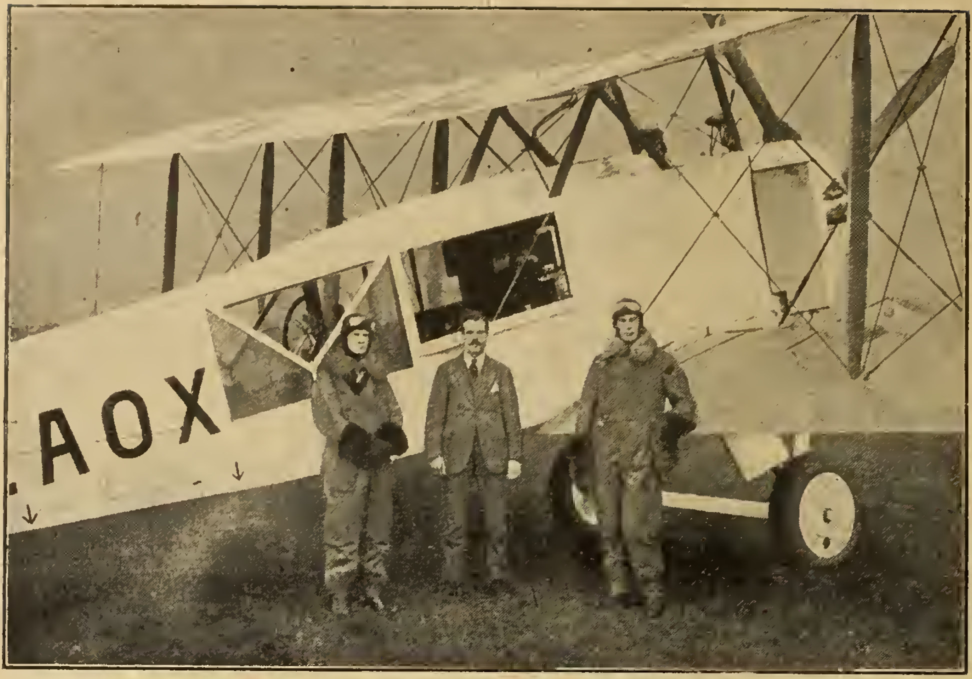
ON Monday of this week, Lord Fisher, in replying to critics, returns to the charge, as follows:—

"MARR'D"

"Do you hear the bleating of these sheep in your ears? We are going to hew Agag into pieces! (I refer to the moaning of the Admirals and to the keeping the best of the ships—exactly the same spirit as Saul.) There was the same bleating of the sheep and the same preservation of Agag when masts and sails were doomed and the engineer came into his own! Saul got kicked out for not 'sacking the lot.'

"The reason I put the word 'marr'd' at the head of this letter is that when, six months before the War, a Cabinet Minister of that period read my printed memorandum that German submarines would sink defenceless merchant ships with their women and children, he observed that I had 'marr'd' my memorandum by that prophecy! Don't let us have another 'marr'd' prophecy.

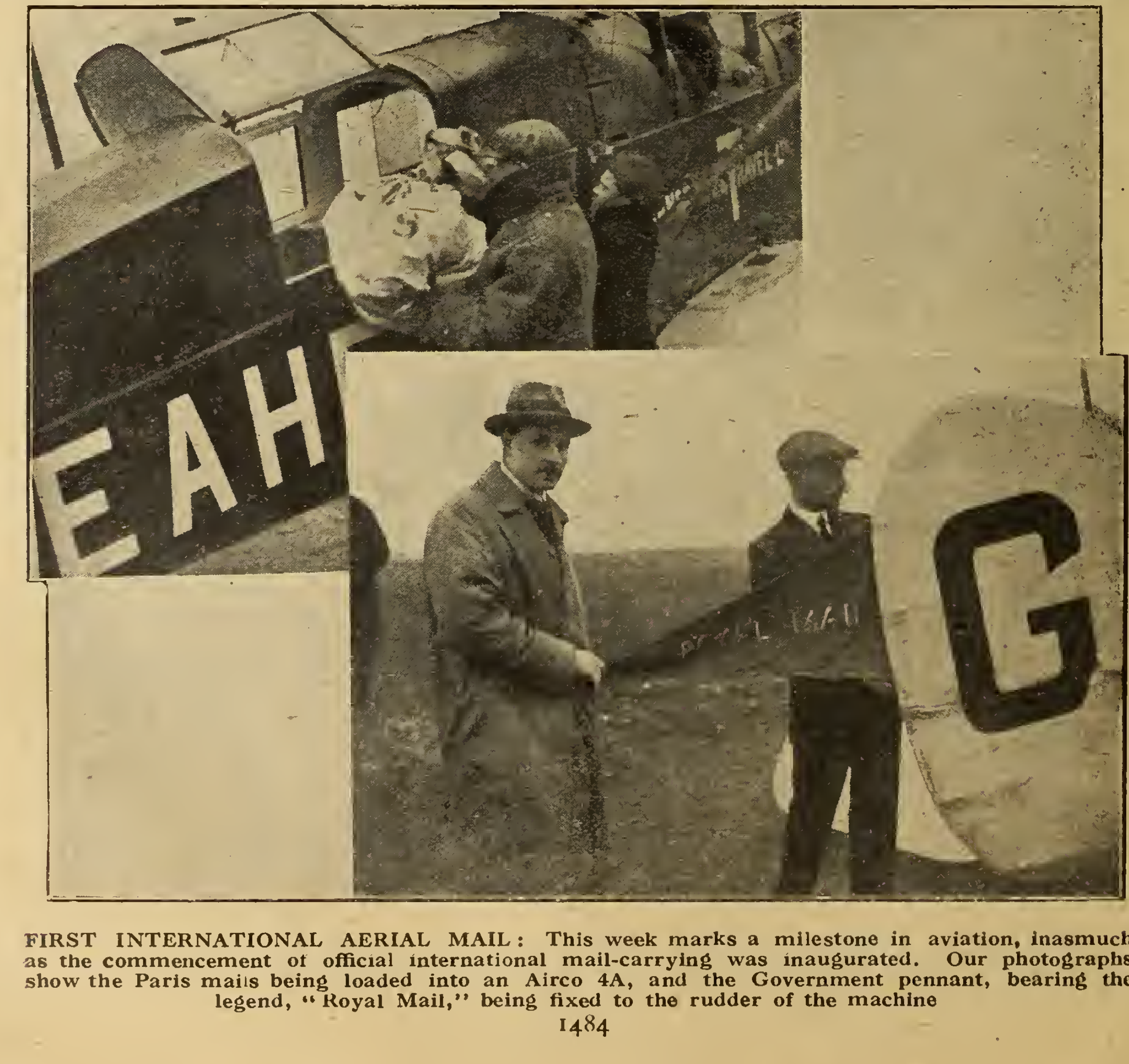
"The air controls the water. Unless all warships can get under the water they will be blown out of the water.



Weatherbound: The Alliance-Napier machine entered for the flight to Australia has had to stand by owing to unsettled weather conditions. As soon as conditions improve, a start will be made. Our photograph shows; on the left, Lieut. R. Douglas, M.C., D.C.M., the pilot of the machine; on the right, Lieut. Ross, the navigator; and, in the centre, Mr. J. A. Peters, the designer of the Alliance machine. The photograph gives a good idea of the cabin arrangement

Millions upon millions of money are still being wantonly wasted in the upkeep of ships that can't be used in war. When this winter the price of food and coal goes up, the masses will 'sack the lot.' A gust of fury will clear out this *effete* Parliament."

ALTHOUGH it would be hardly wise to 'Crash the Lot' so far as our Navy is concerned, as a true prophet in the past Lord Fisher holds no mean place, and whilst maintaining an adequate re-organised Fleet, fashioned upon lines of experience gained in the War, the airy "writing on the wall," as



FIRST INTERNATIONAL AERIAL MAIL: This week marks a milestone in aviation, inasmuch as the commencement of official international mail-carrying was inaugurated. Our photographs show the Paris mails being loaded into an Airco 4A, and the Government pennant, bearing the legend, "Royal Mail," being fixed to the rudder of the machine set forth by Britain's tried and proven Old War Genius, should be translated into action.

- - -

NEW South Wales is to be carefully surveyed for the purpose of establishing an aerial service between Sydney and Broken Hill. Mr. Sidney Pickles—wonder if it really should be Sydney—who has not lost much time once he crossed the water for home, has undertaken the job at the request of the New South Wales Government. As an earnest of his view of the scheme, he has already indulged in a "flip" across the country, covering the distance of 624 miles between the two cities in 11½ hours flying time. Only hope S.P.'s report will be favourable to a regular aerial route being opened.

- - -

FROM "A Londoner's Diary":—

"A good deal of amusement is being caused just now in business circles by certain demobilised officers who insist on the Army rank. In some cases slight resentment is felt by men who have served through the War without gaining or accepting a commission. Two yarns on the subject have reached me.

"An ex-major, on taking up his pre-War position, decided to be known as 'Mr.' On asking for a business interview he sent in a message to the effect that Mr. A. would be glad if Mr. B. could see him. Mr. B., however, replied that Capt. B. was unable to grant Mr. A. an interview.

"Mr. A. promptly retorted by asking the messenger to say that Major A. desired to see Captain B. at once, and within a minute Captain B. came hurrying in to find out what his superior officer wanted.

"The other story is of a man in a good business position, who during his Army career only rose to the rank of corporal. A caller introduced himself as Captain X., and the answer he received was that Mr. —— did not do business with officers, but only with gentlemen."

AN ancient monoplane side-wind. Why is the Government like an unfaithful goose? Because it doesn't stick to it propaganda.

- - -

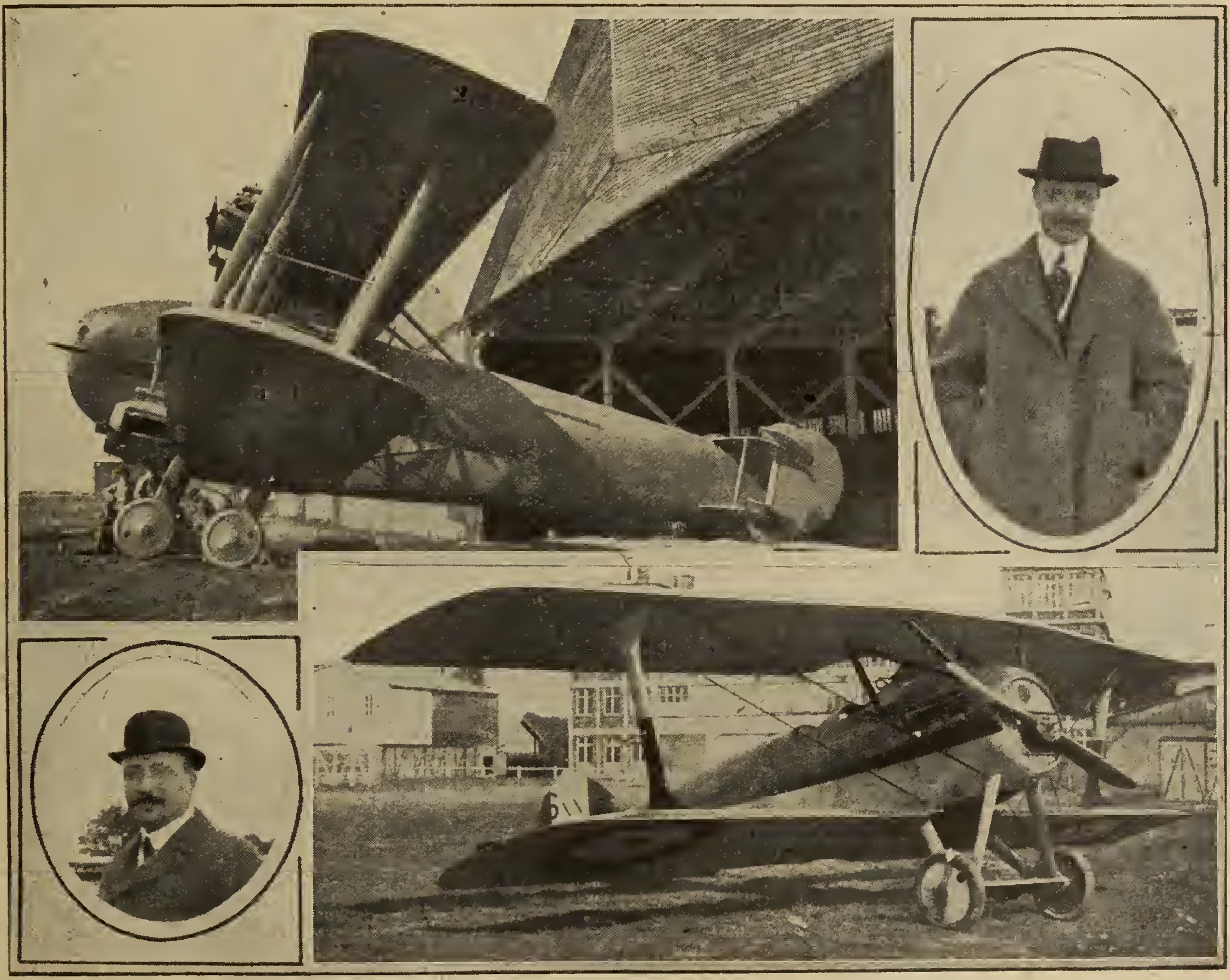
THE *Observer* reprints the following extract from its issue of a hundred years ago:—

"During the aerial flight made by Messrs. Livingstone and Sadler, from Liverpool, such was the fright experienced by the game on the moors near Over Darwen over which the balloon passed, that great numbers, supposed to be from 60 to 100, flocked down into the Valley, some entering the houses and others alighting on the roofs, screaming in a loud and terrified manner."

It is difficult to believe that game could be so greatly alarmed by the mere silent passing of a balloon in those days, and the spectacle of respectable grouse or pheasants screaming on the roofs wants a bit of swallowing. When we recall the Hendon sky-larks singing as per programme in the midst of the pre-War Aerial Derby or the weekly Grand Speed Handicap, quite unconcerned at the noises of the Gnomes or the rattle of the Renaults, we can hardly think that bird nature has so completely altered. If Mr. Livingstone chanced to be an ancestor of the Brigadier-General of that name perhaps his descendant may favour us with a few remarks on the subject, from the family records.

- - -

ONE of the most envied members of the Royal Aero Club is Mr. J. Withers, of Hampstead, who holds the distinction of having the first Rolls-Royce chassis delivered to the public since the War. Needless to say, Mr. Withers placed his order early to avoid the rush, his enthusiasm being prompted by the regard he has had for his previous Rolls-Royce car, which was one of the regular features at Hendon before the War, where Mr. Withers acted as judge for the flying races on many occasions.



SOME SNAPS FROM FRANCE: The upper photograph shows the new Blériot 28-passenger machine with four Hispano-Suiza engines. The lower photo. is of a 300 h.p. Spad, flown by Sadi Lecointe. The upper inset is a photograph taken the other day in France of M. Blériot, while that in the lower left-hand corner shows M. Birkigt, the designer of the Hispano-Suiza engines

THE ROYAL AIR FORCE

London Gazette, November 4.

The following are granted permanent commns. in the R.A.F. in the ranks stated, with effect from Aug. 1 :—Flight-Lieut. E. L. Williams, M.C. (A. and S.), Flying Officer A. C. Collier (A.).

The notification appearing in the *London Gazette* of Aug. 1 appointing the following officers to permanent commns. is cancelled :—Capt. M. O. F. England (O.), Capt. C. J. Galpin, D.S.O. (A. and S.), Capt. E. A. Jackson (T.), Capt. W. S. Newton Clare, M.B.E. (Ad.), Capt. C. S. MacNab (S.O.), Lieut. F. M. I. Watts, M.B.E. (T.), Lieut. R. B. T. Hedges (A.), Lieut. W. Myers, M.C., D.C.M. (S.O.), Lieut. J. M. McEntegart (T.).

The following temp. appointments are made :—

Staff Officers, 2nd Class.—(Q.).—Lieut. (Hon. Maj.) C. A. Cnthill, and to be actg. Maj. while so employed ; from June 21, 1918, to Nov. 25, 1918. (Air).—Flight-Lieut. W. B. Callaway, A.F.C. ; Sept. 1. (T.).—Sqdn.-Leader F. J. Rutland, D.S.C., A.M. ; Sept. 1. (P.).—Sqdn.-Leader G. H. Thomson, O.B.E. ; Sept. 1.

Staff Officers, 3rd Class.—(Air).—Flight-Lieut. W. P. Groves ; Sept. 1. Flight-Lieut. A. W. Mylne ; Oct. 4. (T.).—Flying Officer P. A. Simmons ; Sept. 15. (P.).—Flight-Lieut. H. V. German ; Sept. 25. Flying Officer G. D. Ashby ; Sept. 26. (Q.).—Flight-Lieut. R. S. Sugden, A.F.C. ; Sept. 27.

Staff Officer, 4th Class.—(T.).—Flying Officer J. R. R. Harvey ; Sept. 22.

Flying Branch.

Sqdn.-Leader (actg. Wing-Com.) R. Grey relinquishes the actg. rank of Wing-Com. on ceasing to be employed, as Wing-Com. (A.) ; Oct. 8.

Capt. W. W. Carey-Thomas, M.C., is graded for purposes of pay and allowances as Maj. while employed as Maj. (A.) ; from May 1 to Sept. 29.

Capt. L. C. W. Trend is graded for purposes of pay and allowances as Capt. while employed as Capt. (A. and S.) ; from May 1 to July 25.

Lieut. R. E. Butler to be actg. Capt. while employed as Capt. (A.) ; from Nov 1, 1918, to April 25 (substituted for notification in *Gazette* of Oct. 21).

Flying Officer V. M. C. B. de Sarigny to be actg. Flight-Lieut. while employed as Flight-Lieut. (K.B.) ; from Aug. 1 to Oct. 14.

The following Lieuts, are graded for purposes of pay and allowances as Capts. while employed as Capts. (A.) :—H. R. Gardner, to June 1, W. D. Knibbs, to Aug, 31, H. B. Russell, to July 31 ; May 1.

Flying Officer (actg. Flight-Lieut.) F. Lord, D.F.C., relinquishes the actg. rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut. (A.) ; Oct. 8.

Flying Officer A. V. Burbury, M.C., to be Flying Officer (A.), from (S.O.) ; Oct. 7.

Flying Officer A. F. Lang to be Flying Officer (O.), from (T.) ; ug. 1 (substituted for notification in the *Gazette* of Sept. 26).

Sec. Lieut. (Hon. Lieut.) G. L. Parkinson, M.C., to be Lieut. ; June 22, 1918.

Pilot Officers to be Flying Officers :—C. H. W. Clarke ; May 28. V. M. Mitchell ; July 24. J. L. Booth ; Oct. 1.

Sec. Lieut. G. A. Thompson (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (A.) ; March 27.

Lieut. D. A. A. Shepperson (Lieut., Som. L.I.) relinquishes his commn. on ceasing to be employed, and is granted the rank of Capt. ; Sept. 10 (substituted for notification in the *Gazette* of Sept. 19).

The following relinquish their commns. on ceasing to be employed :—Sec. Lieut. G. R. Harrison (Lieut., New Bruns. R.) ; Oct. 2. Capt. G. E. Chadwick, M.C. (Capt., E. Lan. R.) ; Oct. 12. Lieut. A. R. Walker (Lieut., Gord. Highrs.) ; Oct. 13. Capt. P. E. M. Le Gallais, A.F.C. (Lieut., R.-Suss. R.) Lieut. G. W. T. Pereira (Lieut., Som. L.I.) ; Oct. 15. Capt. E. A. Packe (Lieut., Oxf. and Bucks. L.I.) ; Oct. 16. Lieut. A. H. St. Clair, M.C. (Arg. and Suthd. Highrs.) ; Oct. 18. Sec. Lieut. (Hon. Lieut.) H. Cooper, M.C. (Lieut., R. Fus.) ; Oct. 20. Sec. Lieut. (Hon. Capt.) H. M. P. Hewett (Capt., R. Dgns.) ; Oct. 29.

(Then follow the names of 200 officers who are transfd. to the Unemployed List under various dates.)

Lieut. (Hon. Capt.) C. S. Emden, D.F.C., relinquishes his commn. on account of ill-health, caused by wounds, and is permitted to retain rank of Capt. ; Oct. 27.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—E. R. Bullimore (contracted on active service) ; Oct. 28. Lieut. W. L. Sumsion (caused by wounds) ; Oct. 29.

Lieut. (Hon. Capt.) F. L. Von Stieglitz (Capt., Connaught Rangers) relinquishes his commn. on account of ill-health contracted on active service ; Nov. 4.

Sec. Lieut. J. McRobert relinquishes his commn, on account of ill-health contracted on active service, and is permitted to retain his rank ; Oct. 29.

Lieut. C. G. Ronaldson-Clark to take rank and precedence as if his appointment as Lieut. bore date Oct. 1, 1918.

Sec. Lieut. D. C. Scwell is dismissed the Service by sentence of General Court-Martial ; Oct. 14.

The Christian names of Sec. Lieut. Alexander Alfred Phillips are as now described, and not "Alexander Arthur," as stated in the *Gazette* of Dec. 31, 1918.

The notification in the *Gazette* of Aug. 26 concerning Sec. Lieut. Alexander Alfred Phillips is cancelled.

The notification in the *Gazette* of June 24 concerning Lieut. E. I. Sutcliffe is cancelled.

The notification in the *Gazette* of Oct. 17 concerning Sec. Lieut. W. W. Smith is cancelled.

The notification in the *Gazette* of Sept. 12 concerning Sec. Lieut. F. W. B. Anderson is cancelled.

The notification in the *Gazette* of Oct. 24 concerning Sec. Lieut. S. T. Tipper, wherein this officer was shown "transferred to the Unemployed List," is cancelled.

The notification in the *Gazette* of July 1 concerning Lieut. J. R. Finlay is cancelled.

The notification in the *Gazette* of Aug. 19 concerning Lieut. W. Rodger is cancelled.

The notification in the *Gazette* of Oct. 14 concerning Lieut. R. C. Steele, D.S.O., is cancelled.

The notification in the *Gazette* of Oct. 31 concerning Capt. H. Hemming, A.S.C. (Lieut., Worc. R.), is cancelled.

Administrative Branch.

The following Capts. are graded for the purposes of pay and allowances as Maj. whilst employed as Maj. :—A. Wombwell ; April 28. T. Gash ; from May 1 to Aug. 5. W. F. Routley ; from May 1 to Aug. 11.

Lieut. G. Oliver is graded for purposes of pay and allowances as Maj. whilst employed as Maj. ; from May 19 to Aug. 5.

Flight-Lieut. J. A. Hartcup to be Flight-Lieut., from (S.O.) ; Sept. 10. (substituted for notification in the *Gazette* of Oct. 24).

Lieut. R. M. Nicholls to be Lieut., from (O.), and is graded for purposes of pay and allowances as Capt., whilst employed as Capt. ; from March 13 to Sept. 23.

The following are graded for purposes of pay and allowances as Capt. while employed as Capt. :—Lieut. G. D. Rowden ; from March 27 to July 29. Lieut. (Hon. Capt.) G. Davies ; from May 1 to Oct. 10. Lieut. C. G. S. Fitzgerald ; May 1. Lieut. A. L. Morris ; from May 1 to Oct. 13. Lieut. D. G. Phillippc, M.C., from (O.) ; May 1. Lieut. J. D. Loraine ; from May 19 to Aug. 1. Sec. Lieut. (Hon. Lieut.) J. A. Bonnyman, M.B.E. ; from May 1 to May 21. Sec. Lieut. J. Mellor ; from May 1 to Aug. 9.

Sec. Lieut. G. R. Biggs is graded for purposes of pay and allowances as Capt. while specially employed, from (A.) ; April 10 (substituted for notification in *Gazette* of Oct. 3.)

Lieut. (Hon. Capt.) A. C. T. Applin to be Lieut. (Hon. Capt.), from (K.B.) April 17.

Flying Officer (actg. Maj.) A. D. Carey relinquishes the actg. rank of Maj. on ceasing to be employed as Maj., from (S.O) ; Oct. 8.

Sec. Lieut. R. R. W. Millward to be Lieut. ; Aug. 21 1918 (substituted for notification in *Gazette* of Oct. 17).

Pilot Officer H. H. Ffrench to be Flying Officer ; Sept. 18.

Sec. Lieut. F. McKeown is graded for purposes of pay and allowances as Lieut. while employed as Lieut. ; from May 1 to Sept. 29.

Lieut.-Col. F. H. G. Playfair (Lieut.-Col., T.F. Res.) relinquishes his commn. on ceasing to be employed ; Oct. 31.

(Then follow the names of 49 officers who are transfd. to the Unemployed List under various dates.)

Lieut. H. G. Mitchell (Hussars) relinquishes his commn. on account of ill-health contracted on active service ; Oct. 23.

Sec. Lieut. (Hon. Lieut.) J. A. Redvers Buller relinquishes his commn. on account of ill-health contracted on active service, and retains the rank of Lieut. ; Oct. 29.

The rank of Lieut. D. J. Fryer is as now described, and not Sec. Lieut., as stated in *Gazette* of Sept. 22.

The initials of Sec. Lieut. A. F. Johnston are as now described and not "A. P.," as stated in *Gazette* of May 27.

The notification in *Gazette* of April 25 concerning Sec. Lieut. J. Silvester is cancelled.

Technical Branch.

Sqdn.-Leader (actg. Wing-Com.) C. Barber relinquishes the actg. rank of Wing-Com. on ceasing to be employed as Wing-Com., Grade (B.) ; Oct. 18.

Capt. G. D. Nelson, D.S.C., A.F.C., is graded for purposes of pay and allowances, as Maj. whilst employed as Maj., Grade (A.), ; from April 27 to July 31.

Lieut. A. E. Layton is graded for purposes of pay and allowances as Maj. whilst employed as Maj., Grade (A.) ; from May 1 to July 7.

Flight-Lieut. (actg. Sqdn.-Leader) E. W. F. Cherry, O.B.E., to be Flight-Lieut., Grade (B.), and relinquishes the actg. rank of Sqdn.-Leader on ceasing to be employed as Sqdn.-Leader, from (S.O.) ; Oct. 22.

Capt. (actg. Maj.) W. P. Groves to be Capt., Grade (B.), and relinquishes the actg. rank of Maj. on ceasing to be employed as Maj., from (S.O.) ; July 26.

The following Lieuts, are graded for purposes of pay and allowances as Capt. while employed as Capt., Grade (A.) :—B. S. Crimp, F. W. Clarke, D. Richardson ; May 1. P. S. Laughton ; June 2. L. L. W. Smythe ; June 26. F. Thomas ; Sept. 1.

Sec. Lieut. S. Jupp is graded for pay and allowances as Capt. while employed as Capt., Grade (A.) ; Oct. 9, 1918 (substituted for notification in the *Gazette* of May 27).

Sec. Lieut. (Hon. Capt.) F. C. Marsh is graded for purposes of pay and allowances as Capt. while employed as Capt., Grade (B.) ; May 1 (substituted for notification in the *Gazette* of Oct. 21).

Pilot Officer (Hon. Flying Officer) C. Bishop to be actg. Flight-Lieut. (without the pay and allowances of that rank) while employed as Flight-Lieut., Grade (B. ; Sept. 15 (substituted for notification in the *Gazette* of Oct. 10)

Lieut. J. E. Ruthven to be Lieut., Grade (A.), from (Ad.) ; from April 1, 1918, to Sept. 11, 1918.

The following are graded for purposes of pay and allowances as Lieuts. while employed as Lieuts., Grade (A.) :—Lieut. F. Thomas ; from Feb. 10 to Aug. 21 ; Lieut. H. G. Cook, D.S.M. ; April 7 ; Sec. Lieut. (Hon. Lieut.) R. O. C. Bush ; Aug. 20, 1918. Sec. Lieut. G. C. Walsh ; June 14.

Lieut. E. W. Lawrence is graded for purposes of pay and allowance as Lieut. while employed as Lieut., Grade (B.); Nov. 12, 1918 (substituted for notification in the *Gazette* of Oct. 14).

Sec. Lieuts. to be Lieuts. :—(Hon. Lieut.) W. Bagnall ; April 2, 1918 (substituted for notification in the *Gazette* of Sept. 26). S. T. Kemp ; Feb. 28 (substituted for notification in the *Gazette* of March 7).

Pilot Officers to be Flying Officers, without the pay and allowances of that rank :—F. A. Benfield, W. J. Coadwell, H. Fellows, C. H. Whitlock ; Oct. 1.

Sec. Lieut. H. B. Brown to be Sec. Lieut., Grade (A.), from (Ad.) ; July 17, 1918 (substituted for notification in the *Gazettes* of Oct. 3 and Sept. 5).

Sec. Lieut. H. Sleigh to be Sec. Lieut., Grade (B.), from (Ad.) ; Aug. 6 1918 (substituted for notification in the *Gazette* of Sept. 7, 1918).

Pilot Officer J. E. Neary to be Pilot Officer, from (Ad.) ; Oct. 23.

(Then follow the names of 62 officers who are transfd. to the Unemployed List under various dates.)

The notification in *Gazette* of July 8 concerning Capt. F. R. Hardie is cancelled.

The notification in *Gazette* of Oct. 17 concerning Capt. P. W. Goodchild is cancelled.

The notification in *Gazette* of Oct. 10 concerning Sec. Lieut. S. Japp is cancelled.

Medical Branch.

Capt. (actg. Maj.) H. R. B. Hull (Surgeon-Lieut. R.N.) relinquishes his command on reversion to R.N. (Oct 15).

(3 officers transfd. to the Unemployed List.)

Memorandum.

Flying Officer W. H. Holroyd to be Hon. Flight-Lieut. ; Aug. 31, 1918.

The following Temp. Hon. Lieuts. relinquish their commns, on ceasing to be employed :—J. Beek ; April 16. W. B. Gibson ; Sept. 16. B. Coulam, J. J. A. Gilmore, J. B. Gott, F. Greenall, F. R. Newton, J. H. Woodruff ; Oct. 16.

(4 officers transfd. to the Unemployed List.)

(Then follow the names of 7 Cadets who are granted hon. commns. as Sec. Lieuts.)

London Gazette, November 7

The following are granted permanent commns. in the ranks stated :—

Flight Lieutenant.—L. Wanless-O'Gowan (A.) ; Aug. 1.

Flying Officer.—E. D. G. Galley, M.C., A.F.C. (A.) ; Aug. 1.

The notification appearing in *Gazette* of Oct. 28 appointing Flight-Leut. J. B. Walmsley, D.F.C. (A.), to a permanent commn. is cancelled.

The rank of Flight-Lieut. E. C. Emmett, M.C., D.F.C., is as now described, and not "Capt.," as stated in *Gazette* of Oct. 28.

The name of Flying Officer R. Jones is as now described, and not R. Jones, M.C., as stated in *Gazette* of Aug. 1.

Flying Branch.

Wing Com. A. D. Cunningham, O.B.E., to be Wing Com. (A'ship), from Dep. Dir. ; Nov. 3.

Maj. (actg. Lieut.-Col.) R. J. F. Barton, O.B.E., to be Maj. (A.) and relinquishes actg. rank of Lieut.-Col. on ceasing to be employed as Lieut.-Col., from (S.O.) ; March 3.

Lieut. G. F. Moody is graded for purposes of pay and allowances as Capt. while employed as Capt. (A. and S.), from May 1 to Sept. 21.

Flying Officer W. K. Sutton relinquishes the grading for pay and allowances as Flight-Lieut. on ceasing to be employed as Flight-Lieut. (A.) ; Oct. 18.

Flying Officer (actg. Flight-Lieut.) W. H. Park, M.C., relinquishes actg. rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut. (A. and S.) ; Oct. 27.

Pilot Officer L. J. Chandler to be Flying Officer ; Oct. 1.

Lieut. V. W. Kilroe relinquishes his commn. on ceasing to be employed and is permitted to retain his rank ; July 23.

Lieut.-Col. D. Mackenzie (Maj., E. Lancs. R.) relinquishes his commn. on ceasing to be employed, and is permitted to retain his rank ; Nov. 1.

The following relinquish their commns. on ceasing to be employed :—Lieut. J. R. Taylor (Lieut., Rif. Bde.) ; July 27, 1918. Lieut. F. O. Rose (Lieut., Essex R.) ; Oct. 9. Capt. W. E. Molesworth, M.C. (Capt., R. Munster Fus.) ; Oct. 15. Lieut. R. A. Denne (Lieut., Wilts. R.) ; Oct. 22. Lieut. H. N. Loch, D.F.C. (Capt., Gurkha Rif.) ; Oct. 24. Lieut.-Col. R. H. Mornement, O.B.E. (Surg. Com., R.N.) ; Oct. 31. Col. B. H. H. Cooke, C.M.G., C.B.E., D.S.O. (Lieut.-Col. extra regimentally employed), Capt. H. W. M. Paul (Capt., Middx. R.) ; Nov. 1. Lieut.-Col. A. C. H. MacLean (Maj., R. Scots) ; Nov. 5. Lieut. A. T. Essex (Sec. Lieut., Brit. W. Indies R.) ; Nov. 6.

(Then follow the names of 126 officers who are transfd. to the Unemployed List under various dates.)

Maj. L. F. Richard (Capt., Royal R. of Art.) relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank ; Sept. 30.

Capt. P. S. Fisher, D.S.O., D.S.C., relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank ; Oct. 30.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—C. H. P. Hughes ; Oct. 20. (substituted for notification in the *Gazette* of June 6). F. H. Robinson (contracted on active service), J. Thompson (contracted on active service) ; Oct. 30. H. R. Utley (caused by wounds) ; Oct. 31. R. E. Whittingham (contracted on active service) ; Nov. 1. J. A. Nolan ; Nov. 2 (substituted for notification in the *Gazette* of Jan. 14).

Sec. Lieut. W. A. Down relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; Nov. 4.

Sec. Lieut. A. W. Simon (Lieut., R. Sussex R.) relinquishes his commn. on account of ill-health ; Oct. 30.

Sec. Lieut. G. B. Allen to take rank and precedence as if his appointment as Sec. Lieut. bore date March 30.

The rank of Lieut. W. C. Treen, M.C., D.F.C., D.C.M., is as now described, and not "Sec. Lieut." as stated in the *Gazette* of July 4.

The surname of Lieut. C. E. Kendall (Lieut., R.F.A.) is as now described, and not "Rendall" as stated in the *Gazette* of May 30.

The notification in the *Gazette* of June 20 concerning Sec. Lieut. J. Atkinson is cancelled.

The notification in the *Gazette* of Aug. 5, concerning Sec. Lieut. R. C. Williams is cancelled.

The notification in the *Gazette* of Aug. 19 concerning Lieut. R. S. Jameson is cancelled.

The notification in the *Gazette* of Oct. 10 concerning Lieut. A. T. Essex is cancelled.

The notification in the *Gazette* of Oct. 14 concerning Lieut. C. W. Wridgway is cancelled (*Gazette* of Sept. 12 to stand).

The notification in the *Gazette* of Oct. 21 concerning Lieut E. H. Stanes, M.C., is cancelled.

The notifications in the *Gazette* of Oct. 24 concerning Lieut. W. S. Campbell and Lieut. J. R. Field are cancelled.

Administrative Branch

Flight-Lieut. C. S. McNab to be Flight-Lieut., from (S.O.) ; Oct. 1 (substituted for notification in the *Gazette* of Oct. 14).

Flying Officer J. Keyes to be Flying Officer, from (S.O.) ; Oct. 9.

Sec. Lieut. (Hon. Lieut.) B. Attenborough to be Lieut. ; April 2, 1918.

Pilot Officer (actg. Flight-Lieut.) N. Bucknall relinquishes the actg. rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut. ; Oct. 13.

Sec. Lieut. A. L. Kidd (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. ; May 3 (substituted for notification in *Gazette* of July 22, wherein this officer was reclassified as Lieut. (Ad.), from (O.)).

(Then follow the names of 32 officers who are transfd. to the Unemployed List under various dates.)

Lieut. K. H. Leake, M.C. (L. N. Lanc. R.) relinquishes his commn. on account of ill-health caused by wounds ; Oct. 25.

The notification in *Gazette* of Oct. 3 concerning Sec. Lieut. W. L. Wade is cancelled (*Gazette* of Sept. 9 to stand).

The notification in *Gazette* of Jan. 10 concerning Lieut. W. T. Jourdan is cancelled.

Technical Branch

Flight-Lieut. (actg. Sqdn.-Leader) J. Curtis relinquishes the actg. rank of Sqdn.-Leader on ceasing to be employed as Sqdn.-Leader, Grade (A.) ; Oct. 22.

Flying Officer (actg. Flight-Lieut.) S. J. Gardiner relinquishes the actg. rank of Flight-Lieut., on ceasing to be employed as Flight-Lieut., Grade (A.) ; Oct. 6.

Lieut. H. E. K. Eccles, M.C., to be Lieut., Grade (A.), from (Ad.) ; Jan. 11.

Flying Officer A. F. Lang to be Flying Officer, Grade (A.), from (O.) ; Oct. 10.

Sec. Lieut. (Hon. Lieut.) L. C. Gandy to be Lieut., without the pay and allowances of that rank ; May 4, 1918 (substituted for notification in *Gazette* of March 7).

Sec. Lieut. A. E. Wycherley to be Sec. Lieut., Grade (B.), from (Ad.) ; May 1, and is graded for purposes of pay and allowances as Lieut. whilst employed as Lieut., Grade (B.) ; May 1.

S. A. Gordon (Temp. Sec. Lieut., E. Kent R.) is granted a temp. commn. as Sec. Lieut., Grade (A.) ; June 10, 1918, with seniority from April 1, 1918 (substituted for notification in *Gazette* of Dec. 13, 1918, wherein this officer was shown as "Administration").

(Then follow the names of 44 officers who are transfd. to the Unemployed List under various dates.)

Capt. J. McG. Robertson relinquishes his commn. on account of ill-health (contracted on active service), and is permitted to retain his rank ; Oct. 30.

Physical Training Branch

Lieut. J. Butterfield relinquishes his commn. on ceasing to be employed, and is granted the rank of Capt. ; Sept. 26.

Medical Branch

Flight Lieuts. to be Sqdn.-Leaders :—W. A. S. Duck ; April 11. A. E. Panter, A. R. Sharrod ; Oct. 3.

(1 officer transfd. to the Unemployed List.)

Dental Branch

Sec. Lieut. (actg. Capt.) G. W. Allen to be Sec. Lieut. (from T.), and retains his actg. rank while so employed ; June 3, 1918 (substituted for notification in the *Gazette* of June 11, 1918, in which he was shown under "Medical Branch."

Memoranda

The following Prob. Flight Officers are granted Hon. commns. as Sec. Lieuts. :—F. C. Champneys ; Jan. 13. W. C. Bettles ; Jan. 29. A. L. Coulson ; Feb. 2. D. H. Couch ; Feb. 6. J. G. Butcher, C. T. Child ; Feb. 20. W. H. Boorne ; March 13. J. V. L. Burder ; April 30. W. I. Beckett ; May 15.

The following Temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed :—R. E. Barnard, F. Butt, A. Downie, W. J. Southwell, F. G. Wedge, C. J. Whall ; Sept. 16.

(3 officers transfd. to the Unemployed List.)

The following relinquish their commns. on account of ill-health :—Lieut.-Col. J. D. Markworth, C.B.E. (R. W. Surrey R.) ; Oct. 24. Lieut.-Col. T. A. Monckton, O.B.E. (contracted on active service), and is permitted to retain his rank ; Oct. 30.

AVIATION IN PARLIAMENT

Civilian Discharges

MR. A. SHORT asked the Under-Secretary of State to the Air Ministry whether he is aware that a number of civilian employees are being discharged from the Royal Air Force ; that 1,433 civilians at present employed at No. 1 Stores Depot, Kidbrooke, are to be reduced to 450 by the end of the year ; and that the total number of between 6,000 and 7,000 employed by the Royal Air Force is to be reduced to 3,280 by the end of the year ; whether he will consider the possibility of carrying out these discharges more gradually, in order to give the men a better chance of finding employment elsewhere ; and whether he can state what action is being taken in conjunction with the Ministry of Labour with a view to the absorption of the discharged men into other employment ?

Maj.-Gen. Seely : Subject to the correction of the figure 3,280 to 3,480, the answers to the first three parts of the hon. gentleman's question are in the affirmative. In order to afford the men discharged better opportunities of obtaining employment, the desirability of spreading the discharges over as long a period as possible has already received very careful consideration. I have received two deputations on the matter and have discussed the situation fully with representatives of the men concerned. As a result the period has been appreciably lengthened. I much regret the hardship caused, but it is impossible to still further delay the discharges, in view of the very large reductions in the Air Force. The closest touch is maintained by the Air Ministry with the Ministry of Labour, and advanced information is given of impending discharges.

Leave of R.A.F. Officers

LIEUT.-COL. SIR FREDERICK HALL in the House of Commons on November 4 asked the Secretary for War if a considerable number of officers of the R.A.F. who volunteered for service in Russia were sent out at short notice and without even the usual embarkation leave ; if it was understood that they would be given leave privileges when opportunity occurred to make up for this ; and if now on their return these officers, who in many cases have served long periods in the trying Russian campaign without any leave, are being demobilised and struck off the pay-sheets on their arrival back in this country ?

Mr. Parker (Lord of the Treasury) : I have been asked to take this question. The reply to the first part is that owing to the urgency of the demands many officers were sent out at short notice. Very few, if any, went without a few days' leave. To the second part, that no communication to the effect mentioned was made by the authority of the Air Ministry. The answer to the third part of my hon. and gallant friend's question is that all officers returning from Russia who had not been recommended for permanent or short-service commissions were informed that their demobilisation must be carried out as soon as they returned to this country ; that the question of leave for service in Russia was being dealt with ; and that if it was decided they were eligible for leave their demobilisation would be post-dated for the period sanctioned in order to enable them to draw pay for that period. Since then it has been decided to grant 14 days' leave for each six months' service in Russia, and action is being taken to post-date the demobilisation of officers entitled to leave under this ruling. No leave is admissible for service of less than six months in Russia.

Sir F. Hall : May I ask the Secretary of State for the Air Department whether he is aware that in reply to a supplementary question a few days ago he informed me that these officers had not been summarily discharged, and that leave had been granted ; and can he say whether if any of these officers have been discharged on their arrival in this country and have not had proper leave, he will take steps to see that in lieu of leave, since they are demobilised, they are paid for that period ?

Mr. Churchill : I will inquire into the matter. Certainly they should have their proper leave.

Sir F. Hall : Or pay in lieu of leave.

Col. Yate : What is their proper leave ? Is it not fair that an officer on demobilisation should be given 28 days' grace the same as the men ?

Mr. Churchill : I will not say. I should like to refresh my memory.

R.A.F. in Persia

LIEUT.-COM. KENWORTHY asked the Secretary of State for War how many members of His Majesty's Army and the R.A.F., approximately, are at present in Persian territory ; how many members of His Majesty's Indian

Army are in Persian territory; for what purpose are they there; and when it is expected that they will be withdrawn?

Mr. Churchill: The total number of troops in Persia is approximately 11,175, of whom 10,100 are natives of India. The second and third parts of the hon. and gallant Member's question should be referred to the Foreign Office.

Disposal of R.A.F. Stations

MAJ. GLYN on November 6 asked the Under-Secretary of State to the Air Ministry how many Air Force stations, camps, and aerodromes have been handed over for disposal to the Ministry of Munitions since the Armistice; how many are to be handed over; what steps are being taken meantime to protect the material and property; and how many officers and other ranks are so employed, and at what approximate cost?

The Under-Secretary of State for Air (Maj.-Gen. Seely): In reply to the first part of my hon. and gallant friend's question, there have been surrendered by the R.A.F. since the Armistice:—

(*a*) Stations consisting of land only (*i.e.*, landing grounds and camping grounds)	124
(*b*) Stations consisting of land and buildings	122*
(*c*) Stations at which aerodromes have been released, whilst buildings are still required for R.A.F. purposes	6

* Including 10 transferred to other departments.

Until the strength of the after-war Air Force is definitely decided I am unable to reply to the second part. In regard to the third part, arrangements are being made whereby civilian caretakers will, pending the sale of buildings, be placed in charge of stations cleared of R.A.F. material, vacated by R.A.F. personnel and handed over for disposal. In some cases R.A.F. personnel remain in charge pending the appointment of civilian caretakers and in a few other cases the local police have been requested to exercise supervision over empty buildings. I am unable to give the information asked for in the last two parts owing to the frequent fluctuations during the process of rapid reduction.

Maj. Glyn: May I ask whether the Ministry of Munitions bear no cost at all of the care of these aerodromes, and whether this cost has been put on the Air Estimates?

Maj.-Gen. Seely: It is a fact that when the Disposal Board are unable to take over stores the R.A.F. personnel has to be retained to look after them, and that of course adds to the charge on the R.A.F., but the matter is now being finally considered, and I hope we shall avoid any delay in the future.

Mr. Billing: May I ask whether handing over to civilian control is not likely to increase the cost of that control while certain personnel of the R.A.F. remains?

Maj.-Gen. Seely: The question as to which is the more costly is a very elaborate calculation between the R.A.F. and the civilian control, but there is obviously an advantage in handing it over to the civilian personnel in order that the small R.A.F. personnel retained may be engaged in their proper duties.

* * *

Anglo-Swiss Aerial Traffic

A TEMPORARY agreement permitting British airmen to land in Switzerland, and *vice versa*, has been concluded here, Col. Beatty, of the Civil Aviation Department, signing on behalf of Great Britain, reports *The Times* correspondent at Berne. He adds "the agreement, which will lapse automatically when the International Air Convention comes into force, much resembles it, except in one particular—namely, that Switzerland is unable to agree to the clause in the Convention laying down that there shall be no aerial traffic except between the signatories of the Convention. It will be remembered that the Allies reserved to themselves the right in the Peace Treaty to land in former enemy countries, but Switzerland, being neutral, would not enjoy this right, and would thus, according to the Convention, be unable to deal by air with her German and Austrian neighbours. The agreement, which will come into force as soon as France makes a similar arrangement with Switzerland, does not, therefore, hinder Swiss aeroplanes from landing in Germany, as would be the case if the Convention were signed; but it gives British aviators the right to land in Switzerland without special permission.

"The Swiss have only one important aerodrome—namely, Dubendorf, near Zurich, which Col. Beatty visited today. Larger hangars, new indication marks, and other aids to aviators will be erected for the benefit of foreign fliers. Maj. Isler, the airman who recently landed on the Jungfrau—he is chief of Switzerland's military aviation—anticipates that Dubendorf will become the most important landing-place for British airmen on their way to Rome and south-east Europe.

Peace Through the Air

THE formal presentation to South Africa of the D.H. 9 aeroplane subscribed for by the citizens of Birmingham took place on Saturday at the Castle Bromwich ground. The Lord Mayor, Sir David Brooks, presented the aeroplane to Lord Desborough, President of the Imperial Air Fleet Committee, who asked the Lady Mayoress to christen the city's gift "The City of Birmingham." Lord Desborough then asked the Hon. R. A. Blankenberg, Acting High Commissioner for South Africa, to accept the machine on behalf of the South African Government.

Previous to this ceremony the Lord Mayor and the President of the Chamber of Commerce entertained the company to luncheon.

Lord Desborough, in proposing the toast of "South Africa and the Imperial Air Fleet aeroplane, 'City of Birmingham,'" said he believed the future, both of commerce and of war, if war we were still to have, would be in the air. Trade in the future would follow the 'plane.

Maj.-Gen. Sir Frederick Sykes, Controller-General of Civil Aviation, said that it was hoped soon to set up the International Commission for Air Navigation, which might perhaps develop in Mr. Kipling's prophecy of an Aerial Board of Control. It would be in permanent session, and would deal with and assist international civil flying generally. He said:

"Aviation is the antithesis of Chauvinism. Much of the mutual antagonism and mistrust between peoples of different countries has been attributable to lack of easy inter-communication and consequent misunderstanding. The cable and wireless telegraphy have assisted in the breaking down of this party-wall between the nations. Aviation will do more, as it will afford swift opportunities for the intercourse of living personalities and provides a means of transport that is unimpeded by natural barriers.

"I cannot help thinking what an interest Mr. Joseph Chamberlain would have taken in Empire aviation and what a champion we should have found in him. I wish that this aeroplane could be the first to fly to South Africa, and thus realise—though in another form—the dream of Cecil Rhodes of direct communication between Cairo and the Cape; but although we are advanced in our plans for establishing aerial routes which eventually will link together all portions of the Empire, the time is not yet ripe.

"The way of escape and the future in all its aspects depends upon education, backed by real belief, and I think the Imperial Air Fleet Committee are doing good work in trying to educate public opinion in regard to the air. We must follow up the advance that was made in this direction last month when international flying on an agreed basis was signed by eleven separate Powers. This is the most revolutionary break with international tradition since races first set limits to the encroachment of the stranger, and when the civilised world is intersected by a system of air routes nations will learn that it is as absurd to declare war upon another as it would be for the citizens of Birmingham to declare war upon the citizens of Crewe."

The W.R.A.F. Enquiry

THE Select Committee which has been enquiring into the dismissal of Miss Violet Douglas-Pennant from the W.R.A.F. concluded the taking of evidence on Tuesday. The Chairman, Lord Wrenbury, said that though the Committee would report in due course, they were going to take the unusual step of announcing some of their conclusions. Grave accusations had been hanging for months over the heads of several persons, and they were entitled to the Committee's conclusions upon them.

"The Committee find the accusation of immorality between Colonel Janson and Miss Glubb to be untrue. The accusation of general immorality at Hurst Park Camp is entirely unsupported by any evidence. The accusation that Colonel Bersey desired immorality to continue at Hurst Park Camp is found to be untrue. The accusation that General Livingstone and Colonel Bersey desired, by improper means, to allow to continue a state of things under which young girls were taken to London and brought back, often drunk, in the early hours of the morning, is not supported by evidence."

Lord Wrenbury added that the above were the unanimous findings of every member of the Committee.

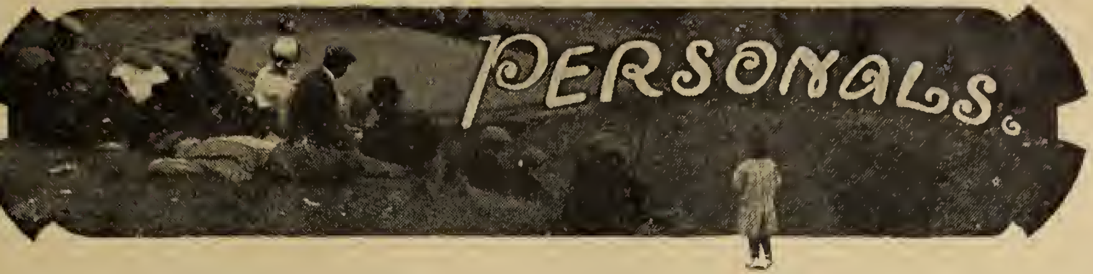
Messrs. Simmons and Simmons, of 18, Finch Lane, Cornhill, state that Brigadier-General Livingstone and Mr. W. C. Bersey have instructed them to issue writs against Miss Violet Douglas-Pennant for libel.

Aerial Signposts

THE Air Ministry announces that the following "Notice to Airmen" is issued:—

"The roofs of the following railway stations are now marked with the name of the place in large white letters:—

"REDHILL (S.E. and C. Railway).
"TONBRIDGE (S.E. and C. Railway).
"ASHFORD (S.E. and C. Railway).
"HITCHIN (G.N. Railway)."



PERSONALS

Deaths

Capt. **GERALD FETHERSTON KNIGHT**, who died on October 30 at the R.A.F. hospital, Eaton Square, was the son of Robert Lynam and Lena Fetherston Knight, and grandson of Rev. Robert Knight, late of "Stanmore," Torquay.

Capt. **CLAUD HARRY**, R.A.F., D.F.C., who was reported missing on October 29 and now known to have died on November 7, 1918, was the youngest son of Mr. and Mrs. **HENRY STOKES**, 24, Granville Park, Blackheath.

Lieut. **BRODIE WYATT WILSON**, 19th London Regt., attached R.A.F., who was reported missing on September 23, 1918, and is now presumed killed on that date, was the eldest son of Rev. H. E. and Mrs. Wilson, Little Billing Rectory, Northampton.

To be Married

The engagement is announced between Mr. W. S. **ALLEN**, R.A.F., only son of W. Allen and the late Mrs. Allen, of 50, Gloucester Terrace, W. 2, and **CLARA ELEANOR**, only daughter of the late H. G. **JOHNSON** and Mrs. Johnson, of Long Close, Winchester.

The engagement is announced between Mr. J. A. **WEATHERHEAD BINNIE**, R.A.F., son of Mr. David Dreghorn Binnie and Mrs. Binnie, of Glasgow, and **OLAVE**, only daughter of Mr. **CAMPBELL HARRIS** and Mrs. Campbell Harris, of Eastbourne.

The engagement is announced between Capt. T. **WALFORD CAVE**, M.C., R.F.A. and R.A.F., eldest son of the Rev. Thomas Cave, vicar of St. James, Handsworth Wood, Birmingham, and **GWENDOLIN MARY**, only daughter of Herbert H. and Mrs. **PIGGIN**, of Hendon Hall, N.W.

The engagement is announced between Lieut. Com. **THEODORE ELMSLEY**, A.F.C., R.N., son of the late Remy and Mrs. Elmsley, of Toronto, Canada, and **JOAN**, only daughter of the late **EDWARD** and Mrs. **JACKSON**, of St. Andrews, Fife.

The engagement is announced between Flight-Lieut. **CECIL GEORGE MATHEW**, R.A.F., younger son of A. C. Mathew, of Cranford, Church Crookham, Hants, and **EMILY GEALE HESTER LOWRY**, youngest daughter of the late Col. C. M. **ALEXANDER** and Mrs. Alexander, of Termon, Carrickmore, Tyrone.

The engagement is announced between Lieut. W. **ROLAND ROGERS**, R.A.F., only son of the late Samuel Rogers, of Preston Hill, Penkridge, Staffordshire, and of Mrs. Rogers, Beaumont, Yapton, Sussex, and grandson of the late William Rogers, of Mount Pleasant, Messcliffe, Shropshire, and **MURIEL**, only daughter of the late **LIONEL ROBERT BARKER**, elder son of the late Frederick Barker, of Gaskyns, Rudgwick, Sussex, and Mrs. Barker, of Hobb's Farm, Yapton, Sussex.

The marriage has been arranged, and will take place early in December, between **STEPHEN WHITE SYMONS**, late R.A.F., son of the late William Christian Symons and Mrs. Symons, of 129, Beaufort Street, Chelsea, and **MARGARET LE BRASSEUR**, eldest daughter of Mr. and Mrs. Robert Le Brasseur, of Sunnycote, Rosslyn Hill, Hampstead.

Items

The first Reunion dinner for all officers of 110 Squadron, R.A.F., will be held at the Trocadero on Saturday, November 15, 7 o'clock for 8. Any officer not having received previous intimation should apply for particulars to Major Nicholl, R.A.F., Eastchurch, Kent.

SIDE-WINDS

ROLLS-ROYCE, LTD., announce that there is no truth whatever in the rumour that they intend to place on the market during the year 1920 a Rolls-Royce chassis of 20 h.p.

- - -

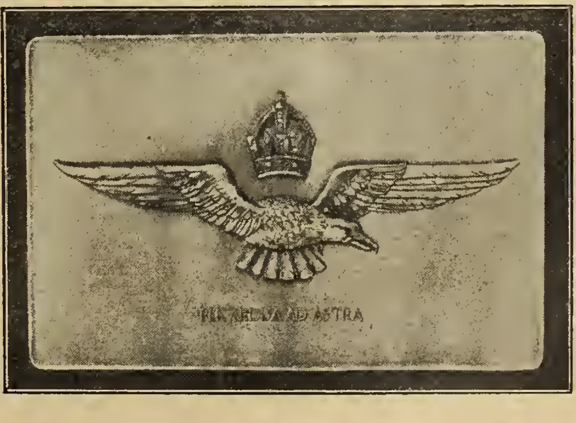
DURING the week ending November 5, 1919, the Handley Page London-Paris service carried 39 passengers and 2,588½ lbs. of freight. The London and Paris flights were carried out daily in rain and wind-storms, and proved that, despite the inclement weather associated with this period of the year, scheduled air flights are possible. On November 3, a Breguet machine, working in conjunction with the Handley Page Transport, Ltd., flew from London to Paris after a four-hour trip through wind, hail and rain. This was the only machine in the Continental air service to accomplish the journey. On November 1 a Handley Page aeroplane carried 12 passengers, 500 lbs. of freight, and nearly 400 lbs. of personal luggage to Paris through driving rain, Lieut.-Colonel Robert Loraine, the actor and pilot, being amongst the occupants.

- - -

DURING the same period 17 passengers and 558½ lbs. of freight were carried on the London-Brussels service. The restrictions regarding the carrying of freight to Belgium by air have now been removed.

- - -

THERE have been several attempts to produce something which shall perpetuate the record of service of individuals or units in the Great War, but a good many of the results have, to say the least, not been conformable to the canons of good taste. It is a pleasure, therefore, to see the excellent work of the Birmingham Guild, Ltd., of Great Charles Street, Birmingham, in this direction. It consists of a plaque bearing the regimental crest, mounted on a tablet of well-seasoned dull mahogany, and framed. The plaque itself is reproduced in bronze, heavily silver-plated and toned to an old silver colour, the crest and motto being modelled in low relief by distinguished artists. In addition, where required, a small silvered plate is mounted, below the plaque, on which the name, rank and dates of service may be engraved. The whole forms a permanent memorial, chaste and dignified, the combination of the old silver and the rich but subdued colouring of the mahogany, giving a pleasing result. Among the badges reproduced is that of the R.A.F., one of which was recently sent to Air Vice-Marshal Trenchard, who expressed his delight with it, and stated that it should be preserved in his office at the Air Ministry. The dimensions



The memorial plaque produced by the Birmingham Guild, Ltd.

of the full service record tablet are: Overall size of back plate, 18 ins. by 13 ins.; size of metal plaque, 7 ins. by 4½ ins.; size of inscription plate, 7 ins. by 2 ins.; and, with a brief inscription, the price is four guineas complete. The crest plaque, suitably mounted on a smaller tablet, can be had for two guineas. In this connection it should be noted that the tablets can be obtained from Messrs. Vickery's, of Regent Street, Berkeley, Ltd., of Victoria Street, and Selfridge's.

- - -

ONE of the most striking exhibits at Olympia is the new Hispano-Suiza car, and it has a special interest for all concerned with aviation, being largely the outcome of the wide experience gained by this company in the building of aero-engines. It is said that 50 per cent. of the aeroplanes used by the Allies on the various fronts were fitted with Hispano-Suiza motors, and no fewer than 21 different firms were entrusted with the manufacture, 14 of them being French firms. Including the output of the companies manufacturing under licence, a grand total of approximately 50,000 Hispano-Suiza engines were made during the War. It is obvious that an enormous amount of valuable experience was thus acquired, and it is the benefit of this which is embodied in the new six-cylindered car.

- - -

Two recent worlds' records gained by Hispano-Suiza aero-motors are the height record of Lieut. Casale and the speed record of Lieut. de Romanet. But some of the greatest exploits with which the name of the Hispano-Suiza is associated are the brilliant deeds of the "Stork" Squadron of the French Air Service, for the immortal Guynemer and his brave comrades of that wonderful squadron achieved their most notable triumphs on Spads so engined. This fact has been the inspiration of a most distinctive and artistic motor mascot. It consists of a silver stork in full flight, and it will be the exclusive mark of the new Hispano-Suiza cars. In the grace and elegance of its lines there is a suggestion of swiftness in this mascot which indicates with great appropriateness the close connection between a famous chapter in the history of the War in the air and the evolution of a wonderful car. Congratulations to M. Birkigt, the designer of these motors, and the directors of "Entente Industrielle (England)" Ltd., the sole concessionaires for Great Britain.

The charming mascot on Hispano-Suiza cars

- - -

MESSRS. C. C. WAKEFIELD AND CO., LTD., were unlucky in the ballot for space at the Motor Show, and had to be content with a modest stand in the accessories section. They are, however, exhibiting a range of their famous "Castrol" motor oils and the well-known "Castrol R," so well known to all aviators, which has so long a record of success on all types of aero-engines. As one of their representatives remarked the other day, "a small stand but a big reputation!"

- - -

ON Thursday, November 6, Maj. Draper gave special flights at Hendon on the B.A.T. saloon passenger machine in the presence of visitors from Australia and Spain. Passengers were taken from these countries, all of whom expressed delight at the comfortable saloon, and they were also particularly impressed by the remarkable smooth landing. The Amsterdam service is still in operation, but last week, owing to weather conditions, no machine left this country for Holland.

NEW COMPANIES REGISTERED

AUTOVEYORS, LTD., 36, Victoria Street, S.W.—Capital £100, in £1 shares. Aircraft, motor and motor launch dealers and mannfacturers, etc. First directors: L. H. Barton and C. R. Cook.

LIBERTY ENGINEERING CO., LTD., 1, Warwick Street, W.1,—Capital £1,000, in 1s. shares. Mechanical, motor, aviation, and general engineers, etc.

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl.=cylinder; I.C.=internal combustion; m.=motors.

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published November 6, 1919

14,675. J. MOSTON. Automatic control of aircraft. (133,401.)
16,029. SPERRY GYROSCOPE CO. Visual indicating-devices. (133,410.)
16,507. D. J. MOONEY. Aeronautical machines of metal. (133,444.)
16,520. R. F. POWER. Controlling means for aircraft. (133,445.)
16,521. SOPWITH AVIATION CO. and L. A. POLLARD. Aeroplane seats, etc. (133,446.)
16,538. W. R. TURNBULL and E. C. G. ENGLAND. Screw propellers. (133,449.)
16,540. C. M. WILLIAMSON. Cameras for aircraft. (133,450.)

Published November 13, 1919.

7,995. C. J. H. MACKENZIE-KENNEDY and E. A. VESSEY. Shock-absorbers (133,720.)
14,126. R. E. ROWE. Miniature or toy aeroplanes. (133,728.)
15,061. E. R. CALTHROP. Parachutes. (133,734.)
16,852. P. FERRARI and E. MIGLIOLI. Flying machines. (133,771.)
17,104. RUDGE-WHITWORTH, LTD., and F. C. J. RAVEN. Wiring means for attachment to aeroplane spars. (133,791.)
19,330. SOC. LORRAINE DE DIETRICH ET CIE. Screw propellers. (133,825.)
19,605. SOC. DES. MOTEURS GNOME ET RHONE. Rotary motors. (133,828.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published November 6, 1919

494. W. J. DAVIS. Aeroplanes. (133,559.)
11,566. W. R. TURNBULL and E. C. G. ENGLAND. Screw propellers. (133,628.)
11,609. SOC. MARION ET CIE. Device for determining angle for correcting drift of aeroplane. (133,629.)

Published November 13, 1919.

1,173 G. W. BENNETT and L. E. WILTON. Testing balance of propellers, etc. (133,865.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xliii, xliv, xlv, and xlvi).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates*:—

UNITED KINGDOM	s.	d.	ABROAD*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

the requirements of the R.A.F., it is for consideration whether it will not be necessary to adopt a combination of subsidies and grants for services rendered. To our way of thinking, it is not so much a matter for consideration as for immediate decision. The principle of encouragement has been passed by the Government long ago, and sufficient time should have elapsed by now for the formulation of a concrete scheme through which the principle can be applied. It would seem, on the face of it, that a combination of paragraphs (1) and (2) of the alternatives quoted above would best meet the case as it exists. The simple allocation of a grant to "approved" companies for mileage and weight carried is good, but it seems to us to be too restricted in its incidence. Manifestly it would be out of the question to subsidise every company or concern embarking on aerial transport, but at the same time it seems essential that some measure of support should be given to the industry as a whole. That is where (3) seems to come in, and we suggest, therefore, that a combination scheme, including the two, would probably be best.

◆ ◆ ◆

The Safety of Flying

Not the least remarkable feature of the Memorandum is the light it sheds on the safety of flying as a means of transport. The table given in the Memorandum is exceedingly interesting, and will repay study by those who labour under the delusion that flying is unsafe. Briefly, it shows that the percentage of pilots killed is ·095 per thousand flights, and of pilots injured ·286 per thousand flights. No passengers were killed during the six months covered by the Memorandum, and the percentage injured was no more than ·476 per thousand flights. These percentages have been taken because it is almost invariably in landing or taking off that accidents occur, and it is thus a better guide to assess them on the number of flights than to take mileage flown. As a matter of fact, the record shows that there was one death for each 151,500 miles flown, which is assuredly below the record of any other form of transport. We have not at hand the figures relating to railway or marine transport; but, speaking from recollection, the averages of killed work out very much higher than these. Therefore, we feel we are on safe ground when we claim that in so far as actual mileage traversed is concerned, flying has been actually demonstrated to be the safest form of transport. Taking another form of assessment, for every 5,200 passengers carried one has been injured, which again is a splendid record and one which should convince even the most sceptical that there is really nothing of the heroic in trusting oneself to aerial transport.

Another point that emerges from these statistics is that the regulations made by Gen. Sykes' department for the conduct of aerial navigation seem to have worked out very well. As we said at the time of their issue, they are drastic, and very rightly so. We cannot afford at this stage of the development of flight, when the public is looking to see whether it can be trusted or not, to have serious and avoidable accidents. It is far better that the regulations should err on the side of severity than that we should incur a series of accidents which might well retard development by years.

At the present moment what seems to be wanted in general is the declaration of a general policy towards civil flying. Two Committees have investigated the subject. First of all there was the Civil Aerial Transport Committee, which enquired exhaustively into the prospects, and reported before the end of the War that civilian aviation ought to be afforded a substantial measure of support. The whole question was again enquired into by Lord Weir's Committee, which has reported to the Secretary of State for Air. How long it will be before that Report is issued as a public document we have no means of knowing, but it is to be hoped it will not be delayed a moment more than is necessary. The whole industry, and a very large section of the public outside, is waiting anxiously for a revelation of real policy.

◆ ◆ ◆

General Seely's Resignation

For some time past it has been abundantly clear that the dual control exercised by the Secretary of State for War over his own special department and the Air Ministry was not working as well as the Government assured us it would work. Now matters have, as we fully expected, come to a head, and Gen. Seely, who has filled the post of Under-Secretary for Air since the present Cabinet was formed, has resigned, and, what is more important than all, has given his reasons publicly for taking this inevitable course of action. He objects that subordination to the War Office is wasteful of time, of energy, and of money. By practically making the Air Ministry an annexe of the War Office the country is involved in a gigantic waste of commercial possibilities, and a waste of money on a great scale, by not taking advantage of the new inventions and of the new power the air has given to undertake our great and increased responsibilities in the world. Gen. Seely, after an experience of the working of this pernicious arrangement—one we have condemned from the first—has, like a man of honour, decided that he can no longer identify himself with a policy he feels to be inimical to the best interests of the country, and has taken the only possible course open to him of resigning.

We need not follow him through the convincing and straightforward explanatory speech he made in the House of Commons after his resignation. That is now a matter of past history, and what we are mostly concerned with is the future. Mr. Bonar Law, in his usual cynical way, affected to make light of the matter by describing it as a mere difference of opinion as between the Cabinet and Gen. Seely. That will not do. It has become quite clear as a result of the matters which led up to the resignation of the Under-Secretary that the Government has determined to make of the Air Ministry a mere appendage of the War Office. It is true that only the day before Gen. Seely's explanation the Leader of the House had given an explicit assurance that it was intended to maintain the unity of the Royal Air Force, but since Lord Weir's characteristic explanation before the Douglas-Pennant Committee of the difference between a Parliamentary and a truthful answer to a question, these assurances have less weight than ever. What, then, is the ultimate intention? The Government, it is quite apparent, does not propose to willingly appoint a Secretary of State for Air. Does it mean to institute a Ministry of Defence, and to group all three fighting Services together under a single Minister, with an Under-Secretary each for the Admiralty, War and Air? And if so, is Mr. Churchill to be the first tenant of the office? It is common knowledge that he, like

"Flight" Copyright

Lieut.-Colonel ALEC OGILVIE, one of the earliest British pioneers, who did valuable work during the War, in the Technical Department, Air Group, Ministry of Munitions his father, is a strong believer in such an arrangement, and it will be interesting to know in the end if he has been able to impose his views on the Prime Minister, who seems to be singularly receptive of the ideas of other people.

We need not enter into a discussion of the merits of the single Ministry of Defence, especially as we set forth our views on the subject when the idea was first mooted some six months ago. There is the less reason in that there is bound to be a discussion on the points arising out of Gen. Seely's resignation. As a matter of fact, Lord Hugh Cecil asked that time should be given, and elicited a reply to the effect that if the House wished to debate the matter, the Government would give the necessary facilities—some time. Such a discussion must take place, for there are many aspects of Air Ministry affairs which require to have the light of day shed upon them, and this can only be done through the medium of such a discussion as that which we trust will be forced upon the Government by the Air Party in the House of Commons.

◆ ◆ ◆

Aerial Signposts The official recommendations which were issued some time ago as to the desirability of indicating main-line stations for enabling passing airmen to verify their positions, seem to be bearing fruit. According to a "Notice to Airmen" issued by the Air Ministry, the roofs of the stations at Redhill, Tonbridge, Ashford (Kent), and Hitchin have now been marked with their names in large white letters. This is very much of a move in the right direction, and it is to be hoped, now that the railway companies are able to start seriously on the renovation of their large stations, that all the principal points along the main railway routes may soon be indicated in a similar manner. We say advisedly the principal points, for the reason that confusion might easily arise if the sign-posting idea were carried to too great a length.

◇ ◇ ◇ ◇

Prohibited Areas

AN Air Ministry Order published on Tuesday evening announces that aircraft must not land in any prohibited area or fly over such area at a lower altitude than 6,000 feet.

The following places are specified as prohibited areas: Orkney Islands, Cromarty, Firth of Forth, Harwich, Osea Island, Sheerness, Chatham, Dover, Portsmouth, Poole Harbour, Portland, Devonport, Pembroke, and Cork Harbour.

The Airship Department

THE Air Ministry makes the following announcement :—

The Airship Department of the Admiralty has now been transferred to the control of the Air Council. All correspondence should, therefore, be addressed to the Secretary, Air Ministry, Kingsway, W.C.2, in future.

Licences Granted by the Air Ministry

THE Air Ministry has issued lists of licences issued to (1) Pilot, (2) Ground Engineers (Aircraft), and (3) Ground Engineers (Engines). The list of pilots contains 414 names, No. 1 being Capt. H. J. T. Saint; the ground engineers' (aircraft) list contains 243 names, while there are 256 included in the ground engineers' (engines) list. The lists show the types of aircraft for which the licence is granted, and they also give the date of expiry of the licences.

Co-operation with the U.S.

MAJ.-GEN. SEELY gave a small farewell luncheon at the House of Commons, on November 12, to Maj.-Gen. Sir F. H. Sykes, Controller-General of Civil Aviation, who is about to leave the country on a mission to the United States. Other guests included Mr. J. W. Davis (American Ambassador) and Air Marshal Sir Hugh Trenchard, Among the guests were the Marquess of Londonderry, Mr. Adamson (chairman of the Labour Party), Air-Commodore Maitland, Maj.-Gen. Swinton, Sir Arthur Robinson, Air-Commodore Lambe, Sir Archibald Sinclair, Maj. Hall, United States Air Attaché, Lieut.-Col. J. T. C. Moore-Brabazon, Mr. G. Holt Thomas, etc.

Maj.-Gen. Seely, proposing the health of the American Ambassador, said he would ask the Ambassador, in responding, to propose the health of Gen. Sykes, who was about to go to America at the invitation of Lord Grey in order to confer with the United States people in aviation matters, and to do his best to bring the two nations closer together.

Mr. Davis, in acknowledging the toast, said that he had learned that Gen. Sykes was making the visit to America at some personal sacrifice to himself. The visit was evidence of the deep earnestness with which he entered on the task. He was perfectly satisfied that the great majority of the people of both countries—those in official positions, and those, too, who were not—deep down in the bottom of their hearts longed for the co-operation of Great Britain and America, as they longed for no other thing in the international war. After all, faith without works was dead. He rejoiced in the fact that this mission opened a field of work and of labour which they entered upon together, and in which American co-operation, he thought, might be taken as assured. It was a very generous thing that the British Government should be willing to transfer to the United States one of the best, the largest, and most improved airships which it had built. No more striking testimony could have been given to the earnestness of the desire on the part of the British to co-operate or of their confidence in American good faith.

Gen. Sykes said he went to America to try to help that co-operation which they had met with in France in the air, and in Paris in connection with the Conference there. In doing this they had very little to guide them, no established ground on which to work. If they could get, as they had tried to get in Paris, a broad principle on which to work, and thus meet the various needs of the States which had signed or would sign the Convention, they would be on the right road to help aerial efforts on really sound lines.

The Marquess of Londonderry, proposing the health of Gen. Seely, said that whatever Gen. Seely did in the future, he would always be followed with the affection and goodwill of those who had been connected with the air.

"My interest in the air is deep and abiding, and will last as long as I last," said Gen. Seely in reply. He added that he was indeed fortunate in the fact that his last official act as Vice-President of the Air Council was to have the privilege of entertaining the American Ambassador and Gen. Sykes in order further to cement the co-operation between this country and America in this and other matters.

Log-Books for Civilian Aviation

THE Air Ministry announces that, pending the production of aeroplane and engine log-books conforming to the International Air Convention, log-books of the type used by the Royal Air Force are on sale at 2s. net per copy.

These can be purchased through H.M. Stationery Office, Westminster, S.W., or through any bookseller.

Log-books conforming more closely to the requirements of the International Air Convention will be placed on sale as soon as possible.

An Air Board for India

IN furtherance of the policy announced in FLIGHT recently, an Air Board has been formed in India to advise the Commerce and Industry Department of the Government, which has charge of civil aviation.

Models

IT will doubtless be welcome news to many of our readers in all parts of the world that we propose to resume the publication of the model section of FLIGHT. Arrangements have been completed by which contributions by the well-known writer on model aeroplanes, Mr. F. J. Camm, will appear exclusively in our columns. It is hoped that the first article by Mr. Camm will appear in our issue dated December 4.

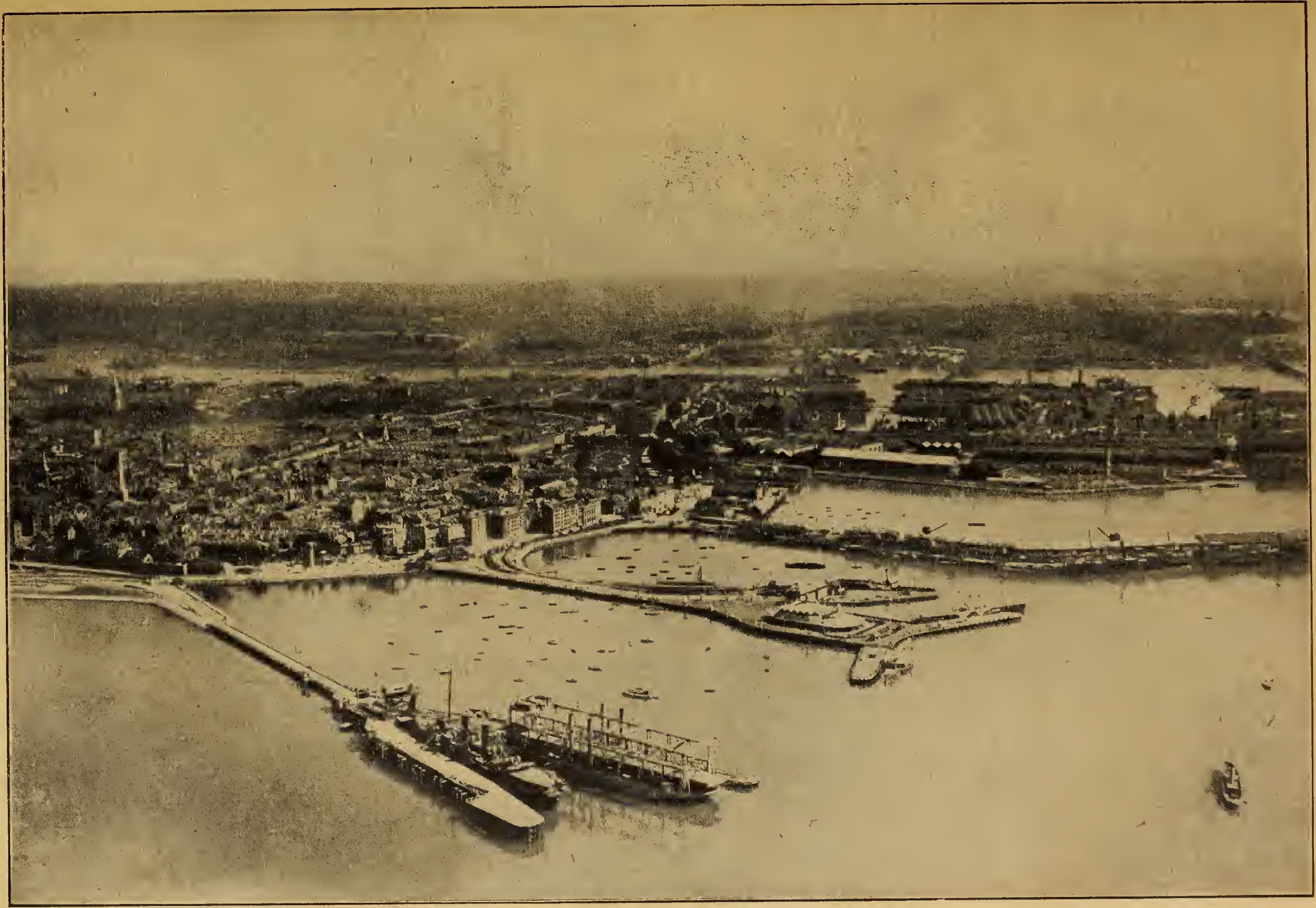
Royal Society of Arts Lectures

AMONG the papers to be read before the Royal Society of Arts after Christmas is one on the "Commercial Future of Airships," by Air-Commodore E. M. Maitland, C.M.G., D.S.O., Three Cantor Lectures on "Aircraft Photography in War and Peace," will be given on January 19, 26 and February 2 by Capt. H. Hamshaw Thomas, M.B.E.

"Kite Balloons"

AT the next meeting of the Royal Aeronautical Society at the Royal Society of Arts on Wednesday, November 26, at 8 p.m., Mr. Griffith Brewer will give a lecture on "Some Kite Balloon Experiments." The chair will be taken by Air-Commodore E. M. Maitland, C.M.G., D.S.O., A.F.C., R.A.F.

The Camera and the 'Plane

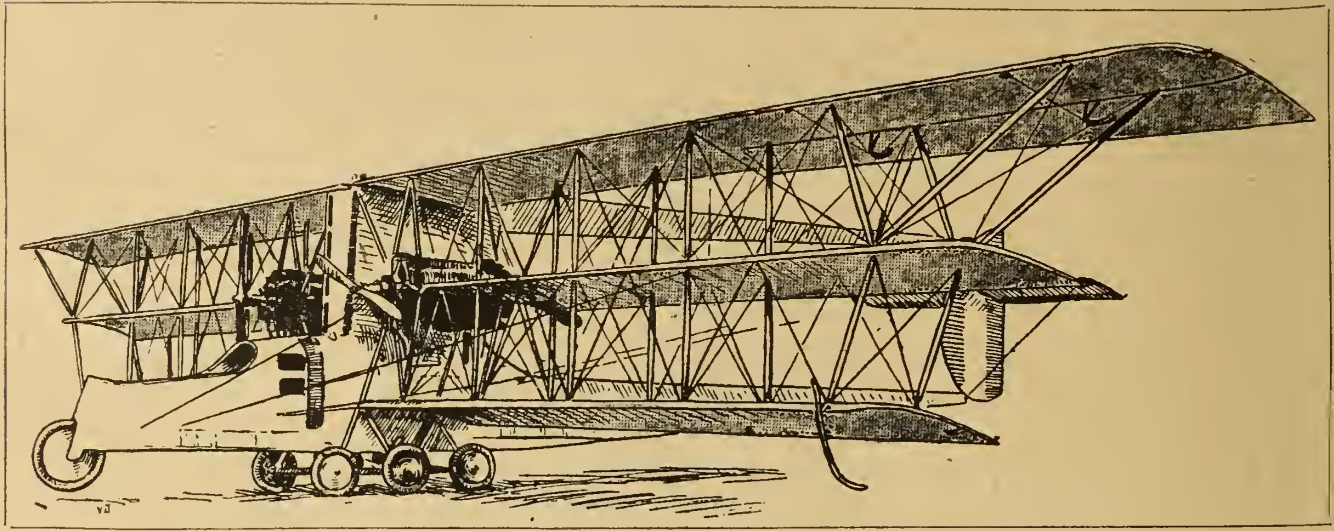


SOUTHAMPTON PIER AND DOCKS: Photographed from a Supermarine flying boat

"Flight" Copyright.

THE VOISIN EXPERIMENTAL BOMBING TRIPLANE

The accompanying illustrations show an interesting French experimental bombing triplane constructed by the Voisin Co. The first model, which is shown in the sketch, was produced during the latter part of 1915, and was fitted with four engines of 150 h.p. each. As this first machine did not come up to expectations on its trials, another machine was constructed in 1916, similar in general design, but embodying many modifications.

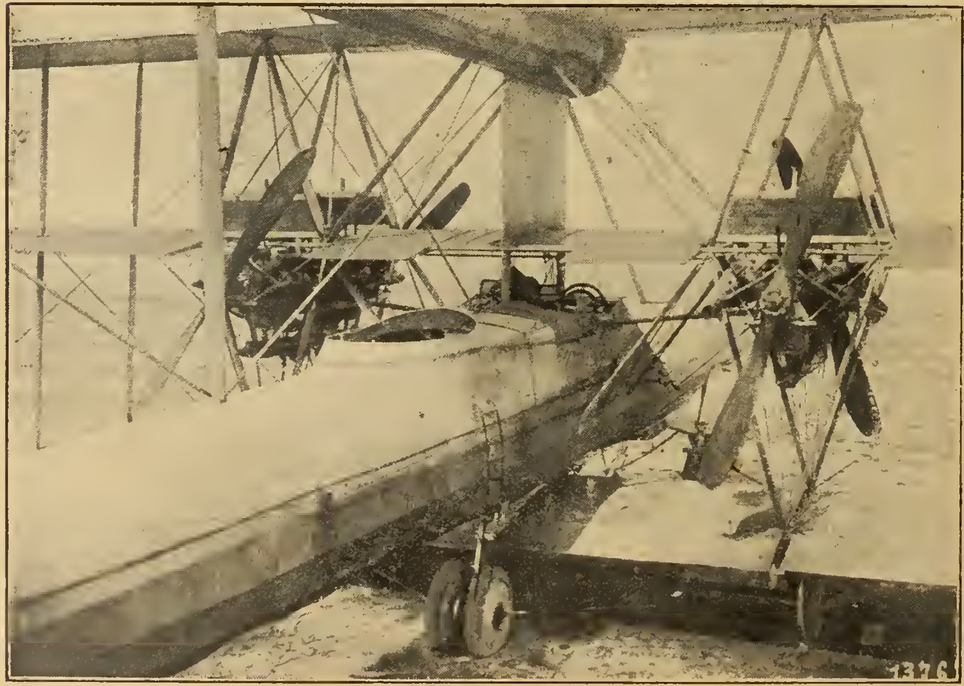


Sketch showing the first, 1915, model of the Voisin bombing triplane.

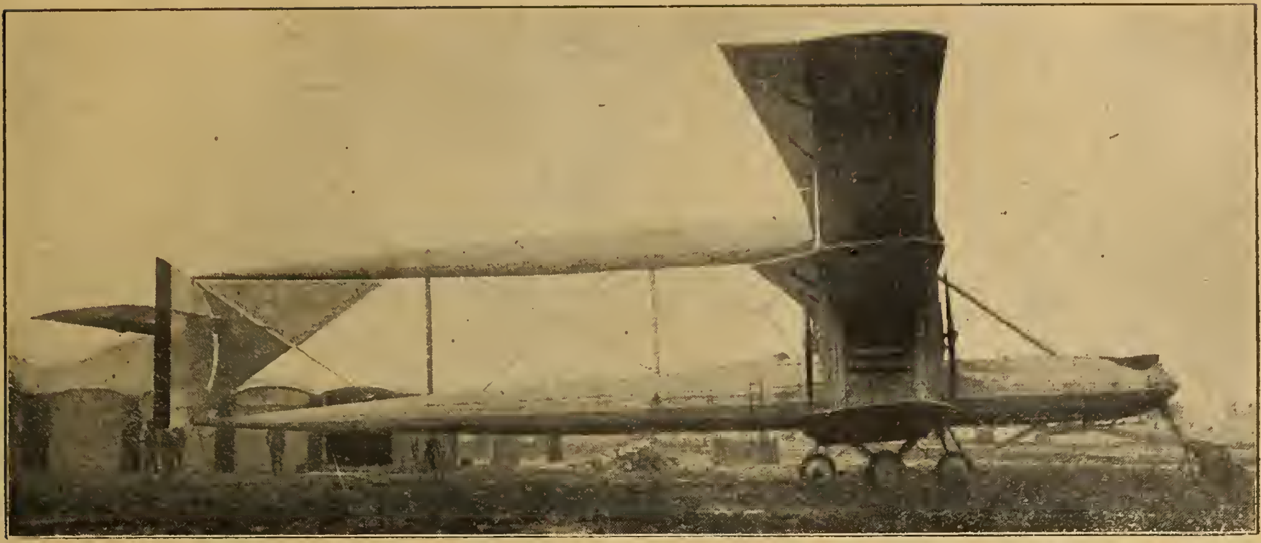
This machine is shown in our other illustrations, from which it will be seen that it possesses many distinctive characteristics. The most notable feature consists of the two *fuselages*, which, unlike those of other twin *fuselage* machines, such as the Caproni, are arranged one above the other, and not side by side. In both models the lower *fuselage* forms the main body, the upper *fuselage* being of much lighter construction and serving as an outrigger for the tail. There is also a cockpit in the fore part of the upper *fuselage*, where a gunner is stationed, from which position a very good range of fire is obtained. In conjunction with the gunner in the nose of the lower *fuselage*, and the rear gunner, who fires through an opening in the underside of this *fuselage*, the machine is well protected against attack.

The four Hispano-Suiza engines (220 h.p. each) are mounted in pairs in tandem, just below the middle plane in the 1916 model, on tubular V frames, extending from top to bottom planes. The engine mounting is additionally braced by diagonal struts from both upper and lower *fuselages*.

The overall span of the 1916 model is 118 ft., and the chord is 6 ft. 6 ins. The total surface is 2,150 sq. ft., and the loading is 7·1 lbs. per sq. ft.

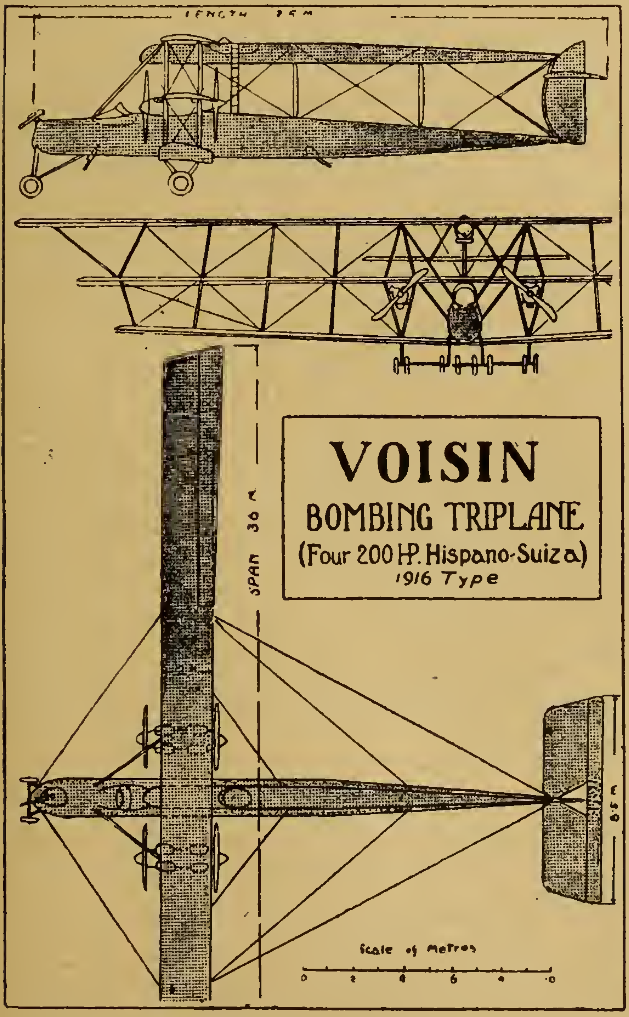


Close-up view of the four Hispano-Suiza engines on the 1916 Voisin bombing triplane.



Side View of the 1916 Voisin Bombing Triplane

or 18 lbs. per h.p. The weight of the machine empty is 11,000 lbs., and the useful load is 4,400 lbs., of which half is accounted for by fuel, oil and crew. The speed at 6,500 ft. is 79 m.p.h., and the climb is 27 mins. for the 6,500 ft. The theoretical ceiling of this machine is 11,500 ft.



THE VOISIN BOMBING TRIPLANE: Plan, side and front elevations to scale, of the modified type constructed in 1916

◆ ◆ ◆ ◆

The Flight to Australia

It is with great regret that we have to record the fatal termination to the third attempt to fly to Australia for the Australian Government's prize of £10,000. The Alliance machine, fitted with 450 h.p. Napier engine, piloted by Lieut. Roger Douglas, M.C., with Lieut. J. S. L. Ross as navigator, left Hounslow at 11.33 a.m. on November 13. The machine passed over Teddington very low, and when over Surbiton it suddenly came out of the clouds in a spin and nose-dived to earth. Lieut. Douglas was killed instantaneously, and Lieut. Ross died in a few minutes after the accident. At the inquest on November 17 evidence was given which showed that the controls and the engine were in good order, and a verdict of "Accidental death" was returned.

Before starting the two officers had received the following messages:—

From Prince Albert: "May you have good luck in your sporting effort."

From Major-General J. E. B. Seely: "I wish you the best of luck on your sporting venture."

From Major-General Sir F. H. Sykes: "Success to your flight."

In our last issue we were able to briefly record the start of the Vickers-Vimy-Rolls-Royce machine from Hounslow on November 12. The weather on the coast was very misty and a heavy snow-cloud was encountered at Etaples. A safe landing was made at 3.40 p.m. at Lyon. The machine left Lyon at 10.6 a.m. the following morning, and in fine weather flew along the Riviera, across the Gulf of Genoa, landing at Pisa at 2.40 p.m. Bad weather had set in, but the machine was reported at Rome on November 17.

The following messages were received by the pilot, Capt. Ross-Smith, before starting:—

From Prince Albert.—"May good fortune attend you in your sporting attempt."

From Maj.-Gen. J. E. B. Seely.—"I wish you all good luck in your sporting flight."

From Maj.-Gen. Sir F. H. Sykes.—"Best of luck in your great adventure."

Capt. Matthews, who is flying the Sopwith "Wallaby" to Australia, is still held up by bad weather at Gonzenheim, five miles from Mayence.

M. Poulet's Progress

On November 11 M. Poulet, accompanied by M. Benoit, arrived at Karachi on his Caudron biplane at 3.30 p.m. He had left Gwadar at noon and landed on British military territory. The distance between Gwadar and Karachi is about 360 miles. On arrival M. Poulet was handed by M. Beaumont, the French Consul, a gift valued at £500.

THE POSSIBILITIES OF FLYING HIGH

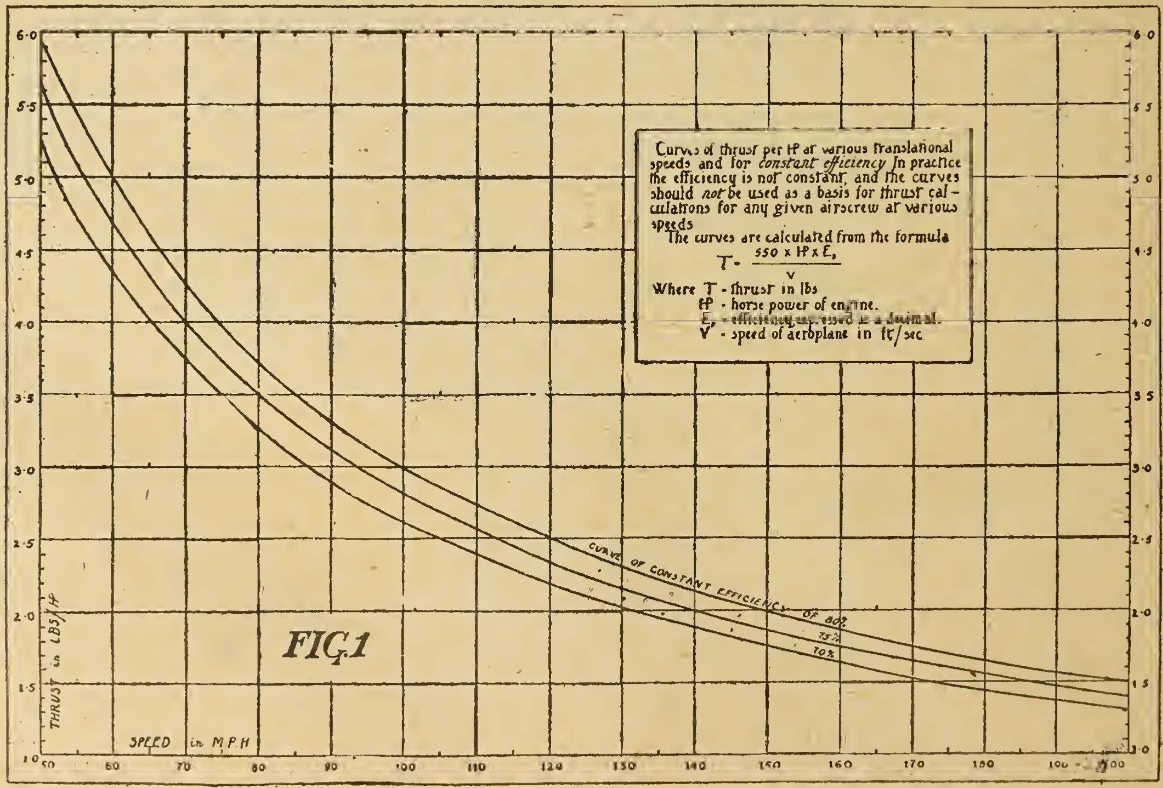
BY "MARCO POLO"

It is fairly certain that with the aeroplane as we know it to-day, no very great increase in performance can be expected. Wing sections have reached a high state of efficiency. *Fuselages* and other component parts exposed to the air have reached a stage where no very great decrease in resistance can be anticipated. Aero engines have been brought to such a pitch of perfection (or rather efficiency) as to weigh as little as 1½ lbs. for each horse-power developed. Structural design also has been greatly improved, resulting in a very light aeroplane, giving, in conjunction with the light, powerful engine, a very low loading per horse-power. Each of these factors in the equation of efficiency may be subject to still further improvements, but these cannot be expected to be of any very great magnitude, and as it is chiefly the loading per horse-power which determines the performance of an aeroplane, it follows that we are beginning to approach the high water mark. To this it may be objected that there is no practical need for better performance. So far as commercial aviation is concerned this may be true, for some time to come at any rate, but for military purposes the maximum performance will still be required. Also it is, unfortunately, a fact that the machine with the high performance is not very efficient as regards the load carried for a given horse-power. It would therefore appear that if some means could be found whereby the efficiency of a machine could be improved, or conversely, whereby the performance could be increased, the gain would be an advantage both to the commercial and to the military machine. Such a means, in fact, is found in flying at a great altitude and making provision for maintaining the engine power at this altitude.

This fact is, of course, well realised, but it would appear that a full understanding of the fundamental principles involved is not shared by all interested in the subject. Generally speaking, these may be divided into two groups; those who fail to see any utility in flying high, and those who, knowing less about the subject, reason somewhat as follows: At 20,000 ft. the density of the air is approximately half that at ground level; the resistance is therefore half, and the machine will be able to travel twice as fast. As usual in such cases, the truth is somewhere between the two extremes, and as the subject is one of considerable and increasing importance to commercial as well as military aviation, it is thought that a few notes dealing with the basic principles may not be without interest. In order to have the subject understood by all interested in aviation, the following notes have been kept as elementary as possible, so as to keep the main principles quite clear, even at the expense of leaving out certain side issues which, although affecting the subject, do so to a small extent only. The notes, therefore, are not intended for those already well up in the subject, but for the student who is anxious to be able to follow more advanced articles on the subject.

It is a well-known fact that the density of the air decreases with altitude, the amount of decrease at any altitude varying according to the time of the year, etc. Thus at 20,000 ft. the density is on an average half that at ground level; at 30,000 ft. it is about one-third, and at 40,000 ft. about one-fourth. These figures are rough approximations only, and when, in the following notes, I refer to an altitude of 20,000, 30,000 and 40,000 ft. this should be taken merely as a convenient way of expressing the altitude at which the density is ½, ⅓ and ¼ that at ground level. The power of a petrol engine decreases with altitude, or in other words with the density of the air. This is, of course, due to the fact that, the petrol engine being a constant volume prime mover, although on each induction stroke the cylinders draw in the same *volume* of air, they do not draw in the same *mass* of air, owing to the rarefied condition of the air at great altitudes. This means that for each induction stroke a smaller mass of oxygen, which is the constituent of the air forming a combustible gas in conjunction with the petrol vapour, is drawn into the cylinders. As the proportion of petrol vapour to air—or to oxygen—is constant for perfect combustion it follows that with a smaller quantity of air the petrol supply must be reduced in order to avoid too rich a mixture. The consequence is that the power of the engine drops off, and it is found that the drop in power is very nearly proportional to the decrease in density. At 20,000 ft. therefore, the engine power will have dropped to about half of that developed at ground level. (Provided, of course, that the engine was designed to give its maximum power at ground level.) At the same time, owing to the density being halved, the lift of the wings has been halved, and to make up for this loss in lift the angle of incidence must be increased. This means increased resistance, and as there is now only half the power for overcoming this resistance, the speed is still further reduced.

It will, then, be quite clear that if it were possible to maintain the power at heights, the machine would be able to fly faster, since the resistance, other things being equal, is directly proportional to the density. Unfortunately, how-



Curves of thrust per HP at various translational speeds and for *constant efficiency*. In practice the efficiency is not constant, and the curves should *not* be used as a basis for thrust calculations for any given airscrew at various speeds.

The curves are calculated from the formula

$$T = \frac{550 \times HP \times E_1}{V}$$

Where T - thrust in lbs
HP - horse power of engine.
E_1 - efficiency expressed as a decimal.
V - speed of aeroplane in ft/sec.

FIG.1

ever, the lift also decreases directly as the density. The formula expressing the relation between the lift or drag of an aeroplane wing and the density of the air, speed of flight and wing area is :—

$$F = C\rho A\,V^2 \qquad (1)$$

where F = the force in whatever units of mass, length and time are employed ; A = the area of the wings ; ρ = the density of the air ; V = the flight speed of the machine ; and C is an "absolute" coefficient depending upon the shape of the wing section used.

If it is desired to obtain the value of F in pounds, and the flight speed is to be expressed in feet per second units, the value of ρ in above equation is 0·00238. If the speed is expressed in miles per hour and the force (lift or drag) F is required in pounds per square foot, the value of ρ is 0·0051. From the equation it will at once be seen that, the other factors remaining the same, the lift or resistance (drag) is directly proportional to the density.

We know that the resistance of an aeroplane varies as the square of the speed and *directly* as the density. It is therefore possible to formulate an expression showing the relationship between resistance (or lift), speed and density.

Let ρ_o be the density at ground level.

Let V_o be the speed at ground level ; and let V_a be the speed at an altitude where the density is ρ_a ; clearly we can then write :—

$$\frac{V_a^2}{V_o^2} = \frac{\rho_o}{\rho_a},$$

from which

$$V_a^2 = \frac{V_o^2 \times \rho_o}{\rho_a}, \text{ and } V_a = \sqrt{\frac{V_o^2 \times \rho_o}{\rho_a}} = V_o\sqrt{\frac{\rho_o}{\rho_a}} \qquad (2)$$

To take an example.

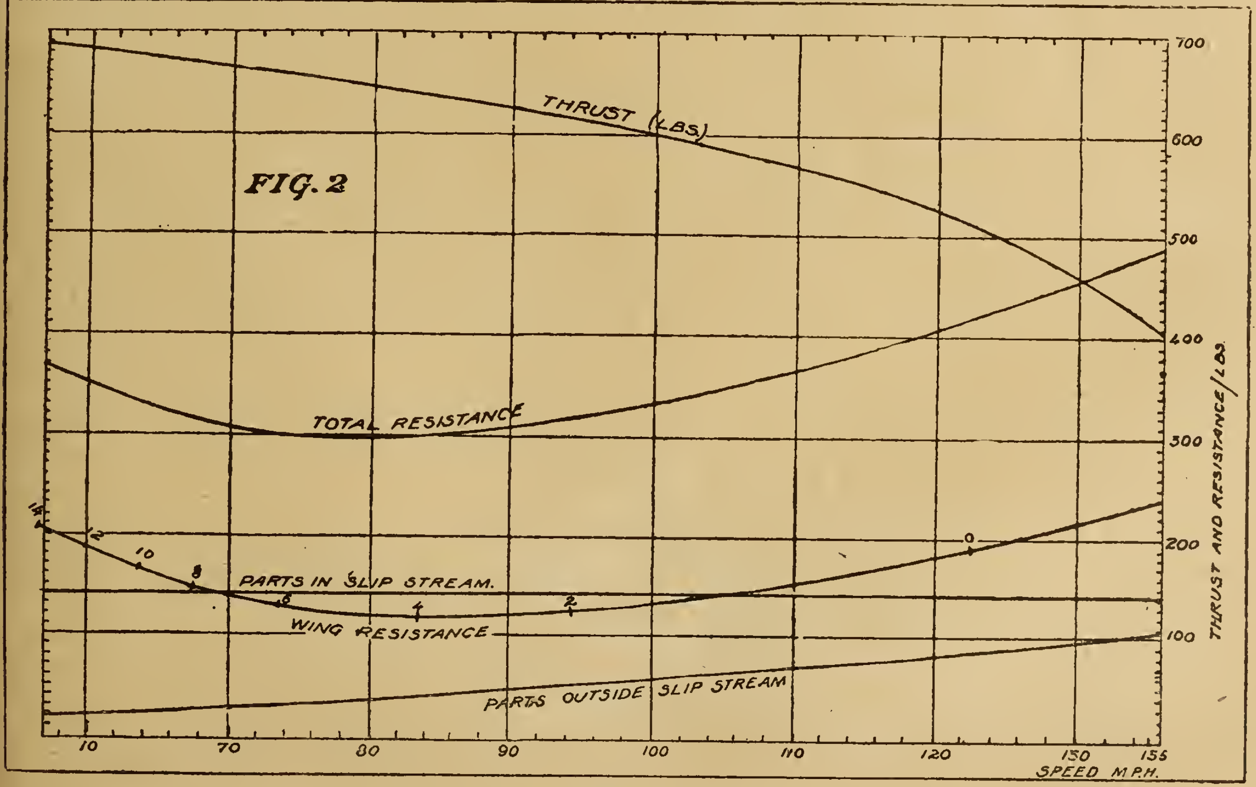
Suppose the speed of a certain aeroplane is 100 m.p.h. at ground level. Then at 20,000 ft. (or, more correctly speaking, at an altitude where the density is half that at ground level) the value of ρ_a is 0·00255. Substituting these figures in (2) we have $V_a = 100\sqrt{\frac{\rho_o}{\rho_a}} = 100\sqrt{\frac{0{\cdot}0051}{0{\cdot}00255}} = 100\sqrt{2} = 141.$ This shows that at 20,000 ft. the speed at which the resistance (and the lift) is the same as that at 100 m.p.h. at ground level is 141 m.p.h., or an increase in speed of 41 per cent. At 40,000 ft. the speed for the same resistance would be $= 100\sqrt{4} = 200$ m.p.h., or twice the speed attained at ground level. On the face of it, therefore, it would appear to be a comparatively simple matter to double the speeds attainable at ground level. Unfortunately this is not the case, for reasons to be pointed out hereafter. In order to understand clearly these reasons, it will be well to commence with fundamental principles. One horse-power is equal to 33,000 ft.-lbs. per minute, or 550 ft.-lbs. per second. If, therefore, an aeroplane has a resistance of 550 lbs. at a speed of 1 ft. per second, it will require 1 h.p. to drive it at that speed, assuming an airscrew efficiency of 100 per cent. If, now, the speed is doubled —that is to say, increased to 2 ft./sec.—the resistance will be four times as great, since the resistance varies as the square of the speed. In other words, the resistance will be 550 × 4 = 2,200 lbs. This represents a horse-power of $\frac{2{,}200 \times 2}{550} = 8.$ We therefore see that while the resistance varies as V^2, the horse-power varies as V^3. A similar reasoning may be applied to the thrust of an airscrew. The horse-power delivered by an airscrew is compounded of two factors ; the thrust and the "translational" speed. By translational speed is meant the forward and not the rotational speed. If, therefore, a propeller is giving a thrust of 550 lbs. at a translational speed of 1 ft./sec., it is delivering 1 h.p. If this propeller is mounted on an aeroplane fitted with an engine of 1 h.p. it is evidently giving 100 per cent. efficiency. If, now, the translational speed is doubled—that is, increased to 2 ft./sec.—the thrust will be halved, since otherwise thrust multiplied by translational speed would not equal 550 ft.-lbs. per second = 1 h.p. It is, therefore, seen that even when the engine power and the airscrew efficiency remain constant the thrust decreases with speed. As already mentioned, these figures relate to an airscrew of 100 per cent. efficiency. In practice such an efficiency is, of course, never attained.

From the foregoing it should be clear that we can write a formula giving the thrust in pounds of an airscrew of any efficiency and at any given translational speed. The thrust varies *directly* as the horse-power, *directly* as the efficiency and *inversely* as the translational speed. Clearly, therefore, the formula for thrust may be written :—

$$T = \frac{550 \times \text{h.p.} \times E_p}{V} \qquad (3)$$

where T = thrust in lbs.,
h.p. = brake horse-power developed by engine,
E_p = the efficiency of the airscrew, expressed as a decimal,
and V = the translational speed in ft./second.

It will be seen that the requirements set out above—that the thrust varies *directly* as the horse-power, *directly* as the efficiency, and *inversely* as the translational speed—have been met, since clearly if, in the formula, the horse-power is doubled the thrust will be doubled, or if the efficiency be doubled, the thrust will be doubled, or again that if the translational speed is doubled the thrust will be halved, since V is the denominator in the fraction.



From (3), it will be seen, it is possible to plot a series of curves giving the thrust per horse-power at various (constant) efficiencies and translational speeds. This has been done in Fig. 1, in which has been plotted the thrust per horse-power at efficiencies of 70 per cent., 75 per cent. and 80 per cent., and at translational speeds ranging from 50 m.p.h. to 200 m.p.h. It will be seen that for an airscrew of constant efficiency of 80 per cent. the thrust has dropped from 6 lbs./h.p. at 50 m.p.h. to 1·5 lbs./h.p. at 200 m.p.h. From (2) it was seen that to keep the resistance (and lift) the same as at ground level, the speed at 20,000 ft. was increased by 41 per cent. Also it has been shown that the horse-power required varies as the cube of the speed (when the efficiency remains constant). Owing to the decrease of thrust per horse-power with speed it is not possible to attain the speed indicated by (2). The speed which can be attained, on a basis of constant horse-power and efficiency, is indicated by a formula similar to (2), but in which cube root is substituted for square root (because the horse-power varies as the cube of the speed). This formula then becomes :—

$$V_a = V_o \sqrt[3]{\frac{\rho_o}{\rho_a}} \qquad (4)$$

For constant power and efficiency, therefore, the speed attainable at 20,000 ft. with a machine doing 100 m.p.h. at ground level will be :—

$$V_a = 100 \sqrt[3]{\frac{\cdot 0051}{\cdot 00255}} = 100 \sqrt[3]{2} = 100 \times 1 \cdot 259 = 125 \cdot 9 \text{ m.p.h.}$$

The increase obtainable on this basis is, therefore, 25·9 per cent. Even this speed, however, is not quite attainable, as a few minutes' consideration will show. The speed indicated by (2) is that at which the resistance (and therefore the lift, as both vary at the same rate) is the same as at ground level. It has been shown by (4) that this speed is not attainable, the figures for the necessary speed and the attainable speed being 141 m.p.h. and 125·9 m.p.h. respectively. Obviously this will mean that the aeroplane will have to make up for the loss of lift resulting from the lower speed by flying at a greater angle of incidence. For all ordinary machines this will mean a slight increase in resistance, so that even the speed indicated by (4) will not be attainable. The speed which is actually possible will vary according to the machine, and perhaps the best indication of what the loss in speed will amount to for a given machine may be given by a numerical example.

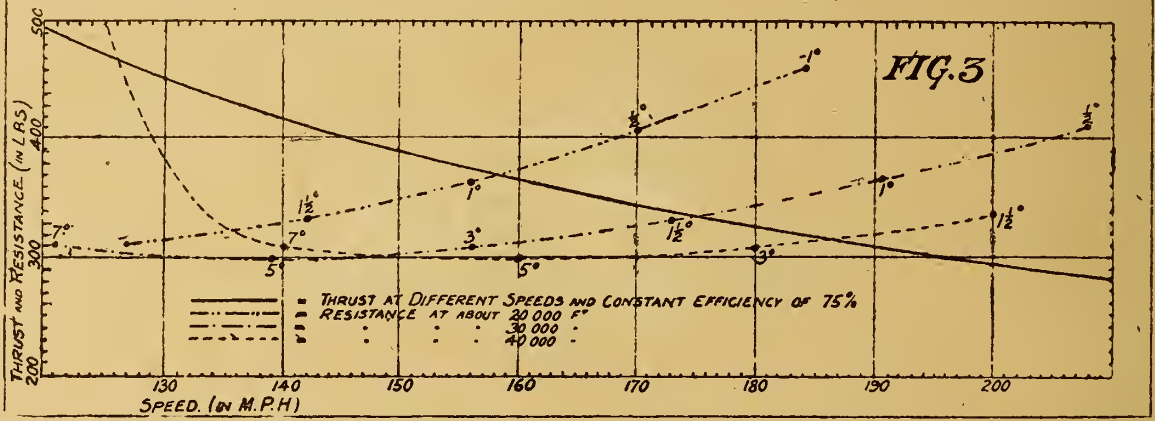


FIG. 3

Fig. 2 shows the performance curves of a single-seater machine, weighing 2,100 lbs. "all on," with an area of 245 sq. ft., and having an engine developing 210 h.p. At ground level, it will be seen, the maximum speed is 130 m.p.h., and a landing speed of about 57 m.p.h. The maximum speed at ground level is only obtainable by flying at a slight negative angle of incidence. We will now imagine that this machine is fitted with means for maintaining both the horse-power and the airscrew efficiency. (The curve of thrust in Fig. 2 was plotted for an airscrew of ordinary type, of which the efficiency varies considerably with the speed). If it is assumed that the propeller efficiency remains constant at 75 per cent. and the horse-power at 210 h.p., we can plot, from (3) a curve of thrust in lbs. for various speeds. This has been done in Fig. 3 for speeds ranging from 120 m.p.h. to 210 m.p.h. From the curve of total resistance in Fig. 2 we can plot other curves for different altitudes (or densities) of speeds at which the resistance and lift is the same as that at the same angle of incidence at ground level, using equation (2). Three such curves have been plotted in Fig. 3, for altitudes of 20,000, 30,000 and 40,000 ft., or, more correctly speaking, for altitudes at which the density is ½, ⅓ and ¼ that at ground level. These curves bring out several interesting facts. For instance, the speed has been increased from 130 m.p.h. to 158 m.p.h., equivalent to 21·5 per cent. At 30,000 ft. the increase in speed is from 130 m.p.h. to 175 m.p.h., or 34·6 per cent. At 40,000 ft. the maximum speed is 186 m.p.h., or 43 per cent. greater than that at ground level. This indicates that, other things being equal, the greater the altitude, the greater the gain in speed.

It has already been mentioned that to make up for the lift lost through not being able to attain the speed at which the lift is the same as that at ground level, the machine would have to fly at a greater angle of incidence. This is clearly brought out by the curves of Fig. 3. While the maximum speed at ground level (for straight, non-climbing flight, of course) had to be made at a slightly negative angle of incidence, at 20,000 ft. the angle is nearly 1°, at 30,000 ft. nearly 1½°, and at 40,000 ft. about 2½°. Purely from the point of view of the planes themselves, this is an advantage in making for greater economy, since the maximum L/D ratio usually occurs somewhere between 2° and 4° incidence. On the other hand, for flying at "cruising speeds"—that is to say, at speeds somewhat below the maximum—the angle of incidence would again be increased; in other words, would be greater than that corresponding to maximum L/D.

It will have been noticed that in the foregoing it has been assumed that the constant airscrew efficiency and the maintenance of power have been obtained without the addition of extra weight. In practice this would not, of course, be so, and an allowance should be made for the extra weight of the supercharger—assuming such a machine to be employed for maintaining the power, and also for a certain loss of power utilised in driving the supercharger. After making such allowances, the speeds attainable would be somewhat lower than those indicated by the Chart, Fig. 3—how much lower would depend upon the efficiency of the means used for maintaining the power and the airscrew efficiency.

Another point which has to be taken into consideration is that at such great altitudes some provision would have to be made to enclose the pilot and passengers in an airtight cabin in which a pressure could be maintained equal to tha at ground level. This again would add to the weight of the machine, and tend to reduce the speed. On the whole, therefore, it will be seen that there are numerous problems which have to be successfully tackled before any very great increases in flying speeds can be attained. The field is, however, one which offers great possibilities, and there is little doubt that in time some very good results will be obtained.

Broadly speaking, there are four distinct ways available for maintaining the power of an engine. The first is that of carrying a supply of oxygen, and using this to make up the deficiency in oxygen as the altitude increases. This method is scarcely likely to prove of great value, owing to the weight of the cylinders. The second consists in raising the compression of the engine and taking steps to prevent a full charge from being taken in while at low altitudes. The third method is that of "over-dimensioning," which will make for a slightly heavier engine. It is more than probable that the most successful method will be found to be a combination of high compression and over-dimensioning. Finally, the fourth system is that known as supercharging, by which is meant the maintenance of a constant pressure in the induction pipe, equal to that at ground level. This may be accomplished in various ways. For instance, in the superchargers built in America, which follow the principle first suggested by Rateau, the energy of the exhaust gases, which would otherwise be lost, is partly recovered by means of a turbine, driven by the exhaust gases, driving a centrifugal blower which delivers air under pressure to the induction pipes of the engine. In Germany, on the other hand, experiments have been made with centrifugal blowers driven direct by means of gearing from the engine. As yet it is not possible to say which method will prove superior, both having given promising results.

For multi-engined machines it would be possible to carry an auxiliary engine driving the blower supplying air to the main engines, and this also has, I believe, been tried in Germany.

HONOURS

It was announced in a supplement to the *London Gazette* on November 18, that the King has approved of the following rewards, conferred by the General Officer Commanding the North Russian Expeditionary Force :—

Distinguished Service Order

Squad. Leader (A./Wing Comdr.) **Robin Grey** (Gren. Gds.).

Commanded the R.A.F., Archangel Area, with great distinction. Owing to the lack of pilots and observers during the winter, he carried out personally the most dangerous reconnaissances. On April 8, 1919, at Obozerskaya, he carried out a reconnaissance in bad weather, bringing back valuable information. On April 22, he carried out two most important reconnaissances with success, but met with a bad accident on landing the second time. Although considerably shaken physically, he continued to command the R.A.F. with marked success until the conclusion of the operations in North Russia.

Flight-Lieut. **Norman Gordon Stewart-Dawson**, D.S.C.

Successfully led several raids with great success during the operations with the "Syren" Force in North Russia from June to September, 1919, notably in the attack on the enemy at Koikori on September 7. Flight-Lieut. Stewart-Dawson has displayed exceptionally good qualities in leadership during these operations in the air, and equally distinguished services in ground-work organisation, where the difficulties were many.

Bar to the D.F.C.

Observer-Officer **Parcell Rees Bowen**, M.C., D.F.C. (5th Welsh R.).

On August 24, 1919, whilst observer on reconnaissance over the enemy aerodrome (Toima), he was fired upon at long distance range from an enemy machine, both himself and the pilot being wounded. The pilot having collapsed from his wound on to the controls, Observer-Officer Bowen managed to guide the machine from the back seat and flew homeward for a distance of 100 miles, by which time the pilot had slightly recovered and took control of the landing, which was safely made on the Bereznik Aerodrome. This officer's action was highly meritorious, and the guiding of the machine over a long distance was especially noteworthy in view of the wound which he had sustained in the right elbow.

Flying Officer **John Sharpe Griffith**, D.F.C.

Between May 5 and July 24, 1919, this officer carried out 40 bomb raids and reconnaissances, all with great success and generally from a low altitude. On June 3, 1919, he dived to within 100 ft. of the ground and destroyed an enemy balloon, as well as several of its attendants. When a two-seater machine was not readily available he fitted a camera to his scout, and, although it is very difficult to take photographs from such machines (and, moreover, he was inexperienced in such work), he succeeded in taking a very good mosaic which proved of great utility to the Commander of the Vologda Force. Flying Officer Griffith is an intrepid pilot and a very skilful all-round officer.

Flying Officer (A./Flight-Lieut.) **Frederick Ives Lord**, D.F.C.

On June 27, 1919, whilst piloting an R.E. 8 machine, he found the position of the enemy on the Pinega River, four versts from Pilegori, and attacked the moving columns from a height of 200 ft. with such effect that their transport was stampeded and their expected attack broke down, without any casualties being sustained by our forces.

Distinguished Flying Cross

Flying Officer **Cyril Arthur Bouchier.**

A very skilful pilot of marked initiative and courage. Has been brought to notice on many occasions for the determination shown in his attacks. His methods are somewhat original. By flying low, parallel with and behind the enemy's lines, stampeding convoys and destroying wagons, he has caused the greatest confusion amongst the enemy to the great advantage of our own forces. Flying Officer Bouchier is a highly competent reconnaissance officer.

Flight-Lieut. **Oliver Campbell Bryson**, M.C., A.M. (Dor. Yeo.).

Has commanded a squadron of heavy bombing machines in North Russia during the whole of the summer of 1919, during which period he carried out a large number of successful raids on the enemy's territory. During the operations on the Dwina in August, and on the Pinega in September, 1919, he flew a Snipe machine with exceptional skill and daring. A very gallant officer he has proved himself during these exceptionally difficult aerial operations.

Flight-Lieut. (A./Squad. Leader) **Charles Roderick Carr.**

On June 17, 1919, this officer flew a scout machine over the enemy aerodrome at Puchega, at an average height of only 50 ft. for 30 minutes. During this time he succeeded in setting fire to a Nieuport enemy machine, to a hangar which contained three aeroplanes (all of which were destroyed), drove all the *personnel* off the aerodrome, and killed some of the mechanics.

Observer Officer **Frederick Talbot Eades.**

On June 9, 1919, whilst serving with the "Syren" Force in North Russia, this officer was on night patrol (observer) in heavy rain, investigating the enemy's position off Schunga, on Lake Onega. Their position was attacked from a height of 300 ft. by machine gun and bombs, the latter being thrown from the observer's cockpit. Having expended all ammunition, the machine returned to base, and after refilling, again attacked and drove one gunboat ashore. A second gunboat was later seen to be in tow, presumably damaged in the attack. On the night of June 11 this officer was observer in the seaplane piloted by Flying Officer Isaac, when the enemy's line was twice cut, the machine sustaining considerable damage in the second attack.

Flying Officer **Harold Alfred Haines.**

During June and July, 1919, this officer performed numerous acts of gallantry in the operations of the "Syren" Force, North Russia. His work has been characterised by care and judgment, coupled with a total disregard of personal danger. He has taken part in numerous actions against the enemy from a very low altitude, and consequently at great risk, which resulted in the infliction of heavy casualties and great damage being done to the enemy's rolling stock, ships, and bridges.

Pilot Officer **Bernard Allen Heeney.**

During the entire winter in North Russia this observer officer flew almost continuously over the enemy's lines on reconnaissance duties, under very arduous and dangerous circumstances. Pilot Officer Heeney was severely wounded on June 20, 1919, whilst flying very low, assisting our Allied troops.

Flying Officer **Frederick Harry Isaac.**

On June 11, 1919, whilst serving with the "Syren" Force in North Russia, this pilot was on patrol endeavouring to prevent reinforcements from reaching the enemy's front; he descended to within 50 ft. of the ground, and, whilst exposed to heavy fire, succeeded in cutting their line, with bombs. During the night the enemy repaired the line, and Pilot Isaac on hearing of this proceeded to the scene and again destroyed it from a height of only 30 ft., his machine sustaining heavy damage from the enemy's fire, as well as from his own bombs. The gallantry and determination of this officer will be more readily appreciated when it is borne in mind that his machine was a seaplane, operating seven miles inland.

Flying Officer **Arthur Edward Lettington.**

During the operations of the "Syren" Force in North Russia, from July to September, 1919, this pilot has proved himself a gallant officer, with marked ability and initiative. In machine-gunning the enemy from very low altitudes he has met with signal success. On August 3, 1919, in co-operation with our Lake Flotilla off Tolvuya, he descended and attacked the enemy quite near the water, in the face of concentrated machine-gun fire, which resulted in the capture of the town and three of the enemy steamers. Many other instances are recorded wherein this officer displayed gallantry of a high order in circumstances of great difficulty.

Flying Officer **Lloyd Wesley Mason.**

This officer has shown great dash and courage whilst flying a Snipe at extremely low altitudes. He has taken part in operations throughout the summer both on the Dwina and Railway Fronts, and has attacked many targets with his machine guns, dispersing troops and breaking up counter-attacks. In an attack on Puchega Aerodrome he descended very near the ground in an endeavour to silence machine guns which were concentrating on his squadron-commander's machine.

Flight-Lieut. **Alfred Price Maurice.**

Commanded the R.A.F. unit at Obozerskaya since May 5, 1919, with marked success, proving himself a most capable and reliable officer adapting himself readily to the unusual and often unfavourable conditions. Flight-Lieut. Maurice has constantly carried out reconnaissances over the enemy's lines in dangerous circumstances, and has conducted bomb raids from low levels, notwithstanding the strong opposition from the enemy's anti-aircraft guns and machine guns.

Flying Officer **John Percival Morkam** (Northants R.).

For more than six months, including the coldest and most inclement portion of the Arctic winter, this officer has displayed marked qualities of good leadership. In May, 1919, great efforts were made to prepare a forward summer aerodrome, but not with much success, and owing to the unsuitability of the available machines all attempts to rise from it failed—in one of these attempts at rising Flying Officer Morkam's machine was smashed and he himself severely injured. Notwithstanding these difficulties this officer, under urgent necessity, voluntarily undertook a reconnaissance flight of three hours over unknown and unmapped country, and returned with very valuable information, his petrol being absolutely exhausted on alighting. The nature of the country is such that no landing was possible anywhere on the return journey until his own base was reached. ("Syren" Force, North Russia.)

Flight-Lieut. **Walter Henry Park**, M.C.

An exceptionally good pilot who has displayed marked ability and courage during the operations with the "Syren" Force in North Russia. His service flights have been specially praised on six occasions by the Commander of the Forces during a period of three months, and his determination in pressing home the attacks on the enemy contributed in a large measure to the success which attended the work of the Air Force.

Observer Officer **Edward Eric Spencer Wheatley** (R.A.).

Has rendered valuable services in artillery observation from low altitudes, having been mentioned several times for this work. During the operations on the Dwina in June, 1919, he carried out many contact patrols, flying very low over the heads of the enemy, keeping our headquarters constantly and accurately informed as to the position.

Distinguished Flying Medal

No. 207177 Sergt. **Charles Victor Robinson**, late 205th Squadron, R.A.F. (France).

On May 18, 1918, whilst acting as observer in a bombing attack on Chaulnes Railway Junction, his formation was attacked by seven enemy scouts. His machine was attacked simultaneously by two of these, one of which he shot down in flames. On the previous day he dropped a 112-lb. bomb on this junction, causing a great conflagration. Sergt. Robinson has carried out 100 successful bombing raids, and is a most reliable observer.

The King has approved of the award of the Military Medal for bravery in the field to No. 26712 Flight Sergt. **Edward Wardell** (Putney), R.A.F., for gallantry in numerous actions extending from June, 1917, to the close of the War.

AIRSHIPS

AIRSHIP ENGINEERING PROGRESS IN THE UNITED STATES

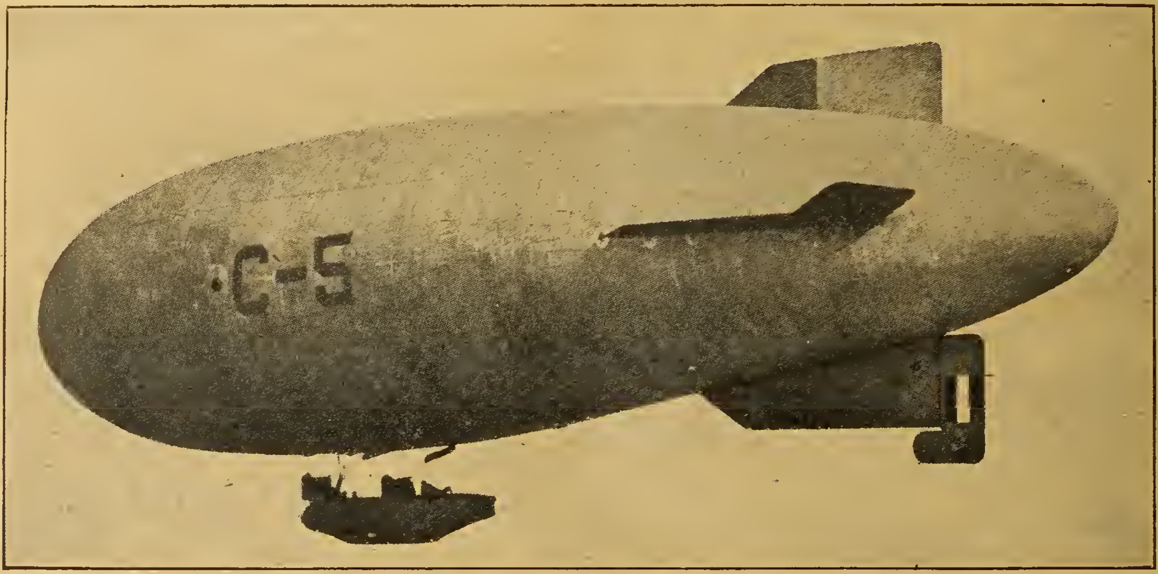
By J. C. HUNSAKER, Eng. D., Commander, Construction Corps, U.S. Navy

(*Concluded from page* 1477)

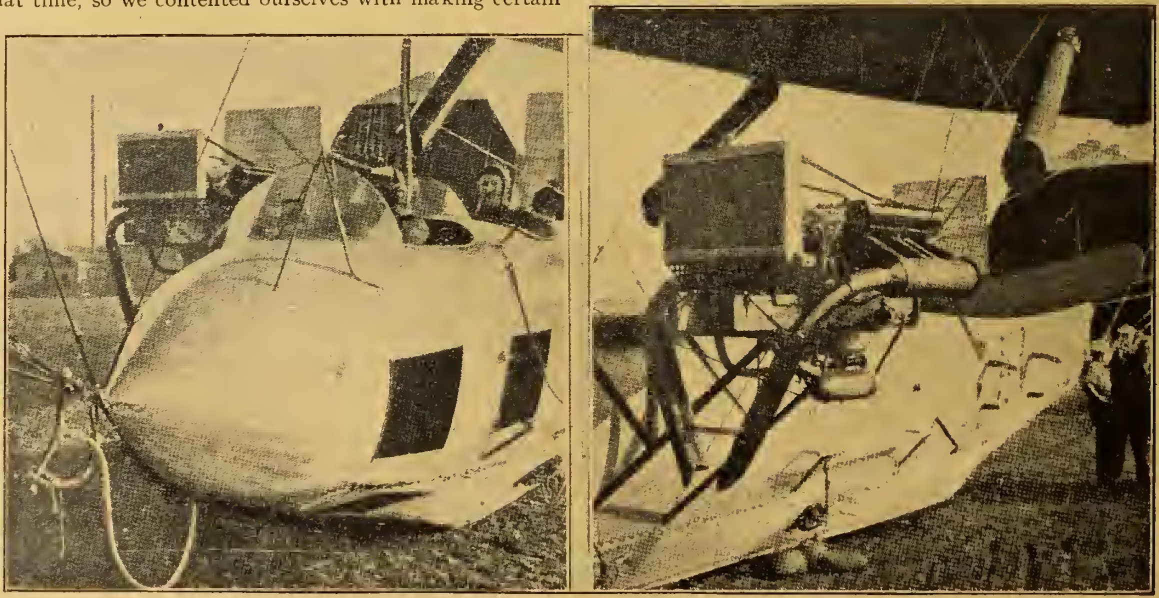
Construction of Rigid Airships

THE employment of Zeppelins by the Germans for naval purposes was so successful that it was obviously necessary to make some sort of provision for their construction if we desired to keep up with the times. The task of building such tremendous structures while in the midst of an intense campaign of war preparations was too much to be undertaken at that time, so we contented ourselves with making certain that all of the materials required would be available when the proper time came.

One of the most difficult materials required was the aluminium alloy for the structural frame, which had never been manufactured in this country. Inquiry regarding this was sent to the Aluminium Co. of America in 1916, and they



The U.S. Navy C-5 twin-engine dirigible, which flew from Cape May to Newfoundland during an attempt to cross the Atlantic



The "bows" of the C-type car, and on the right the port engine of a C-type dirigible

undertook, in co-operation with the Bureau of Standards, to produce such material. They were given samples of German Zeppelin wreckage obtained abroad. This was analysed, duplicated as to chemical composition, but did not develop the desired strength until a correct heat treatment was finally hit upon. Experimental girders were made up for test to get design data and to develop the manufacturing processes in manipulating the alloy. I am very happy to say that, after two years of work, an American alloy has now been produced which appears to be satisfactory in every way and to exceed slightly in strength and elongation the original German samples.

This is an alloy of aluminium containing about 4·5 per cent. copper with smaller amounts of manganese, magnesium and silicon. In the soft condition as it comes from the heat treating bath the tensile strength is about 40,000 lbs., but in 24 hours it seasons and hardens to 60,000 lbs. tensile (15 per cent. elongation). It therefore duplicates mild steel in strength, but weighs less than half as much. In the soft condition it may be bent, stamped and worked cold into useful shapes, and will harden afterward without subsequent warping or heat treatment.

We knew that the German gas cells were made of a cotton fabric covered with goldbeaters' skin, which was of a high degree of resistance to the passage of gas, but we had no knowledge of the processes by which this delicate membrane was attached to the fabric or kept in proper condition. Experiments were begun at an early date, and are continuing up to this time, on various methods of attaching goldbeaters' skin to the cloth, and we now have two successful methods, each presenting advantages over the other and each resulting in a fabric of high quality. One method uses the skins green as they come from the pickle, and the other requires preparation into a sheet, which is then fixed to the cloth by a cement much in the same fashion as rubberised fabric is plied together.

Fabric showing diffusion as low as 0·2 litre per square metre has been produced weighing only 5 oz. per square yard. (The notation appears mixed, but is that of the chemist in the first case and of the textile trade in the second.)

There has been a continuous endeavour both here and abroad to produce some sort of an oil or compound which might be applied to cloth and which would give the same resistance to the passage of hydrogen as goldbeaters' skin. So far nothing has been discovered equal to goldbeaters' skin—that is, nothing of similar weight. Our experiments, however, have resulted in the development by Lieut. H. A. Gardner, of the Bureau, of tung oil coatings, which approximate the resistance to permeability of goldbeaters' skin very closely. When varnished they equal the true skin, and are only slightly heavier.

Special engines for airships have not been developed in the United States to any extent, and we have been using aeroplane engines running at reduced power to get reliability. This necessitates changes in oiling and different jets for the carburettor. The airship engine should resemble the automobile engine more than the aeroplane engine. It normally runs at from one-third to one-half full power; only in the case of a strong head wind is full power called for. The aeroplane engine always runs full power at the start and when climbing, and not below three-fourths power the rest of the time. Ten or twelve hours is a good run for heavier-than-air craft, but in an airship we have already cruised for 40 hours with one of our little ships, and the British record is over 100 hours. The Union Gas Engine Co., of Oakland, Calif., has attacked the problem of producing an airship engine, and their six-cylinder engine will be the standard equipment for all airships of the C and D classes. It has shown great reliability and very low fuel consumption over a wide range of powers.

The Liberty engine is apparently one of the most versatile of creatures. Lacking a large engine similar to the Maybach, we turned to it as a possible airship engine, and found that at from 250 to 300 h.p., the power of the Maybach, the Liberty was at least as economical, no heavier, and apparently as thoroughly reliable and capable of operating for indefinite periods.

One of the greatest problems in connection with the rigid airship is that of maintaining the ship at a constant elevation as the fuel is burned out. Ordinarily this means that, as the ship grows light, gas must be valved, and the possibility of rising to greater heights in the future is consequently reduced. There have been many projects put forward for the prevention of this, including the taking up of water from the sea and the condensation of the moisture in the exhaust gases. Theoretically it should be possible to recover from the exhaust gases of the engine one and a-quarter times the weight of the gasoline burned, but so far no one has ever succeeded in doing this with an apparatus which is practicable for use on an airship. The Bureau of Steam Engineering has, however, been conducting experiments, and has developed an apparatus which has succeeded in condensing as high as 99 per cent. of the weight of fuel burned and has kept the weight within practicable limits. When it is considered that the best previous record for a similar apparatus which could be carried in the air was about 55 per cent., it is believed that a notable improvement in airship operation is due.

In discussing lighter-than-air progress, I should like to point out that while the airship is now being pushed by the Navy, we have had a late start. Compared with the NC flying boat, which is in advance of anything in the world, our best airships, the C class, while as good or better than any of equal size, are very small indeed compared to a Zeppelin. Consequently, we may expect progress in airship design in the United States to be more rapid in the next few years than in seaplanes.

Front view of the car of the C-type twin-engine dirigible

AIRSHIPS FOR THE NAVY: SOME SUGGESTIONS FOR THEIR DEVELOPMENT

BY RAFEX

Now that the transfer of airships to the Air Ministry has been consummated by the removal of the staff from their isolation in Westminster, it is perhaps opportune to put forward various ideas for the development of airships in the future which have been maturing in the mind for the last six months or so. It is proposed to deal not with the commercial aspect, which may safely be left in the hands of the airship transport company which is gradually being evolved, so much as with the Service side—which is not a fashionable topic of the hour, but is none the less important. As a result of the sale of R 38 to America, there is grave reason for anxiety as to the provision of airships for work with the Fleet in the future. It is, perhaps, not fully realised that the Government do not propose to retain for Service purposes any of the ships now building—that is to say, R 34, which is a copy of a German design of 1916, will be, unless and until a change of policy arrives, and a new programme decided upon, our only rigid airship of even approximately modern design. R 80, R 36 and R 37 are all to be disposed of to commercial enterprise when completed. Now it is perfectly manifest that it takes at least twelve months, and a safer estimate would be eighteen months, to put into the air a rigid airship, counting from the moment that design work is commenced. Such design work is based not only on constructional experiments and experience gained during the building of previous classes, but, to an at any rate equal extent, on points arising during extended trials both in the air and on the ground after the ship is put into commission. Anyone who has had any experience with aircraft knows the defects and openings for improvement which constantly become manifest with increasing experience. The whole of this experience will be lost in the case of R 38; or, rather, will be lost to this country, but gained by America. As she is the largest rigid airship that has yet been constructed, we are, therefore, in effect, selling to America the chance of becoming pre-eminent in airship design for the sum of half-a-million pounds. Even in these days of retrenchment the price hardly seems adequate.

As it is now too late to cancel the sale of R 38, it would appear at least advisable to recommence work on R 39 (her sister ship), which should be completed and used for naval work; and to prepare for the production of a minimum of at least two rigid airships per year in order that a certain steady development in design may take place. If this is not done, and done quickly, in eighteen months' time we shall be definitely out of the race for naval rigid airship supremacy. This is not a "scare" headline of the yellow press; it is merely an only too obvious deduction from the facts. The Government attitude is, of course, that they are relying upon commercial enterprise to pull the irons out of the fire for them. But whence is that assistance coming? There is in process of gradual evolution an Airship Transport Co., based upon the analogy of the big shipping companies, such as the White Star and the Cunard. This company will not, presumably, design, but will merely operate airships designed and built by the constructional firms. The proposal appears to be that this company shall commence with one airship station—probably Pulham—at which airships purchased from the Government shall be based. These will be some or all of R 33, R 80, R 36 and R 37. One fact at any rate which is abundantly clear is that unless the capital of this company is to be of dimensions which are beyond all reasonable probability, it will be at least three or four years before it is in a position to give orders to the constructional firms for any airships specially designed for commercial purposes. Unless, therefore, orders are to come from the Government, it is difficult to see how the constructional firms are to be able to afford to keep together skilled employees for the purpose.

From all of which it follows that the Government cannot reasonably look to commercial enterprise for assistance before the end of 1924 at the earliest. In the meantime, the whole rigid airship constructional and (private) design resources of the country will in all probability have turned to other work, and we shall have been overtaken by America and France as well as Germany. It appears, in fact, as if the Government were at least four years too soon in cutting down their own programme and relying upon commercial enterprise.

The whole question of rigid airship design in this country is an exceedingly difficult one. There are only two design staffs in the country. One is the official designers who have been at the Admiralty—detailed for the work from the Department of Naval Construction—and are now going over to the Air Ministry for a six months' trial to see how they like the new régime. The other is the airship design department of Messrs. Vickers at Barrow-in-Furness, who are responsible for R 80. Of these there is no question—whatever may be the opinion of their competence—but that the former have had immeasurably the greater experience and should possess the greater knowledge, owing to their familiarity with German practice from a study of Zeppelins, both in this country, and, since the Armistice, in Germany. It is equally unquestionable, from past experience with aeroplanes, that the organisation from which the best results are obtained is to place the responsibility for producing new designs upon the firms, while the officials concerned, in the department of the Director-General of Supply and Research, check and criticise the designs. This is, however, impossible unless the constructional firms can rely on orders from which they are to draw the necessary profits upon which to pay their design staffs. It is to be feared that the old error of the Royal Aircraft Factory may be repeated in the case of airships and a staff employed upon the preparation of official designs, while at the same time being called upon to criticise the designs of outside firms. This should not be permitted, but it is difficult to see how it can be avoided during the next four years if no Government orders for rigid airships are to be given. As soon as commercial airship services develop this difficulty will be overcome, as there will then be private orders which will make it worth the while of constructional firms to employ design staffs.

There is, or was (I believe it is not yet abandoned), a move in some official quarters which would make the present position worse. It is proposed to establish at an existing constructional station an "airship dockyard"—analogous to the "Factory" in the old days—at which the Government would themselves construct airships to their own designs. This scheme, if allowed to go through, would be not only an unjustifiable charge on public funds, but would further reduce the prospective work for the design staffs of commercial firms; while tending to perpetuate the evil, pointed out above, which was only eradicated after several years and much agitation in the case of aeroplanes.

Up to the present one has been confining one's remarks to airships of the rigid type, but the position is much the same with regard to non-rigids; with the proviso that it is, if anything, slightly worse. During the last year there has not been a single non-rigid airship designed since the Armistice produced from any source; whilst, since the early days of 1915 no non-rigid airship has been commenced in this country to other than official designs. In other words, the practical knowledge of the results of design and experience in rigging is entirely in Service hands; while even official design has been completely stagnant for twelve months. This somewhat lengthy preamble has been necessary in order to clear the ground for certain suggestions which it is hoped will be found of a constructive nature. In the first place, it is desirable to provide any firm interested in the design and construction of airships with the fullest possible information from official sources of the experience gained during the last five years in the design of airships—rigid and non-rigid. Secondly—unless it be decided that airships will not be needed in future naval operations—a definite programme, however small, of airships for Service purposes should be laid down by the Government in order that the gap may be bridged until commercial airship services develop. Full specifications should be issued, designs invited, and tenders subsequently asked for. In this way the firms will be assured of a certain number of orders, while the Service will have progressively improved airships with which to train and experiment. What is perhaps an even more important matter is the organisation of Service experimental work. Up to the present, owing to the airship staff being isolated at the Admiralty, there has been no possibility of co-operation and conjoint working with the aeroplane experimental staff. If the proposed "airship dockyard" scheme comes to fruition, or if the airship experimental work is centred at Howden, this state of affairs will be perpetuated and one of the chief advantages of the transfer to the Air Ministry lost. To avoid this I suggest that all "constructional" experiments—*i.e.*, those on girders, fabric, hydrogen, etc.—as opposed to flying experiments, should be carried out at the Royal Aircraft Establishment. This would be economical in abolishing duplication of staff and machinery, while having the inestimable benefit of ensuring that airship and aeroplane experiments, the results of which are in many cases interchangeable, proceed side by side under the same roof. There would be no need for the erection of airship sheds at Farnborough, as it is not proposed to carry out flying experiments there. In fact, it is doubtful whether it would mean any increase at all, except possibly for a very small number of special instruments for testing purposes, in the existing resources. Presumably the existing practice would then be followed, in the case of non-rigid airships, of putting out the various parts to firms for construction. Until some commercial enterprise develops, it would probably continue to be necessary for these parts to be delivered to the Service—presumably now at Howden, since that is the only station to be retained—who would rig the ship and put her through the necessary tests.

In this way a continuity of improving types—if not an adequate fleet—of airships would be ensured to the Navy until the time arrives when commercial enterprise will supply a nucleus which could be converted to war purposes in emergency. Otherwise we shall cease to progress, and merely stagnate in the condition of development which we had reached in November, 1918, with the training and experimental airships gradually becoming fewer and fewer as they disintegrate through old age. In the meantine we have a steady flow of necessary constructional experiments proceeding at the minimum cost and with the maximum of efficiency owing to advantage being taken of the enormous experience gained with aeroplanes during the War. It is frequently too little realised how many points the airship and the aeroplane have in common, emphasis usually being laid upon their dissimilarities.

◆ ◆ ◆ ◆

HIGH ART IN PHOTOGRAPHY

Owing to the difficulty of obtaining the use of a suitable gallery this year, the 64th Annual Exhibition of the Royal Photographic Society of Great Britain has found its home at 35, Russell Square, W.C., where the series of fascinating photographic studies will be on view until November 29. Considering the charge for entrance—viz., free to all—we fail to see where the profit comes in, let alone profiteering. Even if a reasonable charge for admission were made, it should receive goodly patronage in acknowledgment of the efforts of the Society to maintain the high standard of art which is evident in so many of the works seen on the walls. All tastes are catered for from the more popular pictorial subjects to the highest technical photographic results. From abroad, in little known countries, are some remarkable records of South Pacific natives in all their natural surroundings.

In one from German (pre-War) New Guinea of the "Duk-Duk" man, what appears to be a huge grotesque head-gear of kinds is the attraction. It is to be hoped some observant milliner does not blow into the show and obtain inspiration from this unique study. The police would certainly have to interfere at its advent at any matinée.

The rooms devoted to pictorial photography contain most of the pictures on show, and in the main room are to be found many Rembrandt effects which are reposeful and almost reach the pitch of the most cherished traditions of the brush artist. So delicate are some that they surpass even the most cleverly executed etchings, and with the artists' signatures attached convey a merit far beyond the intrinsic value placed upon them in the catalogue. The nude is well represented, and is surpassed only by some of the studies of diaphanously draped figures. Portraiture finds original and varied expression, whilst in No. 12, a portrait study of the "Little Wizard," a sepia platinotype by Miss Olive Edis, is found the Prime Minister to the life. Mr. Lionel Wood is well represented on the walls, and we wish we could say that his "Aeroplane Banking" were up to the quality of the other work of this artist. Coloured photographs also afford a diversion.

A set of colour transparencies stand as examples of what perfection can be obtained in reproducing nature in its colours by this process. Each plate is a study in itself, and brilliancy is ingeniously obtained by reflection through the negative, set at an angle, on to mirrors.

What particularly interests students of aviation is found in the room devoted to technical subjects. No. 231 is a radiometalogram of the cylinder of a Le Rhone engine, taken in four sections and pieced together to show entire cylinder, by Hector Pilon and Geoffrey Pearce.

Next to this is No. 232 showing the examination of aircraft materials by X-rays. There are six plates by Maj. G. W. C. Kaye and Dr. Robert Knox, F.R.P.S.

No. 1 shows front and side views of a wooden aeroplane-spar built up of three laminæ glued together. The centre layer is seen to contain forbidden knots and worm holes, and the spar was rejected.

2. Radiograph of high-tension wireless cable for a seaplane. The insulation is of rubber. On external examination defects were suspected. The nature of these defects is clearly disclosed by the radiograph.

3. Radiograph of wing skid, showing that the strut had been cut off too short and that a false packing-piece "B" had been inserted at the bottom of the aluminium socket.

4. Front and side view of end of box strut, built up largely of plywood. The radiograph reveals defective workmanship, the wooden end-block being misshaped and split by screws.

5. Front and side view of a spliced joint in an aeroplane spar. The joint could not be seen owing to its being completely covered by glued linen-wrapping. The radiograph revealed the type of joint to be one not authorised, and the spar was accordingly rejected.

The radiograph incidentally shows the difference in opacity of the aluminium washer and the steel wire-holding plate. The difference between the light spring and dense summer growths of the wood (annual rings) is also clearly brought out.

6. Radiograph through a plank of silver spruce. On splitting the plank to discover the cause of the light and dark patches, extensive beetle borings were found. The dark dots proved to be the beetles themselves.

There is also a series of cloud studies taken at two different levels, the work of Mr. G. Auborne Clarke. In the study of meteorology these indicate a valuable field for research. The exhibition, which is open from 11 a.m. till 9 p.m., is, we repeat, free to all, and its interest should not be judged by the absence of admission fee.

◆ ◆ ◆ ◆

Cricklewood to be H.P. Station

As soon as Customs Offices have been erected, the Cricklewood Aerodrome will be the departure and arrival centre for the Handley Page aeroplanes carrying out the air services between London, Paris and Brussels.

No Flying from Weston Sands

For the moment the golfers have prevailed at Weston-super-Mare, and the Council have decided not to allow flying from the sands next season. When the matter was first considered by the Sands Committee, protests against the granting of the concession were made by the golf club and the residents of South Ward. The main point made was that spectators had trampled down the bents and so caused a sanddrift, the removal of which would be an expense to the golf club, while mention was also made of the nerve-strain suffered by certain residents through aeroplanes flying over their houses. The Sands Committee decided to recommend that there should be no more flying from the sands. When the matter came before the Council, there was some opposition, but ultimately it was decided to accept the recommendation. It will therefore be necessary for aircraft companies, wishing to fly at Weston next year to acquire an inland aerodrome. During the past season more than 3,000 passengers were carried in Avro machines.

An Aerodrome for Sheffield ?

A determined effort is being made in Sheffield to secure the Coal Aston aerodrome as a permanent aviation centre, and the Corporation, at the request of the Air Ministry, is to consider the possibility of taking over the ground as a municipal undertaking. A conference of Sheffield manufacturers is to be called also to discuss the question of organising regular air services to and from Sheffield.

Popular R.N.A.S. Reunion

The reunion held on November 8 of R.N.V.R. and R.N.A.S. men who passed through the Crystal Palace Depôt during the War, was so successful that it has been decided to make the reunion an annual event, to take place on the nearest Saturday to Armistice Day each year.

CIVIL AVIATION

The following synopsis of progress of work in the Department of Civil Aviation from May 1, 1919, to October 31, 1919, has been issued by the Air Ministry :—

I.—Introduction

Except for a brief period during Easter week this year, civil flying did not open officially until May 1, 1919, and the six months which have since elapsed forms perhaps a convenient period on which to make a preliminary review of the work done by, and to estimate the future of, the Department of Civil Aviation.

Between February 12—on which date it was announced in the House of Commons that the Government had decided to set up a Department of Civil Aviation — and May 1, the official date of the opening of civil flying, a small staff began to attack the multiplicity of problems and difficulties attending the transition period from War to peace, which had to be met in the commencement of civil aviation. There were the adjustment and redistribution of activities between the service and civil sides ; the framing, with the assistance of representatives from the industry and other experts, of the Air Navigation Regulations for the control of civil flying at home, as distinct from the International Air Convention, governing the regulations for international flying ; the necessity for deciding upon which routes traffic was most likely to follow and develop, and the aerodromes which should therefore, be retained in the general after-War liquidation.

There were also a number of other problems of a kindred nature to assist in the solution of which there were no landmarks, no established precedents and no accumulated experience.

II.—Progress

(*a*) *Relations with Foreign Countries.*—The International Air Convention, which was in the main based on the Air Navigation Regulations drawn up for the control of civil flying at home, was signed on October 14 by 11 out of the 13 nations, which were parties to it, the United States and Japan not yet being in a position to sign.

The terms of this Convention were made public some months ago, but it was considered desirable to anticipate its becoming operative by provisionally opening traffic by air with certain foreign countries, as it was thought that aerial transport firms could not too soon gain experience of running regular international services, both for the benefit of the industry, and the early development of the air routes of the Empire on a commercial scale.

Great pains were therefore taken to make temporary agreements with other countries, and such were concluded with Belgium, France, Holland, Italy, and Portugal, while permission for individual flights was obtained from Denmark, Norway, Spain and Switzerland ; and steps have since been taken which it is hoped will ensure the subscription of Holland, Spain and Switzerland to the International Convention at no distant date, and later of the Scandinavian countries, so that one code of rules for the air will obtain throughout the whole of Europe.

The conclusion of these provisional agreements has enabled British aircraft belonging to commercial firms to visit Amsterdam, Brussels, Christiania, Copenhagen, Lausanne, Madrid, Paris and Stockholm, whilst a demonstration flight for civil purposes carried out by R.A.F. aircraft was made as far as Helsingfors.

Every effort has been made to assist British firms to establish regular services between London and Paris, London and Brussels, and London and Amsterdam.

(*b*) *Reconnaissance.*—Considerable progress has been made with the reconnaissance and development of imperial air routes.

The Cairo-Karachi route has been opened for military purposes, and will be available for civil traffic at an early date. That from Cairo to the Cape has been surveyed, and a chain of landing-places established. Of the latter the section lying in the Union of South Africa should shortly be available for the use of civil enterprise, and the whole route should be capable of being flown on an experimental basis before the end of the year. A full reconnaissance of the route from India to Australia has also been completed.

(*c*) *Air Navigation Regulations.*—The Air Navigation Regulations which came into force on May 1, 1919, were based on War experience and on an estimate of the requirements of civil aviation. In a few directions experience has shown that there are omissions, while in others the Regulations have been found to be somewhat in advance of requirements and their strict enforcement up to the present has proved undesirable. It has not always been easy to administer the Regulations so as to secure the safety of the public without handicapping the expansion of air work, but frequent consultations between the Department and representatives of the industry and the goodwill of all concerned have enabled a very fair measure of success to be obtained in this respect. Any defects in the Regulations or in the method of administering them brought to light by experience are corrected as rapidly as possible.

An Air Navigation Bill, to make operative the International Air Convention recently signed in Paris in accordance with its requirements, is being drawn up under which the Regulations revised to date will be re-issued.

The following approximate figures, which have been supplied voluntarily by certain of the firms engaged in civil air traffic, are interesting as showing the extent of the work carried out, and for the mileage covered, the number of accidents must be regarded as remarkably small.

Number of hours flown	4,000
Number of flights	21,000
Number of passengers	52,000
Approximate mileage	303,000
Total number of accidents	13
Number of fatal accidents	2

	Total Numbers.	Per 1,000 Flights.	Per 1,000 hours flown.
Pilots killed ..	2	·095	·5
Pilots injured ..	6	·286	1·5
Passengers killed ..	Nil	Nil	Nil
Passengers injured	10	·476	2·5

Percentage of passengers injured to those carried, ·019, in other words, for every 5,200 passengers carried only one has been injured.

It will be noted that the great majority of the flights were of short duration.

Indeed, much of the work during the period under review may be said to have been of an educative character. At the same time, since the greater number of accidents occur in getting off and landing, the proportion of accidents to flights made is a truer guide than that for hours flown. The figures clearly establish the fact that firms are intent on securing the safety of the public and also that the regulations in force are in principle suitably designed to attain that object.

(*d*) *Accidents*—Stress has been laid on the necessity for the punctual report and investigation of accidents, as only by this means can the weak points in administration, personnel and material be eliminated and the safety of the public proportionately increased. The organisation for this work built up during the War by the R.A.F. has been absorbed by the Civil Aviation Department. On receipt of the report of an accident involving a fatality, or injury to personnel, or serious damage to a machine, experts are immediately sent to investigate matters on the spot. This work has fortunately been exceedingly light and the facilities afforded by the firms concerned have enabled the necessary investigations to be carried out satisfactorily.

(*e*) *Aerodromes and Licensing.*—In the same way as ships require harbours, so aeroplanes and seaplanes require aerodromes, which have to be built, inspected and licensed. Licences also are necessary for the pilots competent to control the machines, and for the officials at the aerodromes qualified to pass machines as fit for flying, while every civil machine has to be registered and numbered in the same way as a motor car, and, if flying for hire, must in addition be certified as "airworthy." A special branch of the Department of Civil Aviation deals with this and kindred questions, and between May 1 and October 31 has granted the following licences and certificates :—

Licences for pilots	374
Licences for ground engineers ..	258
Licences for engineers	1
Licences for navigators	2
Licences of aerodromes	92
Certificates of registration	303
Certificates of airworthiness	241

The reason that there has as yet been little or no demand for engineers' or navigators' licences is that conditions which would necessitate the inclusion of these classes in the crew of an aircraft are not yet common.

The large majority of the aerodromes licensed have been those in the vicinity of towns required temporarily by firms engaged in carrying passengers for short flights.

It is believed that the London terminal customs aerodrome at Hounslow is the only one of its kind in Europe, and that the organisation for dealing with regular traffic arriving by air from other countries has not elsewhere been so fully developed. Lympne for aeroplanes and Felixstowe for seaplanes have also been constituted as customs aerodromes.

During the six months under review an approximate sum of £2,000 has been received at Hounslow, in payment of housing and accommodation fees, etc., apart from the sale of petrol and oil. From this fact it is fair to assume that a definite revenue will be derived from the main aerodromes of the future.

In addition to the licensing of aerodromes already carried out, negotiations are in progress for the establishment of land or sea aerodromes under the control of the municipal authorities, to serve the undermentioned localities :—Edinburgh, Newcastle, Southport, Liverpool, Leeds, Bradford, Hull, Manchester, Margate, Southampton.

For emergency landing grounds a large number of possible sites have been notified by Lords Lieutenant. The inspection of these sites, however, must, of necessity, cover a considerable period, and some time must elapse before maps showing the emergency landing grounds available in each country can be completed.

(*f*) *Communications.*—One of the lessons learnt during the War was the supreme necessity for rapid ground communication. It was early realised that for civil aviation ground communications, wireless, etc., must be speeded up, and greater facilities afforded, in order that the arrival and departure of machines should be promptly reported. For this purpose the ordinary public telegraph and telephone service is often insufficient. Owing to the time occupied in conveying the message to and from the nearest public office, and the pressure of traffic at the present time on the long-distance telephone lines, especially abroad, the aeroplane may arrive as soon as, or even before, the receipt of the message announcing its departure. The scope of the branch at the Air Ministry in charge of this particular work covers the requirements of both civil and the service sides. For the present purpose, however, it is proposed, as far as is possible, to refer only to its functions in regard to civil aviation.

The duties of the Communications Branch may be regarded as falling under two broad heads, which, for the sake of convenience, may be termed *signals* and *navigation*.

Signals.—Under the first heading an important part of the work carried out has been in connection with wireless telegraphy and telephony, and the development of aerial navigation by means of directional wireless. Wireless stations have been erected at Hounslow and Lympne, and wireless liaison has been established with the French for the purpose of the London-Paris air route. By this means machine reports and weather reports have been successfully exchanged, the number of such messages on this route averaging 30 a day. From the experience thus gained it has been possible to inaugurate similar arrangements, which are now nearly complete, for the Belgian and Dutch routes.

Meteorological reports will in future be transmitted almost entirely by wireless telegraphy. At present weather reports are received by this means from British and Continental stations for the information of the Meteorological Service, and weather forecasts distributed three times a day from the Air Ministry.

A complete scheme of wireless organisations for the entire Meteorological Service has now been prepared. In addition to communications, the branch is responsible for the supervision of the training and examination of the wireless personnel.

Regulations are also being drawn up in conjunction with the Post Office for a revised wireless operator's certificate in order to provide for qualified "air" wireless operators. Similarly, the conditions for obtaining licences to work wireless stations have been revised to include the use of wireless in commercial aircraft and from ground to air.

It may be noted that the Communications Branch has, since the Armistice, been instrumental in arranging for the release for public use of switchboards, 63 ; trunk lines, 96 ; exchange lines, 324 ; telephones, 2,040.

Navigation.—On the navigational side, the whole of the London to Paris air route has been surveyed, an experimental strip map prepared for aerial purposes, and "flying directions" compiled containing information as to aerodromes, landing grounds, wireless and meteorological data. This is the first of a comprehensive library of air maps and flying directions which it is hoped will be produced for all the main routes. Charts and maps are also prepared and issued for all intended flights on new routes.

In co-operation with Trinity House, proposals have been considered for the installation of an aerial lighthouse system on the London to Paris route, and an experimental lighthouse has been erected at Hounslow. Preparations have also been made for the lighting of the aerodromes on this route, in the event of firms setting up services which necessitate night flying.

(*g*) *Collation of Information.*—Technical information is collected and collated by the Information Branch from the various foreign journals with a view to assisting the constructive side of the industry, civil and service. From time to time, as thought necessary, technical memoranda on different subjects are issued. The Research Branch of the Air Ministry is kept supplied with information, as also is the business community interested in civil aviation.

In regard to foreign markets, close co-operation has been established with the activities of the Department of Overseas Trade and the various naval and military attachés. By these means British firms are supplied with information in the form of periodical summaries on such matters as foreign aviation, amalgamation of foreign aircraft firms, regulations and by-laws affecting civil aviation in foreign countries. During the past two months 45 special notices have been sent out through the Society of British Aircraft Constructors, and numerous requests from British firms for information on urgent questions have been received and answered.

This Branch is also responsible for the issue of official Press *communiqués* on all questions affecting civil aviation.

(*h*) *Meteorology.*—To no other form of human activity are the vagaries of the weather so vital as to aviation. Information of air currents, and more especially of mists and fog, may make the difference between success and failure. For this reason, and although the claims upon a Government meteorological organisation of the Army, the Navy, the Board of Agriculture and Fisheries and other bodies concerned were fully recognised, it was recently decided by the Cabinet to transfer the Meteorological Office and attach it to the Civil Aviation Department of the Air Ministry. With the exception of one or two details, the arrangements for this transfer are now complete.

As much as possible of the personnel, etc., are being moved from South Kensington to Kingsway ; but lack of accommodation makes a complete transfer at present impracticable. A new Meteorological Committee has been formed, with the Controller-General of Civil Aviation as President and Sir Napier Shaw, Director of the Meteorological Office, as Chairman. On this Committee the Royal Society has two representatives, and the Admiralty, War Office, the Board of Agriculture and Fisheries, the Board of Trade and Colonial Office, have each nominated one representative.

Endeavours are being made further to assist scientific research, and, in addition to the ordinary routine work of the Meteorological Office, special attention is now being devoted to the requirements peculiar to flying.

A system of weather maps is being produced at six-hour intervals from information supplied by a network of R.A.F. and Civil Meteorological Office stations, and reports and forecasts covering various aerial routes have been prepared and issued, together with maps showing the speed and direction of the upper wind over each.

In connection with the Cape-Cairo route a statement has been drawn up showing the annual variations of the weather by months.

Special attention has been given to the London-Paris route, for which the service of weather reports is being improved. Good communications are vital to an efficient meteorological service, and in this particular some difficulty is necessarily experienced in dealing with the large area and many foreign countries now concerned. All countries signatory to the Air Convention undertake to carry out certain arrangements with regard to communications ; but the speed in setting up a thorough system must necessarily be that of the slowest country.

One of the first steps consequent upon the transfer of the Meteorological Office to the Air Ministry has been the closing down and elimination of many R.A.F. meteorological units called into existence during the war. General after-war requirements for meteorological information have been considered, and a scheme formulated providing for the least possible number of stations necessary. The policy followed has been to obviate overlapping between flying and non-flying meteorology.

The personnel of all meteorological stations at home is being placed on a civilian footing. Where service personnel is employed, as, for instance, in Egypt, it will be trained by the Meteorological Services. The necessary steps for the demobilisation of service personnel and their substitution by civilians have been taken.

(*i*) *Airships.*—Although the rigid airship has not been exploited in this country to the same extent as the aeroplane, the commercial possibilities of this type of aircraft in connection with long-distance flights are fully realised. By the curtailment of the Government airship programme a certain number of airships, in various stages of construction, became available for civil enterprise. A public meeting was held to explain the position, and those interested were invited to consider the formation of a company with a view to taking over these surplus airships and to investigate the commercial value of this type of aircraft. The formation of this company is now under consideration.

(*j*) *Staff.*—The staff of the Department of Civil Aviation on October 31 consisted of a total of 143, of which 52 are administrative officials and 91 clerical subordinates, at a total salary of £50,000 per annum. These figures include the Air Ministry Meteorological staff, but not the personnel of the Meteorological Office recently transferred to the Air Ministry.

It should be borne in mind that the staff of the Communication, Accidents and Meteorological branches are engaged on technical work for both the civil and service sides.

The selection of a staff to deal with the many questions involved has not been an easy task owing to the fact that the Department must in the nature of things be a civil one, and that those officers possessing the requisite administrative and technical experience can usually be found only among those who have served in or with the Royal Air Force. It has been impossible until conditions are more certain to offer fixity of tenure in the Department of Civil Aviation, and the terms of appointment have been necessarily brought into unfavourable comparison with the improved rates of pay recently conceded to the Royal Air Force. The result has been that recruitment has been difficult and slow. Steps are being taken to remedy this.

III. General Considerations and Conclusions

This brief summary of the work carried out during the last six months, and the organisation of the Department of Civil Aviation, has been written as a record of work done. If it appears that a useful purpose will be served it is proposed to issue a further synopsis at the end of another period of six months. No attempt has been made to suggest the potentialities of civil aviation. The speed at which it will develop cannot be gauged even approximately, but the possibilities are undoubtedly great, and there seems no doubt that when once the postulates of reliability, safety, comfort and economy have been met, as they will be, civil aviation must play an increasingly important part in the development of civilisation.

It is in any case, perhaps, not too much to say that when civil aviation has developed it will be the main reserve of strength from which the R.A.F. will draw in times of stress. The R.A.F. of the future should be capable of rapid expansion and of the organised assimilation of large numbers of personnel and material at short notice. As the mercantile marine reinforced the Navy during the War, so should civil aviation be regarded as the potential reserve of the R.A.F. in future crises. This source of supply can only be regarded as satisfactory if civil aviation is in itself a healthy and well-developed body. The building up of such a body on a true basis is largely dependent upon the growth of a steady demand for quicker communication. Irregular and spasmodic demands keep the cost of such communications at a high figure, and do not, therefore, assist development.

The carriage of mails promises to be one of the most important and regular demands which can serve to develop civil aviation and to place aerial transport concerns on a firm footing. The future of aerial mail services lies on those routes where a material saving of time can be effected, so that a definite commercial advantage may be obtained. In England, railway communications and distances are such that letters posted at the end of the business day can be delivered early next morning at almost every large town by the regular train services. The Postmaster-General is doubtful, therefore, whether the demand for express mails during the day time between the more distant towns in the United Kingdom is likely to be sufficiently extensive to meet the considerable expense of running such a service for mails only. But if commercial services were established for passengers and goods, the opportunity would be taken to utilise them for express letters.

The line of development of aerial mails would seem to lie more on the Continental and Imperial routes, where the long distances give more scope for the element of speed. For example, in normal times the ordinary time of transit by railway is 36 hours to Turin, 48 hours to Rome, 23 hours to Berlin, 58 hours to Christiania, and 24 hours to Berne. Over such distances the potential saving by aerial transport is considerable. If such acceleration could be obtained, and regularity of service kept up, sufficient correspondence might be attracted to enable the extra fee to be fixed at a relatively small figure. When regular services to extra-European countries become practicable, the gain in time will be still more marked.

The more such services can be brought into being, the larger is the area over which the overhead charges are spread, and the lower becomes the cost of each additional service, which automatically produces an increased demand for such services on routes where high cost has hitherto negatived the desire for speed.

It has been the object of the Department to ensure the safety both of the flying and non-flying public, without imposing irksome restrictions on the various firms concerned. In numerous problems on which technical advice has been required the Department of Civil Aviation has received the assistance of the directorates of research and aeronautical inspection of the Department of the Director-General of Supply and Research, which is a separate Department in the Air Ministry from that of civil aviation. Hitherto all machines employed by civil aerial transport firms have been converted war machines, and although numerous new types are on the stocks, it may be said that no true commercial machine has yet appeared. Divergencies in type and construction between service and civil aircraft will, however, rapidly appear.

Partly owing to the difficulty of determining the future composition of the R.A.F., and the consequent uncertainty of what aerodromes will be required by the Service, it has not yet been possible to settle the aerodromes to be retained by the civil side, and to complete negotiations with the municipalities and others concerned. An Advisory Committee has been discussing this and kindred problems, together with the question of imperial air routes, and their report is expected shortly.

The work of the Department must necessarily be of a pioneer character. The results of its labours—if, indeed, the foundations of the new scheme of things have been well laid—can only become visible in their entirety in years to come. Had the spade work not been done, however, it is doubtful whether this country would have been able to inaugurate and maintain the first international air services.

It may be questioned whether civil aviation in England is to be regarded as one of those industries which is unable to stand on its own feet, and is yet so essential to the national welfare that it must be kept alive at all costs.

If this question is answered in the affirmative, there appear to be three methods of assisting it :—

(1) By means of direct Government subsidies—it is in this way that France has decided to act, and 18,000,000 francs have already been earmarked for this purpose.

(2) By recognising that *at the beginning* the British aircraft industry cannot stand on its own feet, and that to ensure its existence, although foreign to usual British practice, some form of *direct* Government assistance, probably in the shape of a grant to approved aerial transport companies for mileage and weight carried, is a necessity.

(3) By following the principle usually accepted in this country, that if an industry is to survive it must stand as nearly as possible by itself, and that a policy of "doles" is unsound. In this case the assistance given would take the indirect form of the provision of certain "key" aerodromes and shed accommodation at home and on the Empire routes, and the collation and issue of information, including meteorological data, and the provision of communications.

The problem is how best to tide over the difficult transition period through which we are passing. Adhesion to the British principle of independent private enterprise will undoubtedly be right eventually, but if a limited industry is to be maintained—as it must be to meet the requirements of the Royal Air Force—it is for consideration whether it will not be necessary to adopt a combination of (2) and (3) above.

(Signed) F. H. SYKES,
Controller-General of Civil Aviation.

November 1, 1919,
Air Ministry.

◆ ◆ ◆ ◆

To Replace the "Bodensee"

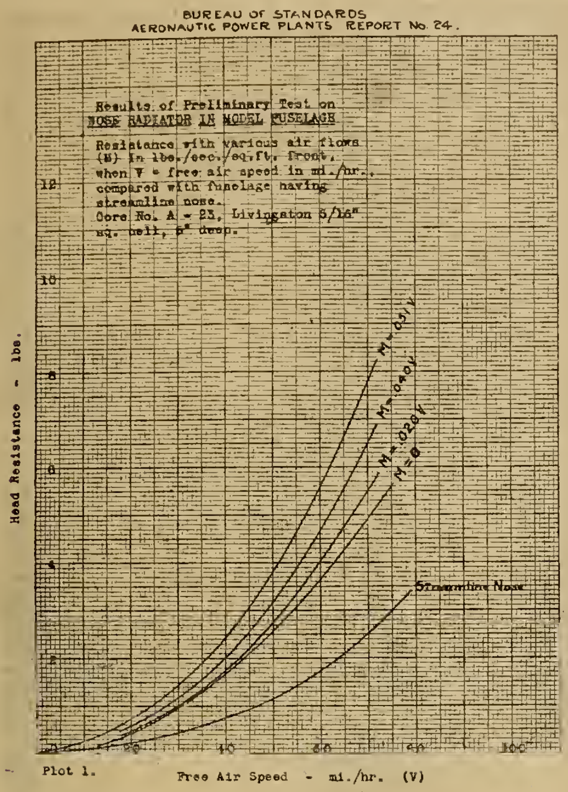
Undeterred by the mishap to the "Bodensee," the owners of that vessel have placed an order for the construction of a new passenger airship of similar type, which will be placed in service as soon as possible.

A Climbing Record

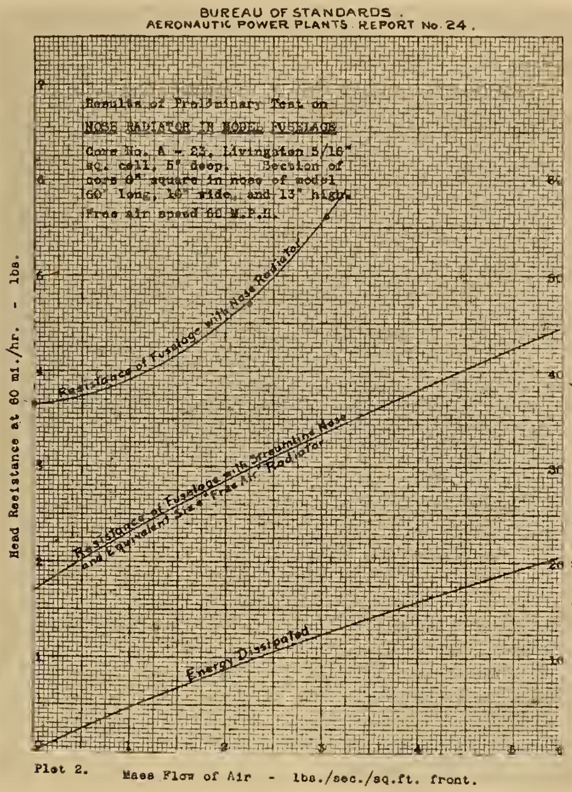
From Rome comes a claim for a new record. It is stated that on November 13 an aeroplane, piloted by a warrant officer, at the Montecelio aerodrome, near the Italian capital, climbed 1,000 metres in 47 secs. and 5,000 metres in 11 mins.

PRELIMINARY REPORT ON RESISTANCE DUE TO NOSE RADIATOR*

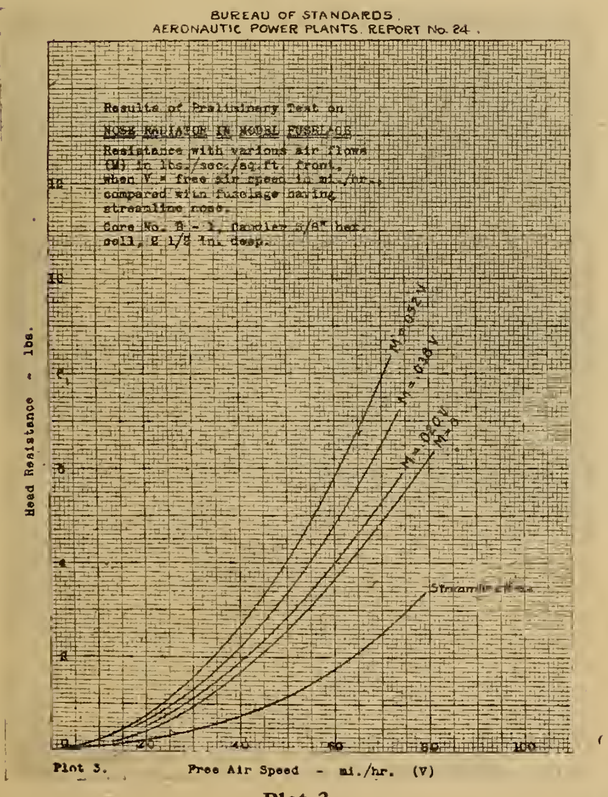
THE present report considers the effect of placing a radiator in the nose of a *fuselage* as compared with the effect of placing a radiator of the same core construction, having an equivalent cooling capacity, in the free air, and streamlining the nose of the *fuselage.* The results of these tests indicate less difference than would be shown by comparing results with



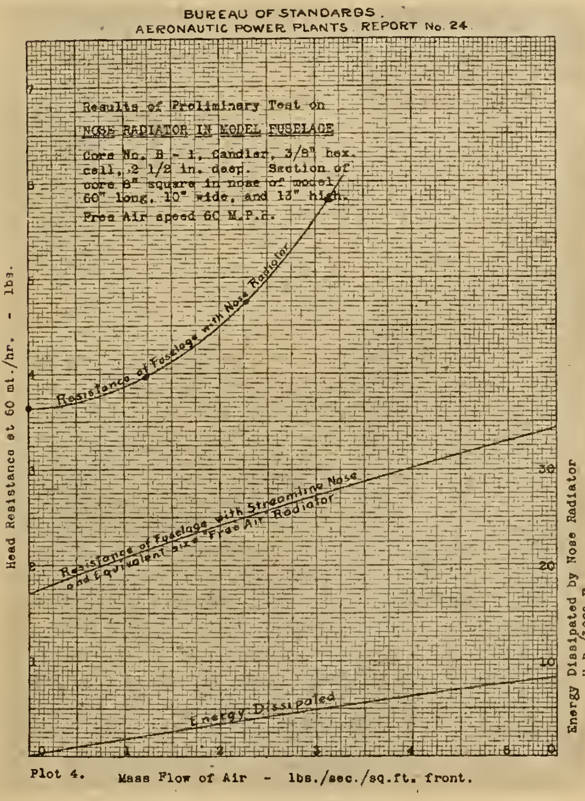
Plot 1



Plot 2



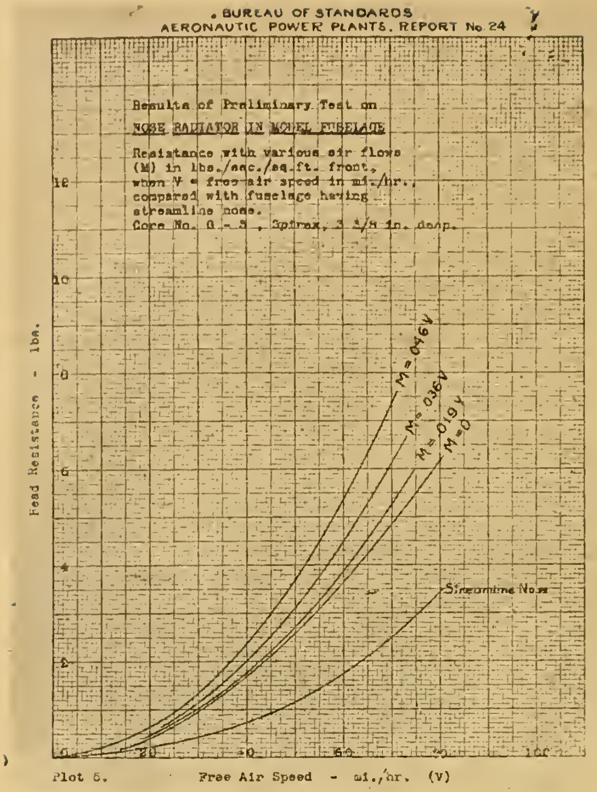
Plot 3



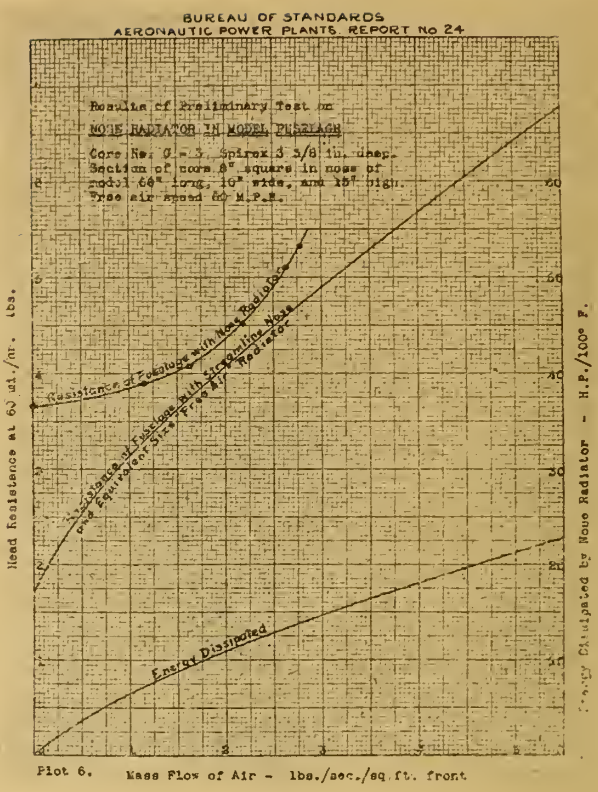
Plot 4

---

* From experiments carried out by the American Bureau of Standards, which corresponds to our National Physical Laboratory.



Plot 5



Plot 6

radiators specially selected for each of the positions in which they were placed.

The results are qualitative only, but they are so striking as to indicate that the nose of the *fuselage* is not a desirable location for a radiator from the point of view of head resistance.

A model *fuselage*, 60 ins. long, 10 ins. wide and 13 ins. high, was constructed with a removable stream-line nose, which, when removed, allowed an 8-in. square section of radiator core to be placed in the nose (See Figs. 1 and 2). Two holes on each side of the *fuselage*, each about 1½ by 6½ ins., were cut about a foot back from the nose and fitted with adjustable sliding doors. By adjusting these vents the amount of air passing through the nose was varied.

The model was mounted in a 54-in. wind-tunnel, and the head resistance measured under the following conditions :—

(1) Streamline nose on model. (No change in resistance was observed whether vents were open or closed.)

(2) Streamline nose removed, but nose radiator covered with a sheet of paper so that there was no air-flow through the core. (3), (4) and (5) Nose radiator in place, with varying amounts of air-flow controlled by opening the vents. Seven or eight different air speeds were tried in each case, the maximum being about 70 miles per hour.

The results of these runs are given in plot 1, against free air speed. They show (1) that the streamline nose decreases the resistance of the *fuselage* by 50 per cent., and (2) that the total resistance of the *fuselage* increases rapidly when air is allowed to enter the radiator, so that a compact type of core is desirable for this position.

Plot 2 illustrates these conclusions more clearly, since there the resistance of the *fuselage* at 60 miles per hour free air speed is plotted against the mass flow of air through the radiator. There is also plotted the total resistance of the *fuselage* with a streamline nose together with a free air radiator of the same core construction and of such size as to have a cooling capacity equivalent to that of the nose radiator at any given mass flow. Plots 3, 4, 5 and 6 give the same data for two other cores, 3 and 4 being for a core of very low head resistance, and 5 and 6 for a core of very high head resistance, which would be a very good type for a nose radiator and a very bad type for free air. These are types of core considerably better for free air positions than those included in this test, while the core represented in plots 5 and 6 is probably one of the best for the nose position.

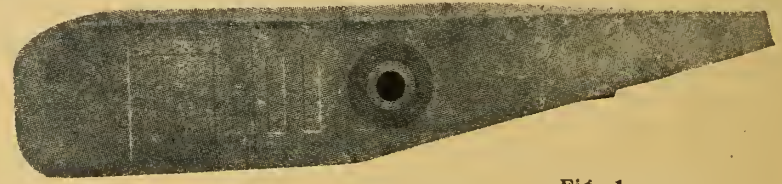


Fig. 1

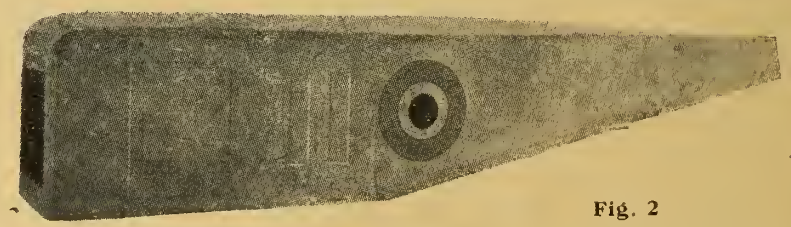


Fig. 2

AIRISMS FROM THE FOUR WINDS

Gen. Seely's resignation should do good by letting the light in upon the anomalous position of the War Office and Air Ministry dual ministerial control. It is for Parliament to appreciate the vital necessities of the situation and to take a firm stand. Without delay Sir W. Joynson-Hicks, Chairman of the Parliamentary Air Committee, called the members together on Tuesday last, and it is to be hoped the open invitation to new members of Parliament and members of the House of Lords who had not an opportunity of joining the Committee, was widely responded to, in view of the important further statement made at the meeting by Gen. Seely.

- - -

Whatever the knowledge of the actual position may be with those who really know, the popular and erroneous view is that, in the words of so usually well-informed writer as Mr. Gerard Fiennes, the "R.A.F. is placed entirely under the War Office." It is true this may be the practical effect of the Winston Churchill duality, and for that very reason Gen. Seely has rightly seen the impossibility of perpetuating so unsatisfactory a position.

- - -

As a fair example of the very wide divergence of views held upon the maintenance of the R.A.F. as a separate entity, or its absorption by the War Office and Admiralty, a couple of communications to the Press upon the subject are well worth publicity, as showing the uninformed and narrow views on the one hand of the upholders of whiskered tradition, and the wider view under modern experience and enlightenment of the defender of a separate and independent Service. Taking the first letter, which is signed as from an "Ex-Chaplain, R.A.F.," this reads as follows:—

Gen. Seely's resignation of his post as Under-Secretary for Air raises two important questions:—First, is there the necessity for a separate Air Ministry? Secondly, is there the necessity for a separate Air Force? These two questions should not be confused. It may be necessary for the future development of aviation that the Air Ministry should retain its independence. Upon that point I do not feel qualified to give an opinion. But the necessity for the retention of the Royal Air Force on a basis of independence of War Office and Admiralty control seems to me to be very much open to question.

As a chaplain to the R.A.F. I have had considerable opportunity of estimating the efficiency of its organisation and administration. I have come to the following conclusions:—

(1) The discipline and administration of Air Force stations, being in the hands of (in the majority of instances) extremely youthful officers, who have risen to senior rank by skill and gallantry in the air during war service, could be much more efficiently and economically carried out if such stations were under purely military (as opposed to Air Force) control, and commanded by Regular military officers of senior rank.

(2) Military and naval officers, who have transferred to the R.A.F., can never work in harmony, their traditions and methods of discipline being diametrically opposed to one another. The same applies to all ranks.

(3) The training required for naval flying officers is entirely different from that required for military flying officers. A naval or military officer can be taught to fly in six months, whereas a pilot cannot be made an efficient naval or military officer in under six years.

(4) The higher control of the R.A.F. administration could easily be carried out by the War Office with but a comparatively slight increase of *personnel*, thus releasing a large majority of the staff at present employed at the Air Ministry. Under the existing arrangement every administrative branch is unnecessarily duplicated.

I, therefore, am strongly of the opinion that the best interests of the nation would be served if the Royal Air Force should cease to be a separate organisation, and that the naval and military branches of the Flying Service should once more be placed under control respectively of the Admiralty and the War Office.

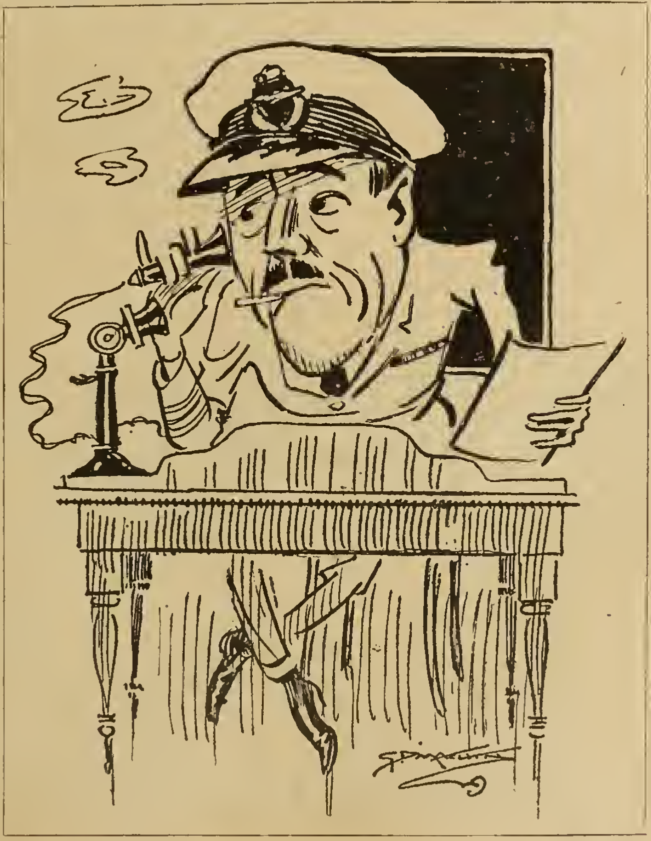
- - -

So much for that side, about as weak a case as could well be put forward. A reply for the separate service contention comes from "Ex-Flight Leader" who answers, *seriatum*, the "arguments" of the Ex-Chaplain. Ex-Flight Leader's points are:—

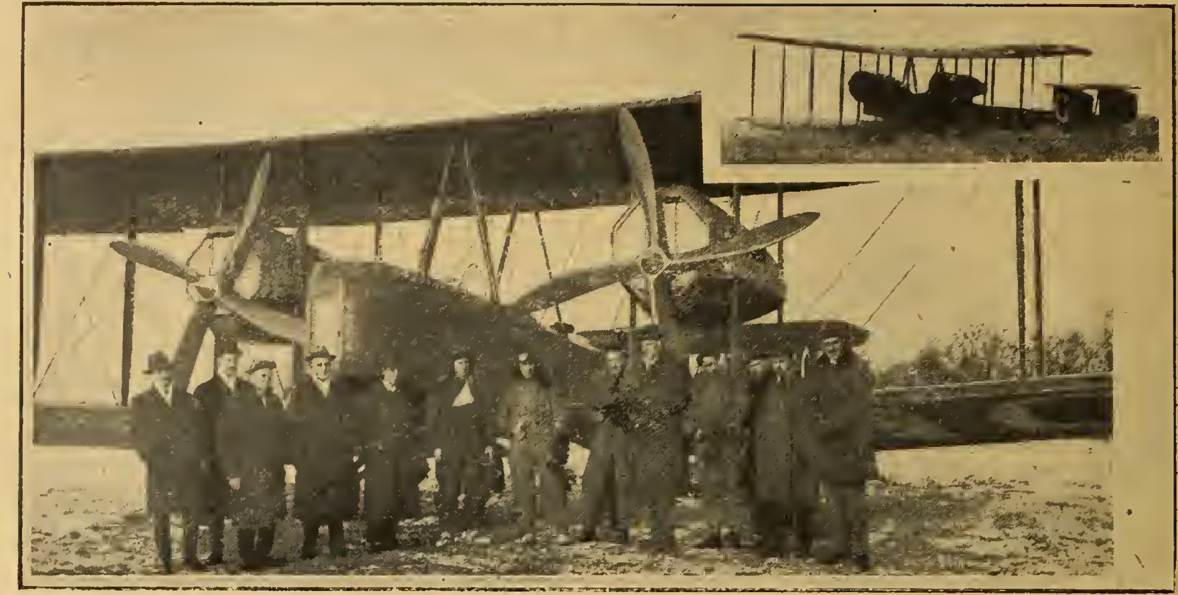
(1) "Ex-Chaplain, R.A.F." complains that the discipline and administration of the Force are largely in the hands of extremely youthful officers, and urges that the higher commands should be given to Regular officers of senior rank.

We have yet to learn that the discipline and administration of the Air Services have been one whit worse than that of the Army. True, the individual flying officer is allowed to exert more initiative than his military brother. He is not so closely fettered by rusty chains of obsolete etiquette and hard-and-fast rules. Nor is it to be desired. In the career he has adopted he is never called upon to meet a situation which is exactly paralleled by a preceding one; and as a consequence has no need for manuals and regulations written in an age long since passed away. But he does require a leader; and in the very essence of things he prefers a comrade who has proved his worth in "actualities" to a relic of ancient days, dug up, may be, from a Reserve battalion or an A.M.L.O.'s office, or to an ex-Brigadier whose only excuse for appointment would be, "We must find him a job somewhere," and whose interest in aviation began and ceased the night that the Hun bombed his chateau in France.

Some R.A.F. Impressions



Squad.-Leader H. E. J. Hewitt, O.C. No. XI Training Squadron, which turned out many expert flyers during the War

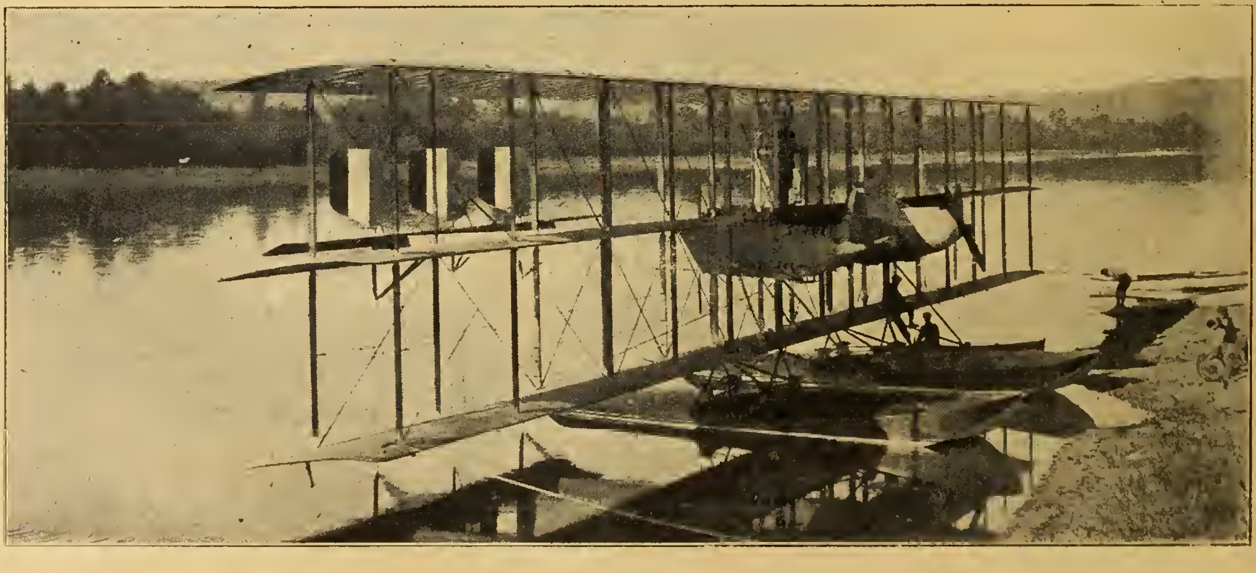


THE FLIGHT TO AUSTRALIA.—As announced in " Flight " last week, the Vickers-Vimy-Rolls left Hounslow on November 11 on its long journey. Our photograph shows the pilots, mechanics, representatives of the Royal Aero Club, and a few members of the staff of Messrs. Vickers, Ltd., standing in front of the machine. Inset: The machine starting.

(2) " Ex-Chaplain " states that *personnel* transferred from the Navy and Army to the Air Force can never work in harmony. How untrue this is can be gauged from the fact that it was only after they began to work together that the enemy lines of communication became well-nigh untenable and England became immune from aerial attack. Before April, 1918, the R.N.A.S. had enjoyed the pick of machines and engines. With the coming of the Air Force a better and juster apportionment of the good things in aviation ensued, with strikingly successful results on the *moral* and efficiency of the new arm.

(3) The statement that a flying officer can be made in six months, but that it takes six years to convert that same officer into an efficient military or naval officer is so manifestly absurd that it requires little refutation. Suffice it to say that the writer, who has seen service both as a military and Air Force officer, has encountered numerous instances of young men who have left the Air Force for the Army and have not only served with credit, but in many cases with the utmost distinction.

(4) To say that the Air Service could easily be controlled from the War Office shows that " Ex-Chaplain " is not writing with a full knowledge of realities. At the present moment he would indeed be a bold man who dared to affirm that the War Office is competent to handle the Army with thorough efficiency. Up to last year the War Office had control of aviation. Before the War aeronautics were regarded by the red tapeworms as an amusing and picturesque addition to manœuvres, and in 1914 were able to put some few dozen machines in the field. In the first three years of the conflict the Clammy Hand was still laid on private enterprise; and our airmen were still sent to meet the Hun in machines whose only recommendation lay in the fact that they were turned out from Government factories. With the establishment of the Royal Air Force and the consequent introduction of " live " and experienced men into controlling positions, came the short and welcome bound into aerial supremacy which in the last weeks of the War made the enemy position in the air practically untenable. After the results achieved, it would be nothing short of criminal folly to revert to the unsympathetic and even envious control of the War Office.



A TRI-MOTORED CAPRONI HYDRO-TRIPLANE: It has a span of 31 metres, and the useful load is 2½ to 3 tons. It can be fitted with three 300 h.p. Fiat or Liberty engines, and the speed is 140 kiloms. per hour.

Nurse McMaugh, at the Central Aircraft Co.'s aerodrome at Northolt, where she is taking her ticket, goes up with Mr. Sykes, O.B.E., for a spin. An Australian pupil at the school wishing her a good trip. Inset: A snap of the above pair in the air, taken from a sister Central Aircraft 'bus.

Let us trust that "Ex-Chaplain" will think again before urging a course of the merits of which he must be entirely ignorant; and if there is reason for discussion of a change, let the Government consult those, and those only, to whom the present high standard and repute of our Air Service is entirely due.

- - -

There is good reason for giving these diverse views at length. For years back Flight has been rubbing in most of the points made by the second correspondent, long *before* the events as they have now materialised. It is, therefore, refreshing to have these facts so ably summarised from an independent source. As we started by suggesting, Gen. Seely's resignation cannot help but bring about good and we entirely sympathise with him in having taken such a drastic step in order to bring the limelight upon so very corrosive a sore in our national and Imperial efficiency.

- - -

It would appear to be almost as difficult a problem to place wrecked aircraft at sea in its proper category as the railway porter experienced when he was confronted with the query as to freight classification for a tortoise. "Cats is dogs, rabbits is dogs, dogs is dogs, but a tortoise is a hinsect, so there ain't no ticket for that." So with a view to a solution, the Fisheries Division of the Board of Agriculture and Fisheries (*why* this body is equally a bit of a problem) has been discussing with the Air Ministry questions relating to the salvage of aircraft at sea. The result of these discussions is that a section dealing with salvage will be introduced in the Air Navigation Bill to provide that aircraft on the water shall be regarded for salvage purposes as shipping. Aircraft in need of assistance will become "wrecks" within the meaning of the Merchant Shipping Act.

In order to get the law settled, and so save many questions and much expense, it has been decided to send the first case of salvage of civil aircraft for test to the courts, probably the Admiralty Court.

- - -

Many of the "exhibits" at the British Science and Key Industries Exhibition, organised at Glasgow by the Corporation, and opened by Sir Charles A. Parsons, on Monday, matters aviation are well to the fore. Wireless telegraphy and telephony also hold a prominent place, both such important allies to the navigation of the air. The idea of these "key" industries going the rounds of the chief cities is distinctly practical.

By way of marking the landing in January last, by aeroplane, of Vedrines, now he has passed away, on the roof of the Lafayette Gallery in Paris, a monument has been erected at the spot where this remarkable pilot alighted. The experiment was an unnecessarily hazardous one, but it emphasises the possibilities of the not over-far future in the direction of roof-landing in cities under reasonable conditions.

- - -

From the latest reported exploits of d'Annunzio, we were not far out in our surmise a few weeks back that we thought he was unduly optimistic in putting the start of his flight to Tokio at the elapse of a month, and *after* the Fiume chaos, had been finally smoothed out.

- - -

How the untutored tribes in Afghanistan and elsewhere view the might of Great Britain, which they have the audacity to dispute, is fairly exemplified in the astonishment of the Wazir-Mahsuds the outer day, when a little batch of about fourteen fighting planes manœuvred in war formation over the "pow-wow" at which Gen. Climo launched his terms and ultimatum. The Mahsuds thought the maximum number of planes we possessed was *four*.

- - -

One of the latest acts of the Prince of Wales in America before he embarks again for Blighty was the investiture which he held at Washington. After the honours to Admiral Benson and other prominent Americans, the Prince conferred a number of Crosses on members of the American Flying Corps.

- - -

The London Museum, which has recently been re-opened to the public, is one of the least known, but possibly one of the most interesting museums in London. It now comprises numerous exhibits of special interest to all concerned in aviation and the anti-aircraft defences of London which are well worth a visit. There are some photos of air-raid damage by Zeppelins and Gothas which have probably not been seen by the public before, and sundry other relics dealing with the same exciting period in our history. In the basement, which contains many of the most attractive features of the whole museum, will be found a collection of rare old prints and engravings of aeronautical events. Contemporary illustrations of early balloon ascents are now becoming very scarce and are eagerly sought after by collectors, and the specimens shown at the London Museum include some remarkable pictures of ascents in the London district. Among the photos of homes of famous persons we noticed the rooms occupied by Gustav Hamel at Brook Street.

THE ROYAL AIR FORCE

London Gazette, November 11

The following officers have been granted short service commns. in the ranks stated, with effect from Nov. 11. They will retain their seniority in the substantive rank last held by them prior to the grant of the short service commn.

In the case of officers now gazetted Flying Officer from Pilot Officer, seniority will date from the date of *Gazette* :—

Squadron Leaders.—T. S. Impey (A.), J. C. M. Lowe (A.P. (T.)).

Flight Lieutenants.—C. B. Belt, M.C., M.B.E., D.C.M. (Ad.), V. Greenwood (T.), B. D. Hobbs, D.S.O., D.S.C. (S.), H. J. Payn (A.), E. M. Pizey (A.), H. C. Todd (A.), W. D. Wain (T.), R. B. Waite, M.B.E. (S.O.), F. C. Wilkinson (A.P. (T.)), F. R. Williams (T.).

Flying Officers.—E. A. Burridge (Ad.), W. Jones (A.), W. M. Long (Ad.), D. S. C. Maeaskie (T.), W. G. MacD. Nicholl (T.), E. P. Terry (T.), E. A. Tottle (T.), B. Turner (A.P. (T.)), L. A. Walters (A.).

Observer Officer.—W. J. Umpleby.

Flying Officers (*from Pilot Officers*).—E. F. Elliott (Ad.), V. S. Holbrook (T.), A. B. Langridge (Ad.), E. J. Newman (T.), C. H. N. Nunn (T.), T. Thomson (T.).

It is intended that officers employed as Stores Officers or on "Q" duties shall belong to the new Stores Branch when formed. Officers appearing in this *Gazette* who are at present so employed will be transferred to this Branch on its formation and will accept these short service commns. on that condition. They will then come on to the rates of pay of that Branch, but will meantime be permitted to draw the higher rates laid down in the new scheme for officers on the General List. An officer posted to the Stores Branch on its formation will then have the option of declining his short service commn.

The notifications appearing in the *Gazettes* of the dates indicated below, appointing the following officers to short service commns., are cancelled :—Flight-Lieut. T. L. Williams, M.C. (Ad.), Flying Officer E. R. Bruce (A. and S.), Flying Officer A. H. Burmann (S.O.), Flying Officer J. W. Milner (A.), Flying Officer R. N. Walter (Ad.) ; Sept. 12. Flight-Lieut. T. K. Young (T.), Flying Officer D. B. Robertson (A.) ; Sept. 16. Sqdn. Leader H. G. Atkinson, O.B.E. (T.), Flight-Lieut. E. R. Pritchard (A. and S.), Flight-Lieut. P. C. Purser, M.C. (A.), Flying Officer J. Burden (T.), Flying Officer E. H. Colman (A.), Flying Officer C. S. Fulton (S.O.), Flying Officer L. W. R. Grubb (A.) ; Oct. 24.

The notification appearing in *Gazette* of Oct. 28 appointing Sqdn. Leader J. C. M. Lowe to a permanent commn is cancelled.

Permanent Commissions

The notification in *Gazette* of Aug. 1 appointing the following officers to permanent commns, is cancelled :—Maj. E. T. Newton-Clare, D.S.O. (A.), Maj. V. A. A. Albrecht, O.B.E., M.C. (A.), Maj. F. F. Minchin, D.S.O., M.C. (A.), Capt. A. F. F. Jacob, D.S.O. (A.), Capt. G. L. Hunting (T.), Lieut. R. G. St. John, D.S.C. (O.), Lieut. J. H. Rutherford (T.), Lieut. F. Thompson (A.), Lieut. A. T. Laing (Ad.).

The notification appearing in *Gazette* of Aug. 22 appointing Lieut. J. W. D. Leigh, M.C. (A.), to a permanent commn., is cancelled.

The Christian names of Sqdn. Leader John Claude Malcolm Lowe are as now described, and not "John Cecil Mansfield," as stated in *Gazette* of Oct. 28.

The following temp. appointment is made at the Air Ministry :—

Staff Officer, 3rd Class.—(P.).—Flight-Lieut. R. Addenbrooke-Prout, O.B.E., M.C. ; Oct. 21.

The following temp. appointments are made :—

Staff Officers, 3rd Class.—(P.).—Flight-Lieut. F. B. Beauman ; May 31. (T.).—Lieut. J. W. Sawyer ; April 11, and to be actg. Capt. until April 30 (substituted for notification in *Gazette* of July 22).

Flying Branch

Sec. Lieuts. to be Lieuts. :—(Hon. Lieut.) J. S. Arthur, M.C. ; April 15, 1918. A. L. Wilcox ; Oct. 6, 1918.

Sec. Lieut. D. H. Woodhouse (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (A.) ; July 28, 1918.

Sec. Lieut. E. Wallace (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (O.) ; Aug. 8, 1918 (since killed).

The following relinquish their commns, on ceasing to be employed :—Sec. Lieut. (Hon. Lieut.) R. W. V. Midlane (K.R.R.C.) ; May 21. Capt. W. T. F. Holland, A.F.C. (Lieut., Lancers) ; June 5. Lieut. J. C. Preston (Lieut., Bedford R.) ; Aug. 6. Lieut. C. L. Mundey, M.C. (Lieut., R. Fus.) ; Oct. 6. Sec. Lieut. (Hon. Lieut.) R. A. Adams (Lieut., C. Ont. R.), Lieut. (Hon. Capt.) F. H. Eberti (Capt., R.G.A.), Lieut. R. A. Grosvenor, M.C. (Capt., Dragoon Gds.), Lieut.-Col. A. T. L. Nye (Paymr.-Com., R.N.) ; Oct. 16. Lieut.-Col. T. A. E. Cairnes (Capt., Dragoon Gds.) ; Oct. 17. Maj. E. H. M. O'Farrell (Maj., R. Irish Fus.) ; Oct. 18. Lieut. B. D. Collison-Cox (Lieut., N. Staffs. R.) ; Oct. 21. Lieut. C. M. J. Barrington (Lieut., D.L.I.), Lieut. W. C. Thompson (Lieut., R.G.A.) ; Oct. 23. Lieut. C. T. Armitage (Lieut., Lab. Corps), Sec. Lieut. J. H. B. Rygate (Sec. Lieut., Dragoon Gds.), Capt. R. J. G. Temple (Lieut., R.G.A.) ; Oct. 28. Sec. Lieut. P. S. Blowey (Sec. Lieut., Devon R.) ; Oct. 30. Lieut. A. H. W. Fleming (Lieut., Norfolk R.), Sqdn. Leader (actg. Wing Com.) R. Hall, O.B.E. (Capt., Welsh Fus.) ; Nov. 1.

(Then follow the names of 158 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health caused by wounds, and are permitted to retain their rank :—R. M. Montgomery (R.A., T.F.) ; Oct. 31. H. C. Deeks ; Nov. 5.

Lieut. J. G. W. March (Sec. Lieut.,. R. Warwick R.) resigns his commn. ; Nov. 12.

Sec. Lieut. (Hon. Capt.) D. Gale relinquishes his commn, on account of ill-health contracted on active service, and is permitted to retain the rank of Capt. ; Nov. 5.

Lieut. W. J. Gleason is dismissed the service by sentence of General Court-martial ; July 18.

The notification in *Gazette* of May 16 concerning Lieut.-Col. G. C. St. P. De Dombaste is cancelled.

The notification in *Gazette* of May 16 concerning Sec. Lieut. W. J. McDonough is cancelled.

The notification in *Gazette* of May 9 concerning Lieut. J. A. Harkin is cancelled.

The notification in *Gazette* of Oct. 21 concerning Lieut. C. L. Mundey, M.C. (Lieut., R. Fus.) is cancelled.

Administrative Branch

Sec. Lieut. C. P. Sisley to be Lieut. (since relinquished his commn.) ; May 13, 1918 (substituted for notification in *Gazette* of May 6).

Lieut.-Col. (actg. Col.) W. P. Alexander relinquishes his commn. on ceasing to be employed, and is permitted to retain rank of Col. ; Sept. 1 (substituted for notification in *Gazette* of Aug. 29).

Lieut.-Col. F. H. G. Playfair (Lieut.-Col., T.F. Res.) relinquishes his commn. on ceasing to be employed ; Nov. 1 (substituted for notification in *Gazette* of Nov. 4).

(Then follow the names of 45 officers who are transfd, to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their ranks :—R. T. Jones, D.F.C. (caused by wounds), C. J. Stanfield (contracted on active service) ; Nov. 5. Sec. Lieut. F. G. Laing relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; Nov. 5.

Technical Branch

Sec. Lieuts. to be Lieuts. :—W. W. Scott-Davidson ; April 2, 1918, F. A. Dickinson (since demobilised) ; Oct. 8, 1918. J. E. Tyrrell ; March 8.

Sec. Lieuts. to be Lieuts., without pay and allowances of that rank :—P. W. Renshaw ; June 8, 1918 (substituted for notification in *Gazette* of Dec. 24, 1918). R. M. Langley ; Jan. 16. H. A. Chapman (since demobilised) ; Jan. 27. W. T. O. Cosgrave ; May 26.

Pilot Officer H. P. Strong to be Flying Officer ; Oct. 1.

Pilot Officer F. H. Davis to be Flying Officer, without the pay and allowances of that rank ; Oct. 1.

(Then follow the names of 54 officers who are transfd. to the Unemployed List under various dates.)

The initials of Pilot Officer (Hon. Flying Officer) J. G. Dyson are as now described, and not "J. C.," as stated in *Gazette* of Oct. 21.

The notification in *Gazette* of Aug. 27, 1918, concerning Lieut. R. H. Whittingham is cancelled.

Medical Branch

(5 Officers transfd. to the Unemployed List.)

Memoranda

Sec. Lieut. R. F. B. Campbell (late Gen. List, R.F.C., on prob.) is granted the hon. rank of Lieut. ; April 1, 1918.

The following cadets are granted hon. commns. as Sec. Lieuts. :—180398 O. G. Williams ; Jan. 7. H.71746 A. J. Smith ; Feb. 7. 137769 L. Mawer ; March 15. 35646 J. A. Crawford ; March 26. 15587 H. Cheesman ; July 31.

The following prob. Flight Officers are granted hon. commns. as Sec. Lieuts. :—F. L. S. Allen ; Nov. 19, 1918. E. W. Bettany ; Jan. 25. W. Anelay ; Jan. 31. B. D. Bowyer ; Feb. 13. C. F. Byrd ; Feb. 19. C. P. Abbott ; March 31. F. J. C. Bush ; April 15. A. Barron ; May 8. R. G. Agnew ; June 5.

The following relinquish their commns, on ceasing to be employed :—Temp. Hon. Lieut. J. Hay ; March 16. Maj. H. F. Towler (Sub.-Lieut. (actg. Lieut.), R.N.R.) ; Oct. 25).

(5 officers transfd. to the Unemployed List.)

London Gazette, November 14

The notification in *Gazette* of Aug. 1, appointing Capt. W. R. Read, M.C., A.F.C., to a permanent commn., is cancelled.

The following temp. appointments are made at the Air Ministry :—

Dep. Director, 2nd Class.—Group Capt. I. M. Bonham-Carter, O.B.E., from Dep. Dir., 1st Cl. ; Nov. 1.

Staff Officer, 3rd Class.—(Air.)—Flying Officer H. C. Pyper ; Oct. 29.

The following temp. appointment is made :—

Staff Officer, 1st Class.·(Air).—Wing Com. F. W. Bowhill, D.S.O. ; Oct. 30.

Flying Branch

Wing Com. R. P. Ross, D.S.O., A.F.C., to be Wing Com. (A. and S.), from (S.O.) ; Oct. 22.

Wing Com. R. C. M. Pink to be Wing Com. (A.), from (S.O.) ; Nov. 1.

Sqdn. Leaders to be actg. Wing Coms. (without pay and allowances of that rank) whilst employed as Wing Coms. (A. and S.).—R. J. Bone, D.S.O., to Oct. 17, L. Tomkinson, to Oct. 2 ; Aug. 1.

Capt. M. R. Buck and is graded for purposes of pay and allowances as Maj. whilst employed as Maj. (S.) ; May 1.

Lieut. H. J. Gibson is graded for purposes of pay and allowances as Capt. whilst employed as Capt. (A.) ; from May 1 to Aug. 2.

Flying Officer (actg. Flight-Lieut.) G. N. Trace relinquishes the actg. rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut. (A. and S.) ; Oct. 3.

Lieut. F. E. E. Villiers to be Lieut., from Unemployed List ; May 16, precedence next below Lieut. F. S. Reed.

Sec. Lieuts. to be Lieuts. :—T. F. Harvey (deceased) ; April 10, 1918. R. H. Owens ; Oct. 13, 1918. W. E. J. Bloodworth ; Dec. 27, 1918 (substituted for notification in *Gazette* of Oct. 21). •W. A. Manson ; Feb. 1. A. H. Ashtch ; July 15.

Sec. Lieuts. to be actg. Lieuts. whilst employed at Lieuts. (O.) :—A. F. Adams, to Oct. 2, J. F. Mehigan, to Oct. 3 ; May 1.

The following relinquish their commns, on ceasing to be employed :—Sec. Lieut. E. Brittain ; April 20, 1918. Sec. Lieut. (Hon. Lieut.) J. S. Batty (Lieut., R.F.A.) ; March 21. Sec. Lieut. W. J. McDonough ; May 3. Lieut. E. L. Brown (Lieut., Warwick R.) ; Aug. 20. Maj. A. V. Squire (Paymaster Lieut.-Com., R.N.) ; Oct. 10. Lieut. G. W. Panter, M.B.E. (Lieut., R.I. Rif.) ; Oct. 15. Lieut. G. Malone (Lieut., R.I. Regt.) ; Oct. 16. Lieut. (Hon. Capt.) M. M. Parkenham (R.A.S.C.) ; Oct. 17. Maj. C. A. A. Hiatt, M.C. (Lieut., Norf. R.) ; Oct. 20. Lieut. F. O. Cave, M.C. (Lieut., Rif. Brig.) ; Oct. 22. Lieut.-Col. A. Ross-Hume, O.B.E. (Maj., Camer. Scot. Rif.) ; Oct. 24. Capt. G. B. McClure, O.B.E. (Capt., Black Watch) ; Oct. 25. Maj. R. Grey (Capt., Gren. Gds.) ; Nov. 8.

(Then follow the names of 94 officers who are transfd. to the Unemployed List under various dates.)

Lieut.-Col. Hon. C. M. P. Brabazon, O.B.E. (Maj., Irish Gds.), relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain rank of Lieut.-Col. ; Oct. 22 (substituted for notification in *Gazette* of Oct. 24).

The following Lieuts, relinquish their commns, on account of ill-health, and are permitted to retain their rank :—E. E. C. Pickwoad ; Nov. 6. J. A. F. Sinclair (contracted on active service) ; Nov. 7.

Sec. Lieut. A. T. Rose relinquishes his commn, on account of ill-health contracted on active service, and is permitted to retain his rank ; Nov. 7.

The notification in *Gazette* of June 27, concerning Capt. G. A. Revington, is cancelled.

Administrative Branch

Flight-Lieut. L. M. Boddam-Whetham to be Flight-Lieut., from (S.O.) ; Aug. 12 (substituted for notification in the *Gazette* of Aug. 29).

Flying Officer (actg. Flight-Lieut.) H. B. Dakin relinquishes the actg. rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut. ; Oct. 4.

Capt. L. M. Boddam-Whetham relinquishes his commn. on ceasing to be employed, from (S.O.); Aug. 28 (substituted for notification in the *Gazette* of Oct. 21, wherein this officer was shown under Flying Branch).

(Then follow the names of 26 officers who are transfd. to the Unemployed List under various dates.)

Maj. A. Brind relinquishes his commn, on account of ill-health contracted on active service, and is permitted to retain his rank; Nov. 6.

Lieut. A. L. Hitt (Lieut., D. of Cornwall's L.I.) resigns his commn.; Nov. 15.

The notification in the *Gazette* of Aug. 22 concerning Lieut. J. Edwards is cancelled.

Technical Branch

Sec. Lieuts. to be Lieuts.:—W. C. Francis; May 30. C. S. Goode; July 7 (substituted for notification in *Gazette* of Oct. 14). G. C. Walsh; July 14.

Sec. Lieut. (Hon. Capt.) W. E. Humphreys to be Lieut.; April 2, 1918, without the pay and allowances of that rank prior to Sept. 17, 1918.

Sec. Lieut. A. N. Goodwin to be Lieut., without the pay and allowances of that rank; Jan. 19.

Pilot Officer T. G. Brice to be Flying Officer, without the pay and allowances of that rank; Oct. 1.

W. J. Collins (late Deputy Commissary and Hon. Capt., Indian Army) is granted a temp. commn. as Sec. Lieut. (Grade A), without pay and allowances; April 1, 1918 (and to be Hon. Capt.).

Pilot Officer E. C. Farman to be Pilot Officer (Grade B.), from (Ad.); Oct. 18.

(Then follow the names of 30 officers who are transfd. to the Unemployed List under various dates.)

Capt. A. Belton, O.B.E. (R. Fus.), relinquishes his commn. on account of ill-health contracted on active service, and is granted rank of Maj.; Nov. 4.

Capt. C. Gordon Riley relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; Nov. 7.

Lieut. S. C. Tucker relinquishes his commn, on account of ill-health, and is permitted to retain his rank; Oct. 18.

The rank of Lieut. H. A. Chapman is as now described, and not Sec. Lieut. as stated in *Gazette* of March 28.

The notification in *Gazette* of Sept. 5 concerning Lieut. E. A. Baker, M.C. is cancelled.

Medical Branch

Flight-Lieut. G. Cranstoun to be actg. Sqdn. Leader whilst employed as Sqdn. Leader; Sept. 4.

Flying Officers to be Flight-Lieuts.:—S. A. Clark; Sept. 25. S. R. E. Davies, J. Gorsky, V. I. Levy, K. F. D. Waters; Nov. 1.

(2 officers transfd. to the Employed List.)

Capt. Q. Moir Gray relinquishes his commn, on account of ill-health, and is permitted to retain his rank; Aug. 26.

Dental Branch

Flying Officer F. B. Stradling to be Flight-Lieut.; Oct. 30.

Chaplains' Branch

(1 officer transfd. to the Unemployed List.)

The following Prob. Flight Officers are granted hon. commns. as Sec. Lieuts.:—F. H. Dawson, L. J. Empson; Nov. 22, 1918. R. P. France; Dec. 2, 1918. F. W. Ings; Jan. 16. D. E. Huck; Feb. 21. J. S. Mackinnon; March 9. A. E. Blaxill, W. N. Errington; April 15. O. Drew; April 30. J. W. Maidment; June 26.

Lieut. B. D. Bellamy (Essex R.) relinquishes his commn. on ceasing to be employed; Oct. 31.

(5 officers transfd. to the Unemployed List.)

The notifications appearing in *Gazettes* of dates indicated below, appointing the following officers to short service commns., are cancelled:—Flight-Lieut. L. P. Ferris-Scott (Ad.), Flight-Lieut. N. Keeble, D.S.C. (A.), Flying Officer F. G. Brookman (T.), Flying Officer H. H. Sharp (T.); Sept. 12. Flight-Lieut. L. O. Brown, D.S.C., A.F.C. (A. and S.), Flight-Lieut. D. O. Mulholland, A.F.C. (A.), Flight-Lieut. P. D. Robertson, A.M. (T.), Flying Officer C. Rapley (T.); Sept. 16. Flight-Lieut. P. E. L. Gethin, A.F.C. (A.), Flying Officer H. L. Rough, D.F.C. (A.); Oct. 10. Flying Officer S. Dawson, D.F.C. (A.), Flying Officer L. G. Morris (T.); Oct. 24.

The Christian names of Sqdn. Leader John Claude Malcome Lowe (A.P. (T.)) are as now described, and not "John Cecil Mansfield," as stated in *Gazette* of Nov. 11, appointing this officer to a short service commn.

AVIATION IN PARLIAMENT

Senior Officers of the R.A.F.

Maj. Waring asked the Under-Secretary of State to the Air Ministry whether there are in command of the Air Force one marshal of the air and five air vice-marshals; if so, will he state what work can be found to keep these officers employed; and whether the command organisation and administration could be performed efficiently by fewer officers of high rank?

Maj.-Gen. Seely: The reply to the first part of my hon, and gallant friend's question is that there is no marshal of the air at the present time, but that there are one air marshal and five air vice-marshals corresponding to one Lieut.-Gen. and five Maj.-Gens. These officers are fully employed, and I do not consider that this small number of senior officers is excessive for so vitally important a service.

Training and Staff, Egypt

Maj. Waring asked the Under-Secretary of State to the Air Ministry whether it is the intention to recommence flying training in Egypt; and, if not, what reduction it is proposed to make in the administrative staffs and units in that country, in view of the fact that only five active flying squadrons are now employed in that command?

Maj.-Gen. Seely: It is hoped to recommence flying training in Egypt, but a final decision cannot be taken until the strength and constitution of the after-war Air Force is settled. The administrative staff was reduced early this year to what is considered necessary to deal with the units under the command of the Air Officer Commanding, Middle East, of which command Egypt forms a part.

Sherburn-in-Elmet and Tadcaster Aerodromes

Maj. Lane-Fox asked the Under-Secretary of State to the Air Ministry how many machines have gone up from the aerodromes at Sherburn-in-Elmet and at Tadcaster during the past three months; how the cost of these aerodromes has been justified; by what date it is expected that they will be closed; and whether they will be demobilised or sold?

Maj.-Gen. Seely: I am obtaining the information asked for in the first part of this question. In regard to the second part, as I informed my hon. and gallant friend on October 30, both these aerodromes are being used for the storage of standard-type machines and for civil aviation. Other accommodation is not at present available for the storage of these valuable machines, which would deteriorate if not constantly attended to. Tadcaster is also the station of a headquarters unit. In regard to the third part, instructions have been given to close down both stations when cleared of stores. Sherburn-in-Elmet will, it is expected, be cleared by March 31 next and Tadcaster by the end of this year. In regard to the fourth part, when evacuated by the R.A.F. both stations will be handed over to the Disposal Board for sale.

R.A.F. at Fermoy Camp

Mr. Grunny on November 5 asked the Under-Secretary of State to the Air Ministry whether he is aware that the 106th Squadron, composed to a large extent of young lads, is still under canvas at Fermoy, county Cork, with only boards to sleep upon, and blanket covering; and whether, in the interests of the health of these lads and in view of the cold weather, he will consider the possibility of utilising the present surplus huts and other stores?

Maj.-Gen. Seely: No. 106 Squadron was disbanded on October 8 last. If, however, the hon. gentleman is referring to the detached flight of No. 105 Squadron now stationed at Fermoy, arrangements were made some weeks ago to accommodate this flight in buildings lent by the Army.

Gratuities and Deductions for Debt

Mr. Hogge asked the Under-Secretary of State to the Air Ministry whether deductions for debt can be made from airmen's war service gratuities; and, if so, why the practice is different from that obtaining at the War Office, where no such deductions are made?

Maj.-Gen. Seely: The Order granting war gratuities to airmen provides that, except in the case of airmen serving on a normal Service engagement, the gratuities shall be held liable to meet any public claim, Service debt, or Service claim.

Airship Shed, East Fortune

Lieut.-Col. Sir John Hope asked the Under-Secretary of State to the Air Ministry whether the steel airship shed constructed at East Fortune for R 34, at a cost of £250,000, is to be moved to Howden, or how this shed and five smaller airship sheds at East Fortune are to be disposed of?

Maj.-Gen. Seely: It is not the intention to move to Howden Airship Station the rigid airship shed at East Fortune in which the R 34 is at present housed, and to which I assume my hon. and gallant friend refers. The cost of this shed was £160,000. This shed and the other two (not five) small airship sheds on the station, if not required for the purposes of civil aviation, are to be handed over to the Disposals Board.

R.A.F. Stations to be Retained

Sir J. Hope asked the Under-Secretary of State to the Air Ministry whether it has now been finally decided which Air Force stations are to be permanently retained; and whether he has stopped all construction work both on those air stations which are to be abandoned and also on those air stations concerning which a decision has not been arrived at?

Maj.-Gen. Seely: The answer to the first part of my hon. and gallant friend's question is that the retention of certain stations has been decided upon and that in the case of certain other stations a decision is awaiting the final settlement of the peace basis of the R.A.F. The reply to the remainder of the question is that construction work has been stopped on all stations other than those which it is definitely intended to retain except in cases where a small amount of work has been necessary for the safety and preservation of buildings partially completed.

Charlton Rope Works

Mr. Crooks asked the Under-Secretary of State to the Air Ministry whether he is aware that the R.A.F. is using as stores the rope walk of Messrs Charlton Rope Works, Anchor and Hope Lane, Charlton, S.E.7, thereby preventing the firm from carrying out orders which would enable them to work their present staff full time and to employ immediately an increased staff; and whether, in view of the unemployment at present existing in the Woolwich district, he is prepared to order the immediate release of these premises?

Maj.-Gen. Seely: I am aware that the Charlton Rope Works is being used as a depot for mechanical transport stores, which will be moved to Kidbrooke as soon as space is made available by disposal of surplus stores. As far as can be estimated at the present time, it should be possible to hand the rope walk over to the firm in February of next year; I can assure my right hon. friend that there shall be no avoidable delay.

Anti-Aircraft Station, Hyde Park

Mr. Wilson-Fox on November 6 asked the First Commissioner of Works whether he is satisfied that the anti-aircraft station near the Serpentine, in Hyde Park, is still required for purposes of defence against hostile aircraft; and, if it is not so required, if he will order the immediate removal of this encroachment upon space which is needed for purposes of public recreation?

Mr. Parker: The buildings of the station have, I understand, now been sold by the Disposals Board, and will be removed as soon as possible and the land restored to the Park.

R.A.E. Farnborough Apprentices

Viscount Wolmer, on November 10, asked the Under-Secretary of State to the Air Ministry whether he is aware that a number of lads are being discharged from the Royal Aircraft Establishment, Farnborough, before they have completed their apprenticeship; and whether, in view of the fact that there are no other engineering works in the neighbourhood, he will take steps to assist them to complete their apprenticeship in other engineering works in the country so that the time that they have already spent and the knowledge that they have already acquired is not wasted?

Mr. Kellaway: I have been asked to answer this question. No lads of the apprentice class (excepting nine who were dispensed with in June last as unsuitable for engineering training) have been discharged, and, in spite of the drastic reduction in the personnel of the Royal Aircraft Establishment, I hope that the necessity for discharging any lads of that class will be avoided. The remainder of lads discharged since the Armistice, 195 in number, have been selected only from those who were originally engaged as office boys, messengers, etc., but who were subsequently drafted into the shops and given an opportunity of learning a trade.

Ordnance Survey and Aerial Photography

Lieut.-Col. Moore-Brabazon asked the Parliamentary Secretary to the Board of Agriculture what steps, if any, have been taken to utilise the experience obtained during the War in connection with aerial photography for mapping purposes towards assisting the Ordnance Survey work in this country, having regard to the fact that many maps are now out of date?

Sir A. Boscawen: The value of aerial photography for the purpose of map-making in the theatre of war is fully appreciated by the Ordnance Survey, and its application to peace surveys is being carefully studied, but at present the process is generally more expensive than normal methods, and less accurate. The Ordnance Survey has full information on the subject, and is in touch with those who carried out air surveys on the Western Front and elsewhere. Some of these officers are now on the Ordnance Survey staff.

Air Ministry Finance

ASKED by Sir F. Banbury, on November 10, what suggestions of the Select Committee of National Expenditure he proposes to adopt, Mr. Chamberlain, the Chancellor of the Exchequer, said that with regard to the presentation of the 1919-20 Air Ministry Estimates to Parliament before the consent of the Treasury had been obtained, definite instructions have been given that in future no Estimates shall be presented to Parliament before the consent of the Treasury has been obtained.

With regard to the strengthening of the position of the Assistant Financial Secretary, Mr. Chamberlain explained that the Financial Secretary to the Treasury had summoned periodical meetings of the financial officers of other Departments, and was considering with them methods for strengthening the hands of the financial officers within their own Departments.

The position of the Assistant Financial Secretary at the Air Ministry was similar to that of the Assistant Financial Secretary at the War Office, each having independent power of criticism and of appeal, if necessary, to the Council through the Finance Member.

Air Service

CAPT. WEDGWOOD BENN, in the House of Commons on November 12, asked the Prime Minister whether the Government adheres to its pledge to maintain the unity of the Air Service ?

Mr. Bonar Law : The answer is in the affirmative.

Resignation of Maj-Gen. Seely

MAJ.-GEN. SEELY (speaking from the Front Opposition Bench) : The House generally wishes to know the reason for the retirement of any of its members from the Ministry, and in a very few words I will endeavour to tell the House the reasons which have impelled me to resign the high position which I have hitherto held. When the Government was first formed the Prime Minister asked me to go to the Air Ministry, and in a curious phrase, as announced officially, to "preside over the Council." It was a curious arrangement in that the right hon. gentleman opposite (Mr. Churchill) was to hold the seals of both offices as Secretary of State for both War and Air. It had the obvious anomaly that the Admiralty was left out of the business altogether. But I accepted it because I had a very deep interest in the Air business for a very long time. Indeed, I was charged by Mr. Asquith, then Prime Minister, with the task of being President of the Committee of Imperial Defence, which laid the foundations of our present Air Service. Also we were not then at peace with Germany, and I thought it my duty to take any office in which one could be of service. It involved, obviously, the dangers of dual control. Dual control is a dangerous thing anywhere, and, as my right hon. friend the Secretary of State for War would be the first to admit, it is peculiarly dangerous in the air. Nevertheless, I undertook the duty gladly, and endeavoured to work it, but it very soon became apparent that the thing would not work, not for any personal reason, but because by actual fact and by statute the only man who can preside over the council is the Secretary of State. He cannot divorce himself from his responsibility, even if he wishes to do so. All questions such as these, submissions to the Sovereign, memoranda to the Cabinet, dealings with the responsible heads of other Government Departments, where any question of controversy arises, and, above all, on questions of high policy, must be the duty of the Secretary of State, and of him alone.

As soon as this became apparent I informed the Leader of the House, through my noble friend the member for Chichester (Lord Edmund Talbot) that the arrangement was bound to be inefficient and wasteful and that I would ask for a change. He begged me to wait until after peace was made with Germany. I accordingly did so. When the Prime Minister returned in July, I then put the case before him, and in very precise terms stated that the present arrangement, for the reasons I have shortly given, was one which I thought was not in the interests of the State, and, above all, inimical to the interests of the Air Service, and I asked for a change. The decision was delayed, first owing to the Prime Minister's absence in France, having a much-needed rest, and then owing to the railway strike. The matter came up finally for decision twelve days ago. The Prime Minister treated me with the utmost courtesy and consideration, begged me to reconsider my position, and finally told me that he had decided on the present plan after due consideration, and that he did not propose to abandon it. The only possible course for me to take, as I am sure the House will agree, whoever of the two of us was right, was for me to resign and be no longer responsible for an arrangement which I was convinced was wasteful and inefficient.

There is no personal question involved. There is no personal question between myself and my right hon. friend the Secretary of State for War. If any man could have done two things he could have done, with his boundless industry. I have never met so industrious a man—and with his care for the Air Service as a whole, than whom it has had no better friend. If any man could have done it he would have done it, but the thing is obviously impossible. The War Office is a whole-time job, as I have reason to know, and the duty of the Secretary of State for Air—this service, with its vast possibilities—is a whole-time job too. A man cannot be in two places at once, even if he is the Air Minister. The very fact that the offices are distinct, that the Air Ministry is a distinct office, makes it quite impossible for the responsible head of one to be also the responsible head of the other. Still less is there any personal difficulty in the Air Ministry itself. I can say truly, and I have had some experience of public life, that never has a man been so faithfully served by loyal and devoted servants as I have been in my position by the members of the Air Council, and especially by Sir Hugh Trenchard and Gen. Sykes, whom I think the State is fortunate in having at the head of their respective Departments. The issue involved is very clear and very definite, and involves questions of vast importance. By deciding as the Prime Minister has done that the Air Ministry is to receive its guidance from its responsible head, from a man who can only give a fraction of his time to it, it seems to me that three certain consequences follow. First of all, because such a man, however industrious, cannot possibly give enough time to enable business to be efficiently conducted, and it must mean delay, and delay must mean waste—waste of time, waste of energy, waste of money. Secondly, the fact that the Admiralty is left out of the business must make it difficult to work in with that great Department. How can the First Lord of the Admiralty appeal to the Air Ministry for a proper allocation of funds and a proper allocation of energy, with the infinite possibilities of air effort in regard to the Navy, when all the time he finds that the man he is addressing is the Secretary of State for War ?

Over and above all, the result of this decision must be that the Air Ministry is condemned definitely to be a subordinate office and an annexe of the War Office, with results, I am sure, inimical to the good of this country. We must be involved in waste of our commercial possibilities. We must be involved in waste of money on a gigantic scale by not taking advantage of the new inventions and of the new power that the air has given us, to enable us to undertake our great and increased responsibilities throughout the world. If anybody doubts that, let him consider what is the possibility of the air. One aeroplane has saved a war in Afghanistan, and in future aeroplanes may do much more. If it be said, on the plea of economy, that it is wise to combine the offices, then I would say that it is wasteful in the extreme. We cannot possibly hope to maintain our position throughout the world unless we use science to the utmost, and especially the science of the air. I could no longer consent to agree to a plan which I thought would have these fatal results, and I so told the Prime Minister. Believing as I do that the result must be a loss of millions of money and of thousands of lives, I asked him to relieve me of that duty. He may say that he knows better. He may say that this is the old dispute between brigade headquarters and general headquarters, and that from that there can be no appeal. In that case there is no appeal, but here there is an appeal. There is an appeal to this House, and to this House, accordingly, I appeal.

Lord Hugh Cecil : In view of the importance of the statement to which we have just listened from the right hon. gentleman, shall we be given an opportunity of discussnig the statement, and the circumstances in which it has arisen, and, if so, on what day ?

Mr. Bonar Law : It is not usual, I think, for a member of the Government to say anything in reply to a personal statement such as my right hon. friend has made, and I should not have done so except for the noble Lord's intervention. Since I am on my feet, however, I desire to say, on behalf of the Government, how much we regret that our right hon. friend has found it necessary to resign, but at the same time to say that it is simply a question of difference of opinion ; he takes one view and we take another. As regards time for discussion, we shall, of course, follow the wishes of the House. I cannot name a day, but if there is a desire for such discussion we shall be very glad to afford the opportunity for it.

Mr. Billing : May I ask whether the right hon. gentleman the Leader of the House can say if it is the policy of the Government to appoint another Air Minister ?

Personals.

Roll of Honour

The War Office announced on November 12 that Capt. St. C. C. TAYLER, M.C., R. Suss. Regt., attd. R.F.C., who was previously reported missing, is now reported killed.

Deaths

Sec. Lieut. CHARLES CRAWFORD BROUNCKER, R.A.F. (late London Scottish), who was previously reported missing on November 4, 1918, and is now presumed killed on that date, was the only son of Mr. and Mrs. Herbert Brouncker, of The Elms, Parkside, Eltham, and Flotsam, Hythe.

Married

Capt. BERNARD JAMES BEETON, M.B.E., R.A.F., was married on November 11 at St. Peter's, Brighton, to DULCIE, daughter of Mr. and Mrs. TILLSTONE, of Brighton.

To be Married

The marriage arranged between Capt. EDWYN TYRRELL BECK, D.S.O., M.C., Royal Fusiliers, attached R.A.F., and Miss MOLLIE DUGDALE will take place on Wednesday, December 17, at St. Mark's, North Audley Street.

Items

Maj.-Gen. the Right Hon. J. E. B. SEELY, M.P., was received in audience by His Majesty at Buckingham Palace on November 12, upon his resignation as Under-Secretary of State for Air.

All officers of the old staff of the R.A.F. Armament School are invited to a re-union on December 5, at the Connaught Rooms, Great Queen Street, Kingsway. Assemble 19.00 ; dinner 19.30. Tickets £2 (obtainable up to December 1). Apply Maj. G. E. Smith, 10, Chevening Road, Brondesbury, N.W. 6.

Col. E. R. ENGLISH, D.S.O., late A.P.M. of the London District, has been appointed secretary of the new London Flying Club, Hendon.

The will of Lieut. EVAN LINDSAY PRICHARD, R.A.F., of Cardiff, has been proved at £4,328.

BOY MECHANICS FOR THE ROYAL AIR FORCE

The Air Ministry has recently instituted a new scheme to secure the entry of well-educated boys for a systematic course of training as skilled craftsmen for service with the Royal Air Force.

Under this scheme boys will be entered between the ages of 15 and 16 years for a period of 10 years' colour service, followed by two years' service in the Reserve. During the first three years they will undergo a course of educational and workshop training at the end of which those who have passed the requisite tests will be promoted forthwith to the rank of leading aircraftsmen in one or other of the skilled trades.

To give scope to the more capable and ambitious boys, and to ensure that the Air Force shall secure the full benefit of their ability, a certain number of those who show most promise during their training will be chosen for an additional six months' course of higher instruction, being promoted at once to the rank of corporal. From among these some may be selected for the grant of a commission, and will proceed to the Cadet College for training as flying officers, with the cadets entered by open competition.

There will also be opportunities for promotion to a commission at a later stage to those who show their suitability during their service in the ranks.

In order that the opportunity of competing for entry into the Royal Air Force under these conditions may be brought within the reach of the largest possible number of boys, two distinct methods of admission are being arranged—(1) open competitive examinations, (2) examinations limited to candidates nominated as in every way suitable by the local education authority of their district. A limited number of candidates with Service claims may also be admitted on the nomination of the Air Council subject to their passing a qualifying test only.

The first examination under the scheme will be one for boys nominated by their Local Education Authority, and will take place in December. Full particulars in regard to the arrangements of the grant of nominations for this examination have been circulated to the Local Education Authorities throughout the country, many of whom have already promised their support. As nominations must reach the Air Ministry not later than November 22, prospective candidates should communicate with their Local Education Authority without delay. Boys who are successful in this examination will enter the training centre early in February, 1920.

During the War it was not possible to give enlisted boys more than a few months' training, neither was it feasible to confine the entry only to boys of sufficient intellectual attainments to ensure that they would benefit by a long apprenticeship in R.A.F. technical trades.

The scheme which forms the subject of this communique constitutes an entire departure from the methods imposed by war conditions, and is designed to meet the requirements of the R.A.F. as organised on a permanent basis.

Training centres are consequently being reorganised to deal with this new entry, and the machinery of education, both general and vocational, is being largely increased and developed for the same purpose.

◆ ◆ ◆ ◆

French Aeroplane Service in Chile

Commander V. Guichard, chief of the French Aeronautical Mission, has arrived at Santiago in connection with the proposal of French aircraft manufacturers to form a company for running commercial air services in Chile. One of the first lines will be between Santiago and Valparaiso.

Italian Flyer Visits Helsingfors

Lieut. Maddalena, the Italian flying officer, on November 10 flew from Stockholm to Helsingfors, a distance of 440 kilometres, in 2 hours and 20 minutes.

Five Killed in Spain

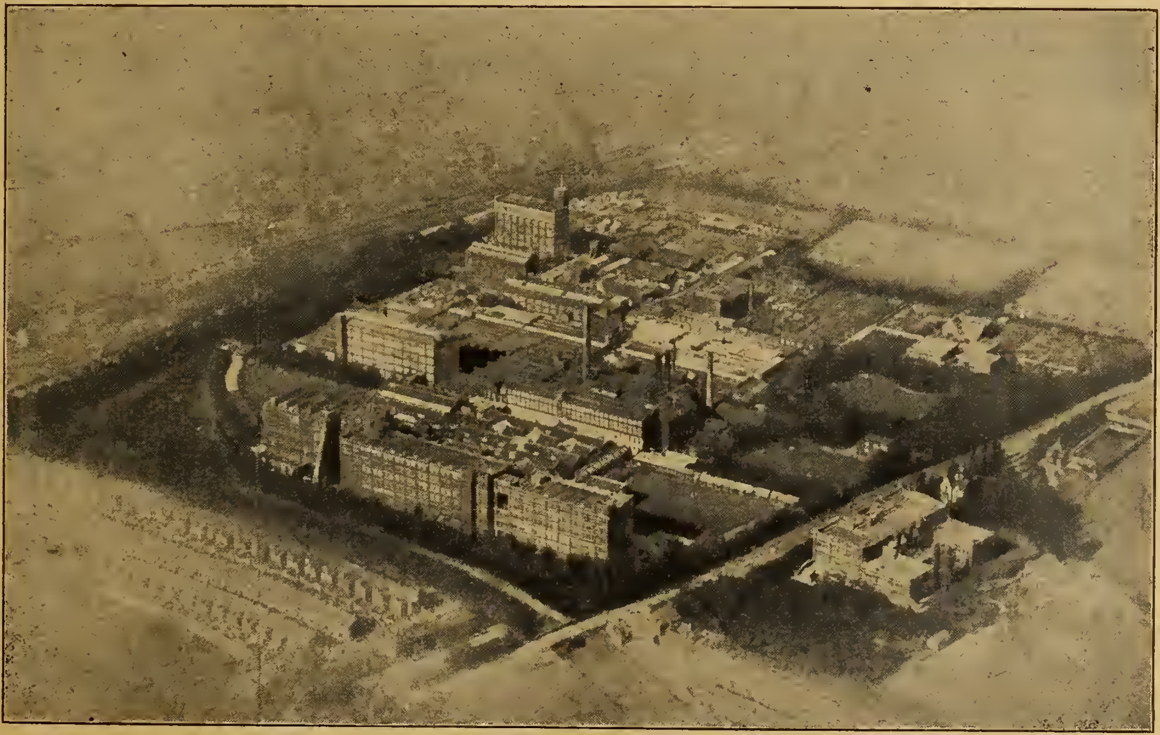
A Farman biplane, flying from Pau to Madrid, crashed on the morning of November 17 outside the village of Delamira, near the town of Soria, midway between Madrid and the Pyrenees. The French pilot Agostini, the Spanish flying officer Capt. Baños and three mechanics were killed.

'Plane Post in Germany

An aeroplane carrying the first aerial post from Berlin to Konigsberg was reported at the end of last week to have arrived at Konigsberg, after a flight of six hours.

German Photogrammetric Project for Brazil

It is reported from Germany that recent experiments have been carried out at Lake Constance with a Schiempflug three-camera outfit, with a view to obtaining data and experience for an ambitious scheme to photograph from the air vast tracts of territory in Brazil. It is proposed shortly to carry out other experiments over Lake Constance by taking aerial photographs with the triple-camera outfit either from a Zeppelin aeroplane or from the airship *Bodensee*.



Where the cocoa of Messrs. Rowntree and Co. is manipulated. Being a photograph from the air by the Aircraft Manufacturing Co., Ltd., of the Rowntree works and Garden Village at York

SIDE-WINDS

WE are informed that Mr. F. H. Arnott has severed his connection with Messrs. Arnott and Harrison, Ltd., which firm will in future be carried on in the same name, under the supervision of Mr. C. A. Harrison and Mr. F. Hornsby Wright as directors.

* * *

MESSRS. ROLLS-ROYCE, LTD., beg to announce that owing to the increased cost of production, the price of the Rolls-Royce chassis is fixed at £1,850.

* * *

ARRANGEMENTS have been completed for the amalgamation of the business carried on by Mr. Robert W. Paul at New Southgate, London, with the Cambridge Scientific Instrument Co., Ltd. Mr. Paul will join the board of directors, and the manufacture of instruments will be continued both at Cambridge and at New Southgate. Until the end of the year the selling and manufacturing arrangements will be unchanged, but on January 1, 1920, the name of the company will be altered to the Cambridge and Paul Instrument Co., Ltd., and as soon as possible the head office and showrooms transferred to London. It is hoped that the experience gained by the staffs of both firms, when combined, will lead to greater and more rapid advances.

* * *

ON Tuesday, November 11, Colonel G. L. P. Henderson, M.C., A.F.C., started from Hounslow Aerodrome for Copenhagen, intending to make the journey in one day. Colonel Henderson's passenger was Mr. Willars Petersen, who was a passenger on the belated Cunarder *Mauretania*, and was due in Copenhagen before the boat landed in England. Mr. Petersen sent a wireless message while in mid-Atlantic to his representative, Mr. Mills, in London, to arrange for an aeroplane to convey him to Denmark. Mr. Mills immediately communicated with the Lep-Aerial Travel Bureau, who arranged with Colonel Henderson to make the flight. Colonel Henderson worked hard with his mechanics to get his 160 h.p. Beardmore-Armstrong-Whitworth tuned up and ready for the flight. Mr. Petersen arrived in London on Monday night and was introduced to Colonel Henderson, and it was arranged that a start should be made at 6 o'clock on Tuesday morning. A splendid flight was made as far as Hamburg, where a landing had to be made owing to a snowstorm on Tuesday evening.

* * *

ALTHOUGH many manufacturers of cars are accepting orders only on conditions that the price charged is that ruling at the time of delivery, the makers of the Armstrong-Siddeley six-cylinder car state that all orders which are given to them now will be accepted and executed at the present price—£720 for the complete chassis.

* * *

THE Aeronautical Intelligence Bureau, Ltd., has removed to more convenient and commodious offices at 50, Jermyn Street, S.W. 1. They have secured the temporary use of one 'phone number—Gerrard 1060—and it is hoped to have three lines installed shortly.

COMPANY MATTERS

Joseph Owen and Sons, Ltd.

THE directors announce a dividend at the rate of 5 per cent. per annum for the half-year and a further distribution of 3½ per cent., making 8½ per cent. for the year, on the preference shares, and a dividend at the rate of 5 per cent. per annum and a further distribution of 23½ per cent., making 28½ per cent. for the year, on the ordinary shares.

PUBLICATIONS RECEIVED

The Flight Across the Atlantic. The Curtiss Aeroplane and Motor Corporation, New York City, U.S.A.

The Costing Problem. By Edward T. Elbourne. London: The Library Press, Ltd., 26, Portugal Street, W.C.2. Price 4*s.* 6*d.* net.

Revue de l'Ingenieur et Index Technique. Vol. XXV, No. 2-3. September-October, 1919. Bureau d'Organisation Economique, 124-126, rue de Provence, Paris. Price 4 fr.

"The Triumph of British Engineering." William Beardmore and Co., Ltd., Glasgow, Scotland.

All About Aircraft of Today. By Frederick A. Talbot. London: Cassell and Co., Ltd. Price 7*s.* 6*d.* net.

Catalogues

Brolt Electric Lighting and Starting System. Brown Brothers, Ltd., Great Eastern Street, E.C. 2.

Motor Accessories. Brown Brothers, Ltd., Great Eastern Street, E.C. 2.

IMPORTS AND EXPORTS, 1918-1919.

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916. see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; and for 1918, see "FLIGHT" for January 16, 1919.

	Imports.		Exports.		Re-Exportation.	
	1918.	1919.	1918.	1919.	1918.	1919.
	£	£	£	£	£	£
January ...	49,402	555,989	24,765	57,571	—	—
February	51,941	453,822	13,545	57,972	—	—
March ...	47,930	704,424	11,451	72,716	1,000	400
April ...	33,342	97,662	10,815	25,433	—	—
May ...	942,866	136,631	67,224	38,428	—	—
June ...	864,296	1,410	35,658	41,526	—	—
August ...	566,137	67,292	71,503	60,581	—	—
September	505,160	172,192	8,033	65,349	100	—
October	294,835	132,243	9,166	87,635	—	500
	3,355,909	2,321,565	252,160	507,211	1,100	900

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published November 20, 1919.

2,145. A. VAN HESTE. Hangars or garages, etc. (133,975.)
11,813. D. M. BOWYER-SMYTH. Propelling and sustaining means for aircraft. (133,978.)
12,082. E. R. CALTHROP. Parachutes. (133,979.)
16,872. H. G. KING. Flying boats, floats, etc. (134,000.)
17,426. C. and C. H. BLAIR. Glueing machine for laminating spars, etc. (134,035.)
17,904. H. S. EDGAR. Fuse for igniting flares, etc., dropped from aircraft. (134,052.)
18,581. H. O. SHORT. Floats for aeroplanes. (134,065.)
18,864. R. STOTT. Rotary I.C. engines. (134,073.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published November 20, 1919.

1,429. A. V. F. MARION. Magnetic compass. (122,643.)
15,220. G. H. FOSTER. Aeronautical apparatus for scientific toy, etc. (134,182.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xliii, xliv, xlv, and xlvi).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates*:—

UNITED KINGDOM	s.	d.	ABROAD*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 570 (No. 48, Vol. XI.) NOVEMBER 27, 1919 **Weekly, Price 6d. Post Free, 7d.**

Flight
The Aircraft Engineer and Airships
Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**
These rates are subject to any alteration found necessary under abnormal conditions
**European subscriptions must be remitted in British currency.*

CONTENTS

Editorial Comment PAGE
"Air Policy Unchanged" .. 1519
The Conservation of Oil .. 1520
A Question of Taxation .. 1520
Flight—and the Men: Mr. Arthur J. Cattle .. 1521
The Nieuport "Nighthawk" .. 1524
Royal Aero Club: Official Notices .. 1532
Some Kite Balloon Experiments. By Griffith Brewer .. 1533
Airisms from the Four Winds .. 1538
The Royal Air Force.. .. 1541
Honours .. 1542
Personals .. 1542
In Parliament 1543
Correspondence .. 1544

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Nov.	...	**Entrance Examination for R.A.F. College.**
Dec. 3	...	**"The Air Force." Lecture by Air-Commodore H. R. Brooke-Popham before R.U.S.I.**
Dec. 19 to Jan. 4, 1920.	..	**Paris Aero Show.**
July, 1920		**S.B.A.C. International Aero Exhibition at Olympia**
1920		
Mar. 1	...	**Air Ministry Competition (Small Type Aeroplanes)**
Aug. 1	...	**Air Ministry Competition (Seaplanes)**
Sept. 1	...	**Air Ministry Competition (Large Type Aeroplanes)**

EDITORIAL COMMENT

"Air Policy Unchanged"

A RECENT question addressed to the Prime Minister in the Commons elicited the reply that the air policy of the Government remains unchanged. In its summary of the Parliamentary proceedings, *The Times* interpolates the remark: "More's the pity." With that we cordially agree. The great trouble, however, seems to be that the Government has no air policy, except possibly to scrap as rapidly as it conveniently can the organisation so laboriously and painstakingly built up during five years of War. It is destroying the fighting side of the R.A.F. and is putting nothing in its place. As to commercial aviation, we are still waiting to hear how and where the "encouragement" of which so much has been heard is to begin. The late Under-Secretary of State resigned because of his dissatisfaction with the way things are going and no move seems to have been made to replace him. Instead, the Air Ministry seems to be becoming more of a department of the War Office than ever. There is talk that matters are to remain as they are, pending the establishment of the prophesied Ministry of Defence.

It may be that it is the Government's intention to constitute such a Ministry. If it is, well and good. We shall certainly not as laymen presume to criticise the motives of policy which, after careful examination of the whole subject of Imperial defence, have led up to the presumed decision. But even if it be in contemplation to take such a course it will be necessary that the Air Department of the Ministry shall have a titular head, responsible to the Minister of Defence and to Parliament—a head, moreover, who will devote the *whole* of his time to air matters. That being so, is there any valid reason why the Air Ministry as at present constituted should be minus a working head? Obviously that is the position now. Mr. Churchill, for all his boundless energy, cannot successfully perform the work of two great departments of State, both of which are at the moment, to a great extent, in process of recasting. It was that which mainly underlay Gen. Seely's decision to resign—because, in his view, both War Office and Air Ministry are each a "one man job."

We agree that the Government has its hands fairly full of the work of reconstruction, but surely this matter of the settling of air policy is one of capital importance and the greatest urgency. While the Government dillies and dallies over policy we are making no progress in commercial aviation, to which we must look—apart from all other considerations—to fill up the cadres of our fighting Air Service in another war. No one dare move in the matter of the organisation of new commercial services until the Government has clearly defined the policy for which it still seems to be groping in the dark. The industry which had begun to feel its feet is rapidly losing faith and heart and unless a move is made very shortly the Government will come face to face with the fact that all the work of building up has to the commenced afresh.

The Conservation of Oil

In the course of an interesting paper read by Rear-Admiral Dumas before the Institution of Petroleum Technologists some very impressive figures were quoted in relation to the world's fuel supplies. In round figures, the annual output of coal over the whole world is some 1,250,000,000 tons, all of which is available for fuel and is presumably so used. Similarly, in round figures the world's oil production is in the neighbourhood of 75,000,000 tons, of which about 45,000,000 tons can be manufactured into oil fuel The huge advantages of oil fuel have appealed to shipowners and other power users, with the result that all eyes are now turned to the utilisation of oil fuel, and it tends to be forgotten that the quantity available is limited, and that unless the oil-owners increase their resources—or raise the price—the demand will very shortly outrun the supply. Admiral Dumas laid it down that there is only of oil fuel about one-thirtieth of the quantity of coal. Oil, he says, is therefore a luxury and as such great efforts should be made to conserve it and to save every ounce possible.

What he suggests is that more and better education is necessary in the economical use of oil fuel, and that the possible oil resources of this country should be properly developed without delay and by corporations which are well found as to funds and the essential technical knowledge. Further, he suggests research in connection with the improvement of the efficiency of oil-consuming engines, both internal combustion and oil-burning steam pumps. But he does not go far into the ways and means. Indeed, all he suggests in his paper is as we have briefly outlined—that present systems are extravagant and wasteful and that they should be improved. We agree that this is so and that the gallant Admiral is right in his appeal for better methods and less waste, though we think it is but fair to point out that this is precisely what every engineer associated with oil-firing or internal combustion practice is now, and has been for years, trying to do. All the talk is of improving efficiency, which is only another way of getting more value out of the fuel unit and thus assisting to eliminate waste. Of course, the question of developing all possible sources of supply is one to which more attention must be devoted and that immediately. The oil fuel supplies of the world are an absolutely uncertain quantity and therein they differ materially from the coal measures. The latter can be guaged within a very little and it is possible to say with approximate certainty the amount of coal which can be recovered from any given working. The oil well is entirely a different affair. All we can say about any individual well is that it is giving a certain amount of oil to-day. To-morrow it may cease to flow, or, on the other hand, it may continue alive for months or years. That is why the way is so clearly pointed to the better treatment of our coal supplies, from which we know it is possible to recover a certain determinate quantity of fuel oil. Again, the development of the shales if they will pay for development, as we are assured they will, must afford a further very early determinable source of fuel supply.

The fact of the matter is that we are only at the commencement of the oil-fuel era and we are at present more or less groping our way. The extent of our resources is a sealed book which we are striving to open. It will be opened, we have no doubt, and we believe its opening will disclose that the available resources will suffice for all the needs of the world for many years to come. That, however, is no argument for the continuance of our present uneconomical methods, with particular reference to the appallingly wasteful methods we employ in relation to the use of coal. That is a subject with which we have dealt before and have urged that legislation should be gradually brought into being to render compulsory the distillation of all coal before it is used for power or heating purposes, so that the maximum quantity of by-products, including the fuel oils, may be first recovered.

◆ ◆ ◆

A Question of Taxation

There is at present sitting a Committee charged to consider the best methods of re-arranging the basis of motor taxation. That is a matter which at first sight does not appear to have much concern to those whose interests lie with aviation, but a little inside examination of the problems this Committee is discussing will show that it has a very direct interest indeed. From certain discussions which have taken place in the press and from other indications which are clear to be read, we have more than an idea that one of the final recommendations will be that there shall be a flat rate of import duty levied on petrol and that there shall be no rebates of any kind whatsoever. That is probably fair enough as it applies to the motor vehicle and would certainly be infinitely better than the chaotic state of motor taxation existing now. But now let us regard the avowed purpose of this taxation. A very large annual sum of money—£23,000,000 this year—has to be found for the purposes of highway maintenance and reconstruction. It is agreed that the road user must pay for his use of the roads. That principle has been laid down by the Government and tacitly accepted by the motoring community. So far, so good. Now, it is proposed that this flat rate of duty—fourpence per gallon has been named as the figure—shall be levied as an import duty on all petrol coming into the country. If it were a suggested tax for general revenue purposes, or a tax levied as part of a protective policy, there would be nothing more to be said. But it is not—*it is a tax for highway purposes.*

Now we come to the objectionable part of the proposal, as viewed from the standpoint of those interested in aviation. Aircraft do not make any use of the roads, yet, under the suggested scheme of taxation, they are to be called upon to contribute, to the tune of fourpence for every gallon of imported fuel used, towards the upkeep of the highways they do not use. It may be that the Committee now sitting will have seen for itself the unfairness of such a proposal and be prepared with recommendations for avoiding it, though we are not particularly impressed with the chances unless the anomaly is pointed out beforehand and fought for to a finish. That is why we have taken the opportunity of doing so, before the Committee has got well to work. It is not at all a question of merely having an anticipated grievance. On the contrary, it is a very serious matter for the aircraft industry, which is struggling to keep its feet during a transitional and very uncertain period and which needs encouragement and not the fastening round its neck of a permanent impost. We are fully aware of the fact that even at fourpence per gallon the industry would be better

Flight—And the Men

"Flight" Copyright

Mr. ARTHUR J. CATTLE, Head of the Central Aircraft Co., and of Messrs. R. Cattle off in the matter of the fuel tax than it is at the moment, but it should be remembered that the present tax of sixpence per gallon is a temporary one and that the time is now approaching when it will be revised. Therefore, it will be well if the industry, and those who speak for it, should keep a careful watch on proceedings and be prepared to argue the case when the time comes.

◆ ◆ ◆ ◆

Gen. Seely's Resignation

At the meeting of the Parliamentary Air Committee at the House of Commons on November 18, Maj.-Gen Seely made a statement of the reasons for his resignation, and the Committee passed the following resolution:—

> "That this Committee expresses its deep anxiety in regard to the present union of the Air Ministry and War Office and the consequent position of the Royal Air Force, and requests the Government to announce its air policy at the earliest possible moment and to provide a day for a full discussion."

Sir W. Joynson Hicks presided. Lord Hugh Cecil was elected deputy-chairman of the Committee, Mr. Raper and Mr. T. C. Platt were chosen as hon. secretaries, and Col. Burgoyne was elected hon. treasurer.

Indian Frontier Air Work

From messages to hand from Waziristan it appears that the air aids against the Waziris and Mahsuds have proved effective. The air operations commenced on November 13 when Kaniguram, Makin, and Marobi were bombed by 25 aeroplanes which dropped five tons of bombs. Operations continued daily, and although machines had been heavily fired at, all returned safely. The offending section of the Wazirs have accepted unreservedly the British terms, and against the Mahsuds air operations continue.

Gen. Sykes's Visit to America

No fresh date has yet been fixed for the postponed visit to the United States of Maj.-Gen. Sir Frederick Sykes, Controller-General of Civil Aviation. It is understood that the postponement of the visit is the direct outcome of Gen. Seely's resignation, Gen. Sykes remaining in London at the request of Mr. Churchill, it being considered undesirable that he should be abroad while the appointment vacated by Gen. Seely is unfilled.

The Defence of London

Sir Percy Scott was the guest of the evening on November 18 at the first annual dinner of the Royal Naval Anti-Aircraft Corps Association, and in proposing the toast of "The Association," he said that at the outbreak of war the War Office thought that no aeroplane or Zeppelin could come to London, and they were just as convinced as was the Admiralty that a submarine could not sink a ship. Sir Percy went on to relate how in fifteen months only eight guns had been got together for the defence of London. On the call of Mr. Balfour, he undertook the defence, and after a struggle to secure guns, he ultimately raised 150. He paid a warm tribute to the efficiency of the corps.

The England-Australia Flight

Although the telegrams from Capt. Ross-Smith, piloting the Vickers-Vimy-Rolls, only reach England after a delay of several days, it is evident that he is making splendid progress. In our last issue it was recorded that the machine had reached Pisa, whence he flew to Rome on November 15. The next day he went on to Taranto and Suda Bay. On November 18 he reached Cairo safely, taking 7½ hours for the trip, while on November 19 he was reported at Damascus.

The Air Ministry announces that Maj.-Gen. Sir F. H. Sykes has received the following message from the Prime Minister of Australia, for transmission to Capt. Ross Smith:—

"Desire congratulate you and party successful start, and wish you every success. Whilst Government and people of Australia hope Australian first fly Europe-Australia and achieve world's record in aerial navigation, urge you to take no unnecessary risks. Do your best, but nothing foolhardy. If you cannot make Australia in 35 days, never mind. Good luck. "Hughes."

Another competitor—the Blackburn Kangaroo—left Hounslow at 10.37 a.m. on November 21. The Kangaroo is piloted by Lieut. Rendle and Lieut. B. R. Williams, the navigator is Capt. G. H. Wilkins, and Lieut. Potts is in charge of the engines. They received the following messages:—

From Prince Albert: "May good luck go with you in your sporting attempt."

From Mr. Winston Churchill: "I wish you the best of luck in your sporting journey."

From Maj.-Gen. Sir F. H. Sykes: "Good luck and success to your venture."

Notice to Airmen

The following notice to airmen has been issued by the Air Ministry. The Radio Telephony stations at the aerodromes at Hounslow and Lympne are now working on 900-metre wave length.

The registration marks of aircraft should be used as the call signs in making or receiving signals by wireless telegraphy or other methods of communication, except when opening up communication by means of visual signals, when the usual methods will be employed.

New Air Service to The Hague

It is announced by Aerial Transport and Travel, Ltd., that a daily air service between Hounslow and an aerodrome near The Hague is being organised This new "Airco" service will connect with express trains leaving The Hague for Rotterdam, Amsterdam, and other cities; by next spring a business man will be able to breakfast in Amsterdam, lunch in Paris, and dine in London—all on the same day.

American Crew for R 38

It is anticipated that the airship R 38, which has been sold to the United States will not cross the Atlantic before next July or August. She is now being completed at the works of Messrs. Short Brothers at Bedford, and should be ready about the end of May. A crew, drawn from the United States Navy, will be trained by the R.A.F. in readiness to take the vessel to America.

French Convention with Switzerland

French delegates have practically concluded with Switzerland an Air Convention similar to that signed on behalf of Great Britain by Col. Beatty. As soon as the French Government has signed, the agreement with Great Britain comes into force.

Death of M. Henri Deutsch de la Meurthe

By the death of M. Henri Deutsch de la Meurthe on November 24, French aviation has lost one of its staunchest patrons. Born in Paris in 1846, he early took an interest in the internal combustion motor, and was quick to recognise its possibilities for aeronautical work. He offered a prize of 100,000 francs for an airship flight round the Eiffel Tower and when this was won by M. Santos Dumont on October 19, 1901, he in conjunction with M. Archdeacon put up a new prize for an heavier-than-air machine which would fly more than 25 metres and another for a flight of one mile in a closed circuit, which was won by M. Henri Farman on January 13, 1908. He built two airships, the second of which—the "Ville de Paris"—he presented to the French Government after the disaster to the military dirigible "La Patrie." M. Deutsch in 1914 gave 5,000 francs to provide for a professor of practical and popular aeronautics at the Conservatoire des Arts et Mètiers. M. Deutsch was a founder member of the Automobile Club of France, and later of the Aero Club of France; he was elected President of the latter in 1913.

Speed Record in Italy

At the Montecelio aerodrome near Rome on the morning of November 20, Lieut. Elia on a Marchetti areoplane flew 274·220 kilometres (171½ miles) in one hour, which is claimed to be a world's record. After certain modifications have been made to the propeller it is hoped to improve on this speed.

High Speed by the "Bodensee"

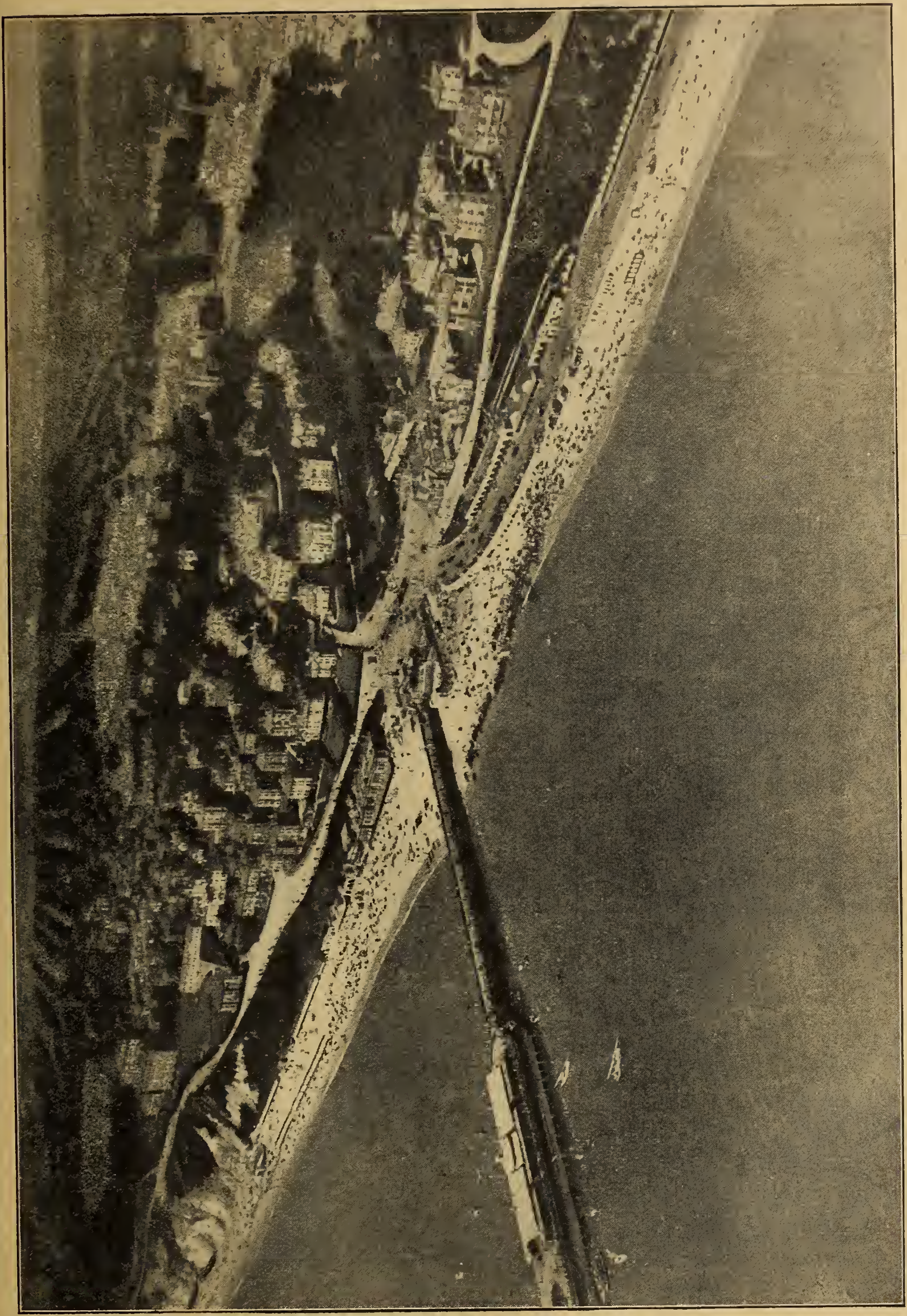
Having been repaired after its recent mishap, the German passenger airship "Bodensee" on November 23 made its fastest voyage, attaining an average speed of over 100 miles an hour, making the trip from Berlin to Friedrichshafen in three and three-quarter hours.

A Reversible Propeller

Successful tests are reported to have been made at Dayton (Ohio) with a reversible aeroplane propeller by means of which aeroplanes can land and be stopped within 50 ft.

Commercial Aviation in South Africa

Maj. Miller, who did such splendid work in recruiting for the R.A.F. in South Africa, is now helping on commercial aviation in the Colony. He has recently made a flight from Johannesburg to Durban, carrying a special edition of the *Johannesburg Star*.



"Flight" Copyright.

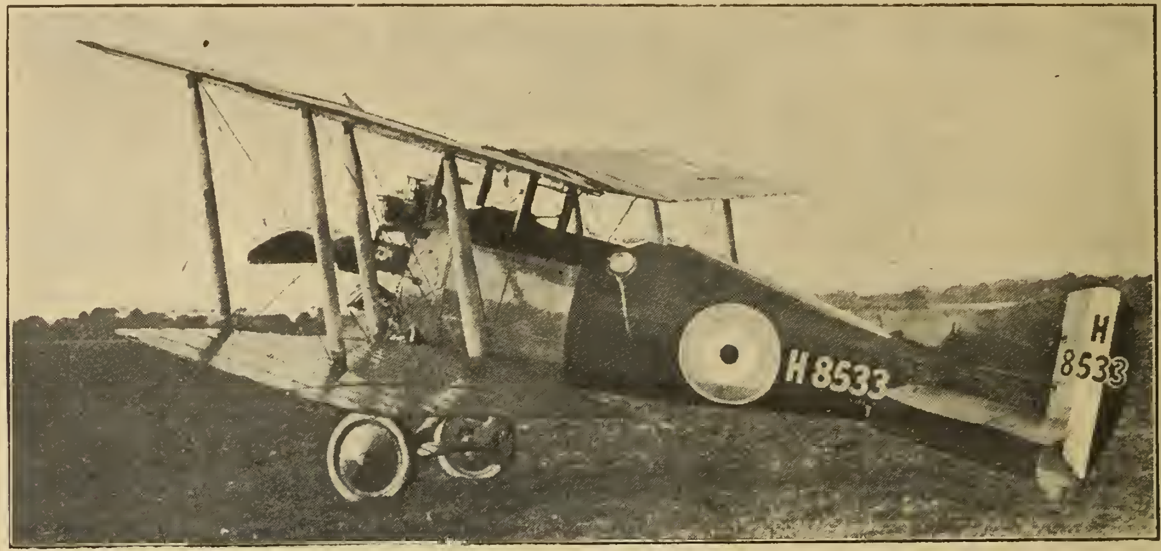
BOURNEMOUTH, AS SEEN FROM A SUPERMARINE FLYING BOAT: Note the racing 'planes on the beach

THE NIEUPORT "NIGHTHAWK"

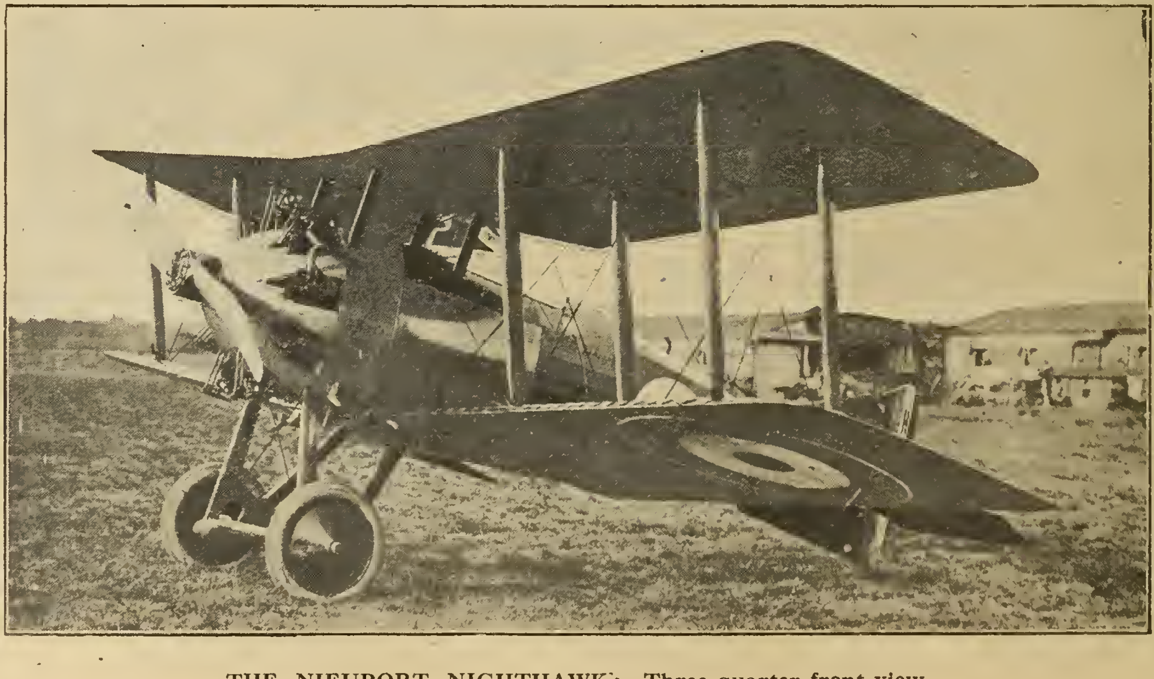
As a type, the "Nighthawk," designed and built by the British Nieuport and General Aircraft Co., Ltd., of Cricklewood, belongs to the single-seater fighter class, of the modern type in which the size of engine fitted has resulted in the employment of two pairs of inter-plane struts on each side. It is a machine which was just beginning to come through in quantities when the Armistice was signed, and, had the War continued, it would doubtlessly have played a considerable part in the air-fighting on the Western Front. Its performance is excellent, and its detail design has been most carefully thought out with a view to ease of production in quantities.

In reviewing the Nieuport "Nighthawk," it is a matter of some difficulty to make up one's mind as to whether the machine is most remarkable for its performance and manœuvrability, or for its detail construction. Perhaps on balance construction has it, and this is said with no intention to belittle the aerodynamic side of the design. It has, however, been proved that performance is chiefly a matter of loading per horse-power, and, given reasonably careful design, machines do not differ greatly when judged on this basis. There are still the questions of stability and manœuvrability, and in the "Nighthawk" is found as great an amount of stability as is compatible with the extreme manœuvrability demanded of a machine which is to be used for fighting.

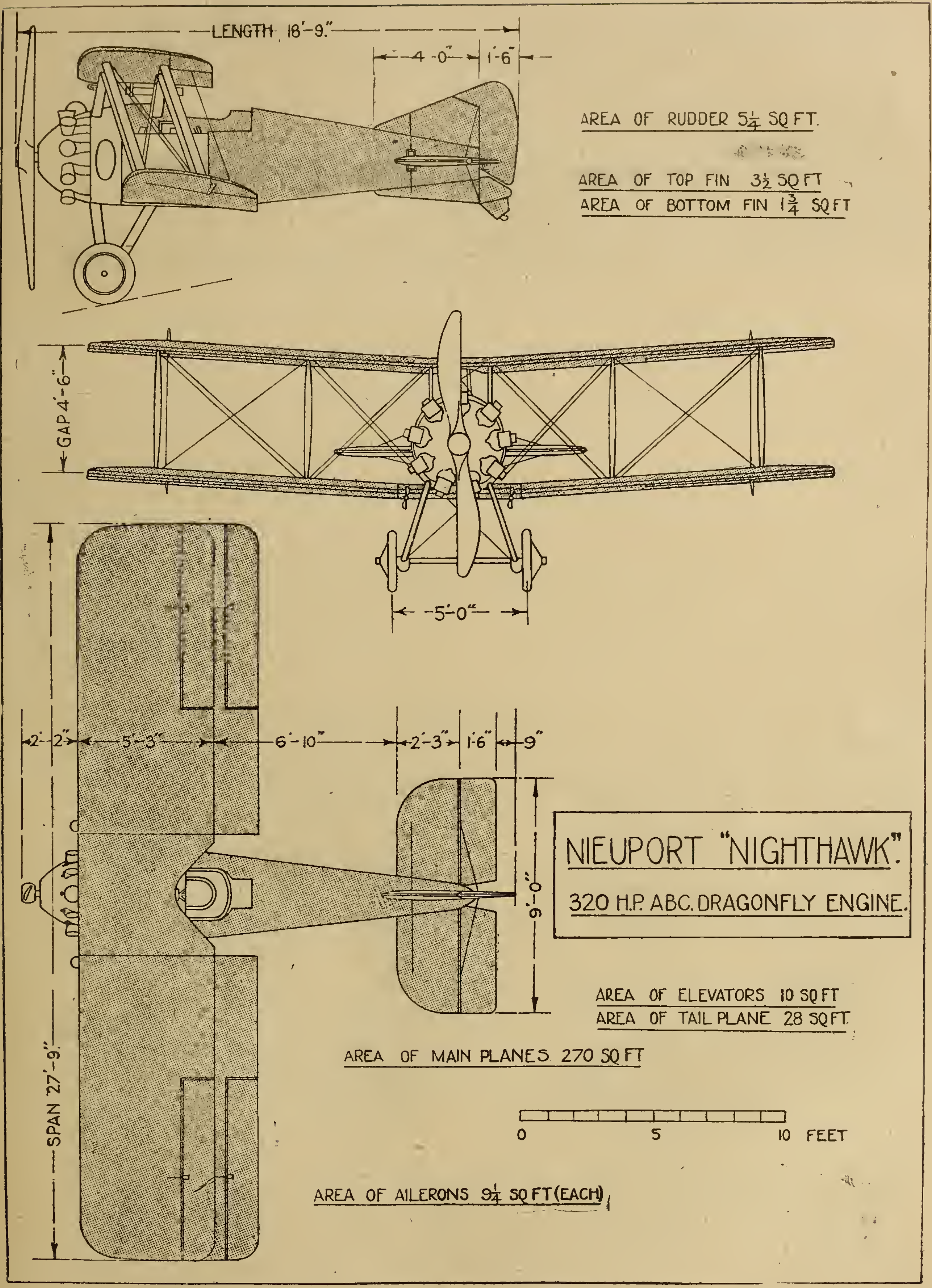
It is, however, in the matter of detail design,



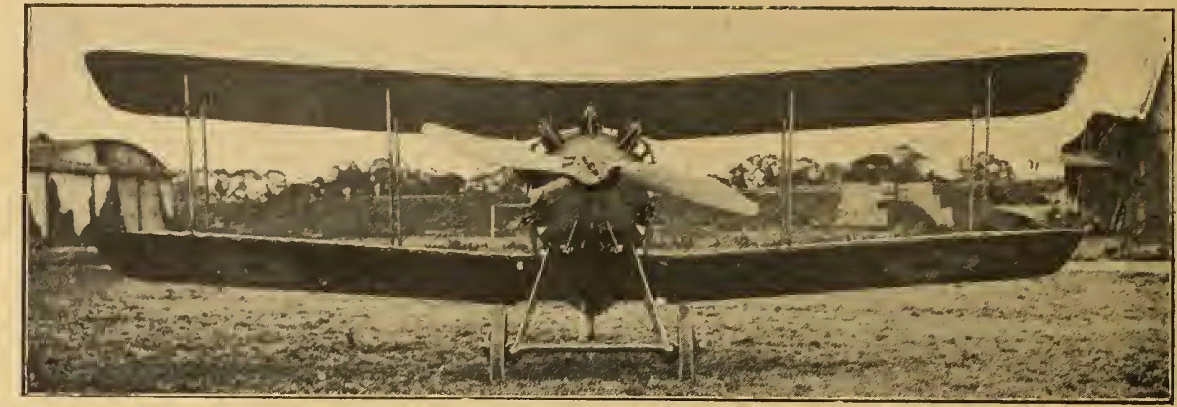
THE NIEUPORT NIGHTHAWK: Three-quarter rear view



THE NIEUPORT NIGHTHAWK: Three-quarter front view


LENGTH 18'-9."
4-0"
1'-6"
AREA OF RUDDER 5¼ SQ FT.
AREA OF TOP FIN 3½ SQ FT
AREA OF BOTTOM FIN 1¾ SQ FT
GAP 4'-6"
5'-0"
2'
2"
5'-3"
6'-10"
2'-3"
1'-6"
9"
9'-0"
NIEUPORT "NIGHTHAWK".
320 H.P. ABC. DRAGONFLY ENGINE.
AREA OF ELEVATORS 10 SQ FT
AREA OF TAIL PLANE 28 SQ FT
AREA OF MAIN PLANES 270 SQ FT
SPAN 27'-9"
0
5
10 FEET
AREA OF AILERONS 9¼ SQ FT (EACH)

THE NIEUPORT NIGHTHAWK : Plan, side and front elevations, to scale

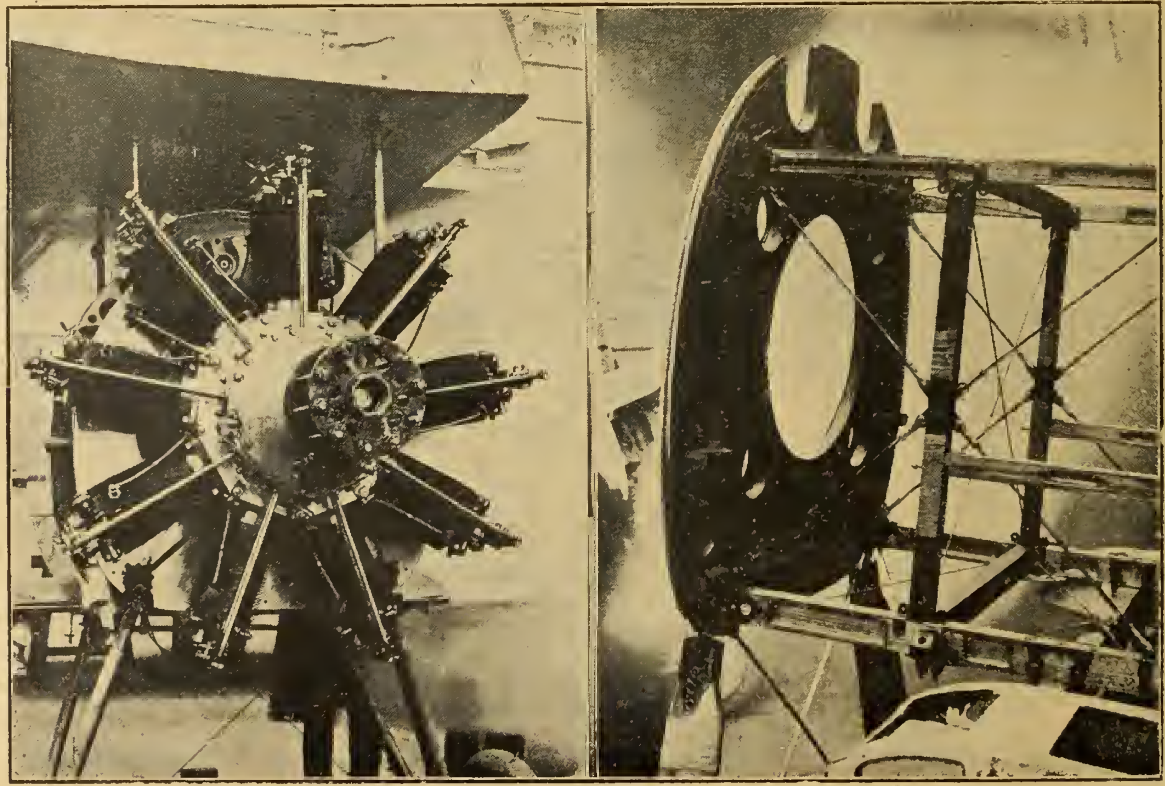


THE NIEUPORT NIGHTHAWK : Front view

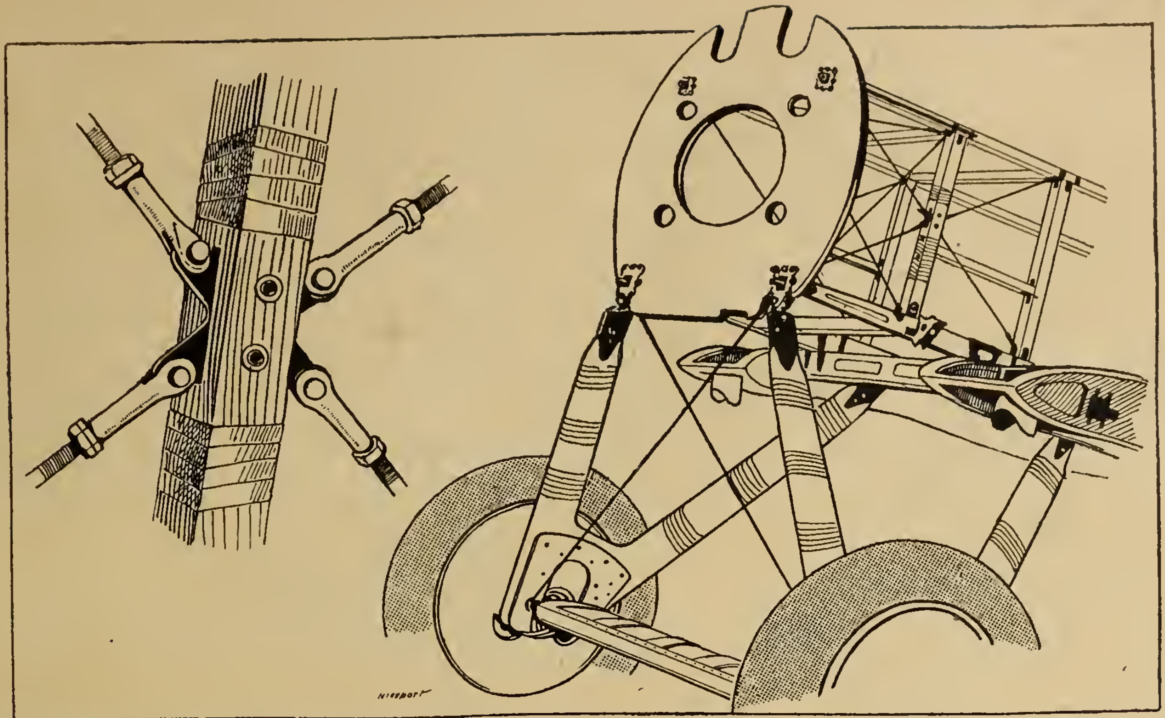
that there is the greatest scope for originality, as well as for sound engineering practice. In this respect the "Nighthawk" offers many interesting features, and, by the courtesy of the designers, we have been able to examine in detail, and sketch, some of the constructional details that go to make the "Nighthawk" such an interesting structure.

A feature which is noticed at once on examining this machine is the absence of welding. Mr. H. P. Folland, chief engineer and designer, has managed to do without this, almost entirely. In its place, where different pieces of metal have to be joined together, riveting and dip-brazing have been employed. The only parts that have been subject to welding are such as do not carry any load, and where, therefore, welding is perfectly safe. Another feature of the "Nighthawk" is the extensive employment of tubular rivets instead of threaded bolts. Special tools have been designed for the production of these tubular rivets, the manufacture of which is carried out in an extremely efficient manner. The use of these rivets instead of threaded bolts has several advantages in addition to cheapness. For instance, the small flanged ends of the rivets project above the wood to a much smaller extent than do the nuts and bolt-heads of ordinary threaded bolts. Where a fabric covering comes into contact with the rivets, this results in a smooth surface without the unsightly projections caused by the bolt-heads.

The *fuselage* is a girder structure of rectangular section, to which are added, as regards the front part of the body, streamline fairings built up of light longitudinal stringers supported on light three-ply formers. The four main *longerons* are of ash



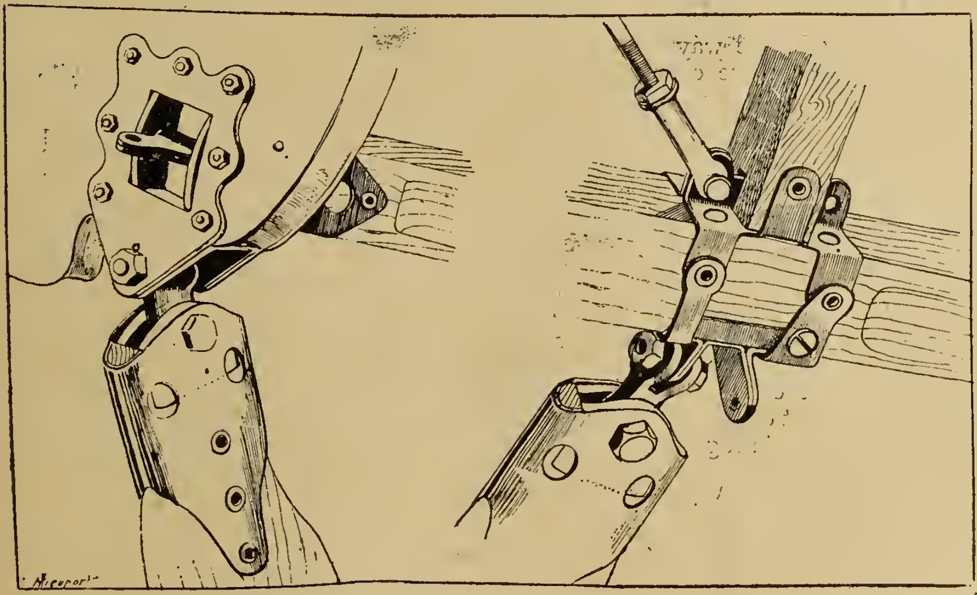
THE NIEUPORT NIGHTHAWK : On the left is shown the mounting of the A.B.C. Dragonfly engine, and on the right the multi-ply engine-bearer



THE NIEUPORT NIGHTHAWK : Sketch of the engine mounting, and, inset, the manner in which the side bracing in the front bay of the *fuselage* crosses the first vertical body strut

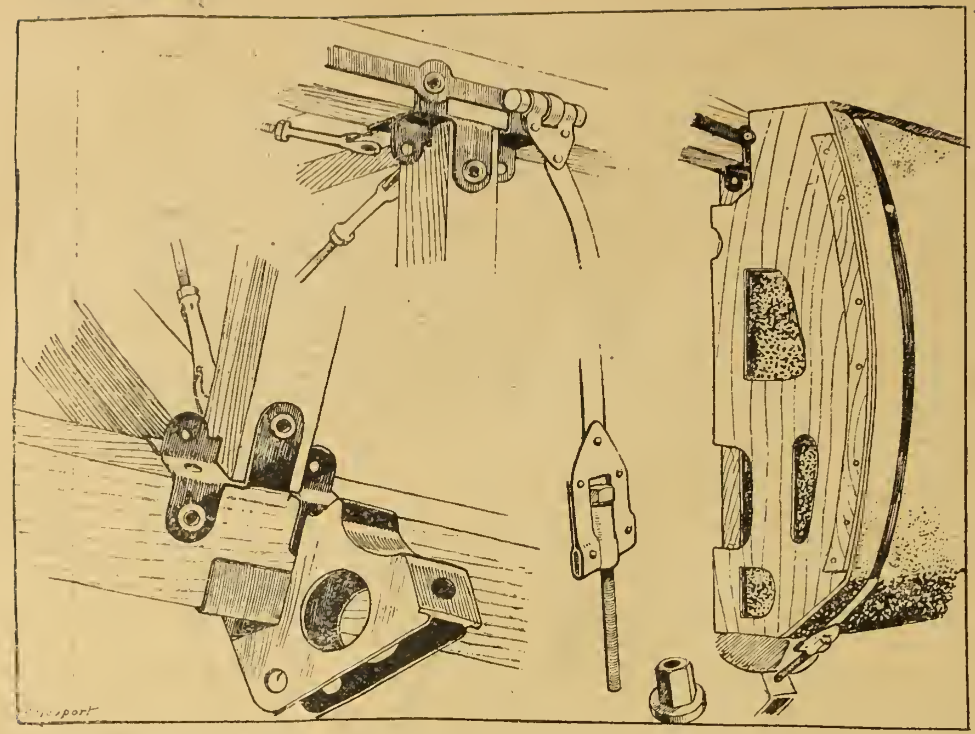
throughout. lightened in some places by spindling. The vertical and horizontal struts are of spruce, of square section, tapered towards the ends, where they fit into circular sockets. The cross-bracing is by tie-rods, the forked ends of which fit over lugs on the very simple *fuselage* fittings.

In the nose the *fuselage* terminates in a roughly circular engine plate made of multi-ply wood, reinforced on its front face by a circular strip of steel, through which pass the bolts securing the A.B.C. "Dragonfly" engine to the plate. The attachment of this engine plate to the *longerons* is by very substantial fittings, the pull on the upper ones of which is transmitted *viâ* steel strips along the sides of the top *longerons* to the first vertical strut fitting, to which the strips are secured. Owing to the weight of the engine, the lower fittings are not subject to the same amount of pull, and the lower *longerons* are not, therefore, thus reinforced. The multi-ply engine plate is lightened by cutting away portions of it, and has, further, at the top two notches for the machine guns.



The Nieuport Nighthawk: Sketches showing front and rear chassis strut attachments. Note the universal joints.

The arrangement of the petrol tanks is unusual, and very well thought out. Instead of carrying them inside the body, where they are in the way, and where, moreover, they are difficult to get at, the tanks are housed in the streamline farings on the sides of the body. Here, if a tank becomes damaged during a fight or through any other cause, by simply removing the aluminium covering and undoing the straps securing the tanks, these can be removed and repaired, or replaced by new ones. There are two



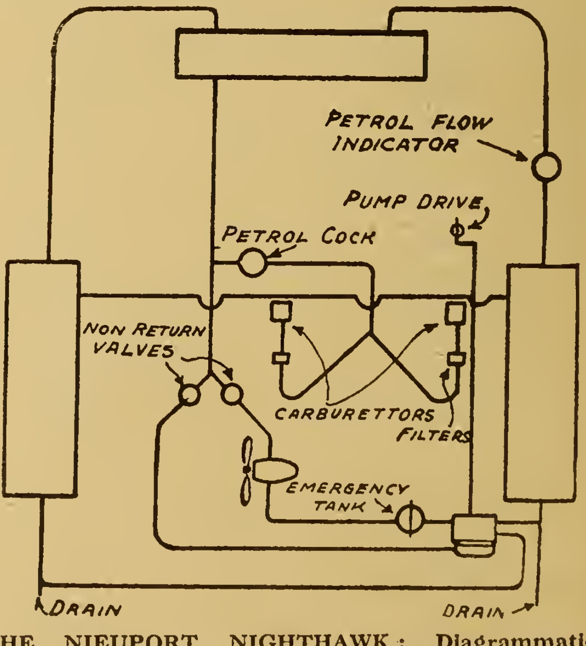
The Nieuport Nighthawk : Some details of the bracket-and-strap mounting of the Imber tanks on the side of the *fuselage*

of these side tanks—of the Imber variety of course—and a third, the gravity tank, is housed in the centre section of the top plane, where it rests on a three-ply floor, and is held in place by the diagonal cross-bracing of the centre section. The manner of supporting the tanks, and of securing them in place, by straps, is illustrated by some of the accompanying sketches.

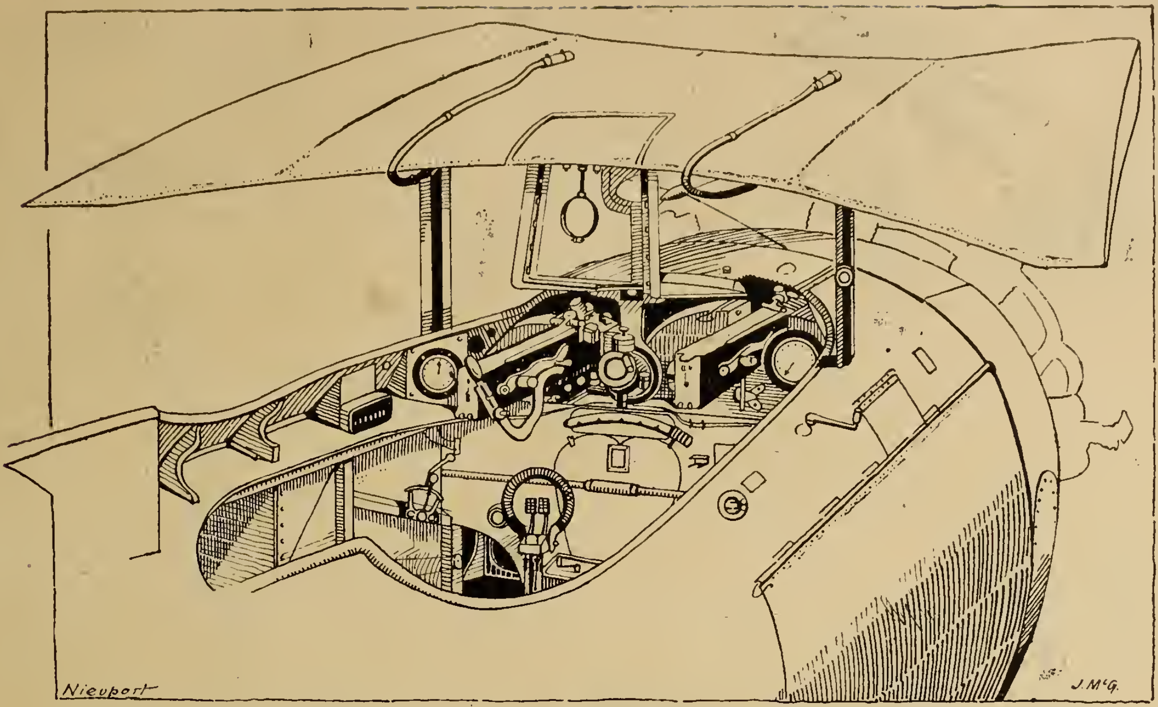
The pilot's cockpit, in spite of the fact that the *fuselage* is of the ordinary girder type with external fairings and of only ordinary maximum cross-section, is extremely roomy, surprisingly so, and the disposition of the various instruments as well as of the two machine guns, has been most carefully thought out, so that all are clearly visible and within easy reach, without, however, being in the way to the slightest extent. The machine guns are easily accessible, yet are sufficiently far removed from the pilot to avoid any danger of him being thrown against them in the case of a bad landing. The wind screen is in the form of a Vee of narrow angle, terminating at the back in two narrow aluminium strips, which are given a slight outward curve so as to deflect the air, even when the pilot is looking slightly past the sides of the wind-screen. In case of the screen becoming covered with moisture, therefore, the pilot is still able, by leaning his head slightly to one side, to see past the screen without being worried by any strong draught of air. The cartridge cases are mounted just in front of the dashboard, and are provided with chutes through the floor of the *fuselage*.

The controls, as regards type, are of the usual form, but in detail design show several interesting features. Thus the control lever is mounted on ball-bearings in an aluminium casting of the form shown in one of our sketches. This makes a very sound, strong, and at the same time simple, job. The foot-bar is of wood, covered with aluminium plates top and bottom, as shown in the sketch. An interesting feature of the foot-bar is the ease with which adjustment for different pilots can be made. It will be seen that the shape of the foot-bar itself provides means for varying the distance from the pilot's seat by reversing the bar, while further adjustment is provided by the bolt holes in the bracket supporting it.

The tail-plane trimming gear is of somewhat unusual type, the lever operating it being held in any desired place by cables passing over pulleys, no notched quadrant or similar locking device being needed. The tail-plane is hinged around its rear spar, the front spar being provided with fittings which engage with the blocks on the two rotatable worms as shown in some of the accompanying sketches. The whole arrangement is well thought out and impresses one as being a very good engineering job.



THE NIEUPORT NIGHTHAWK : Diagrammatic sketch of the petrol supply system

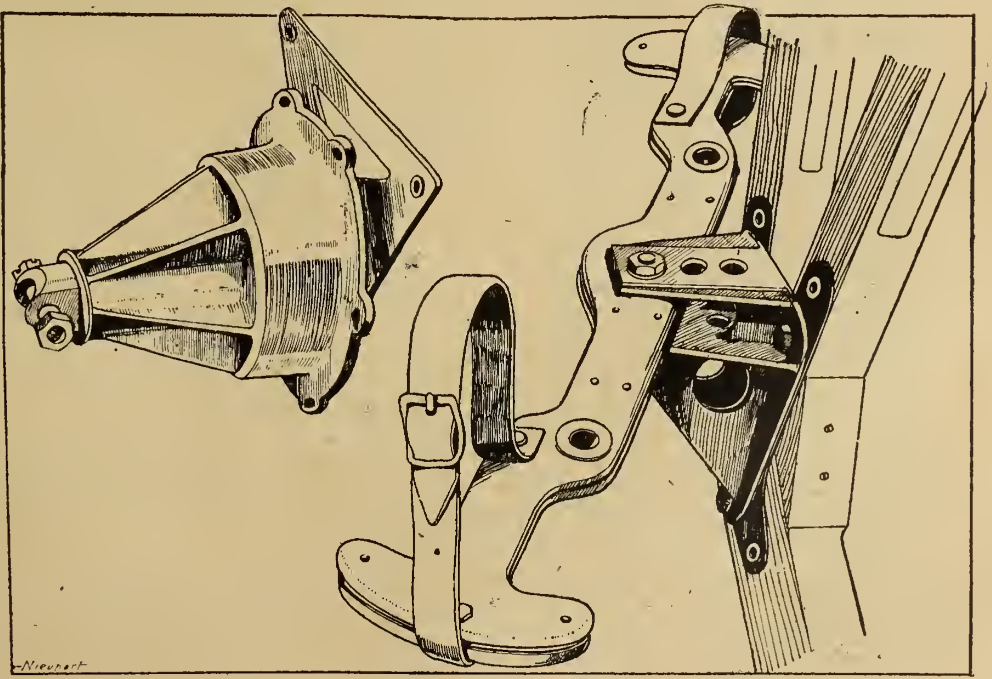


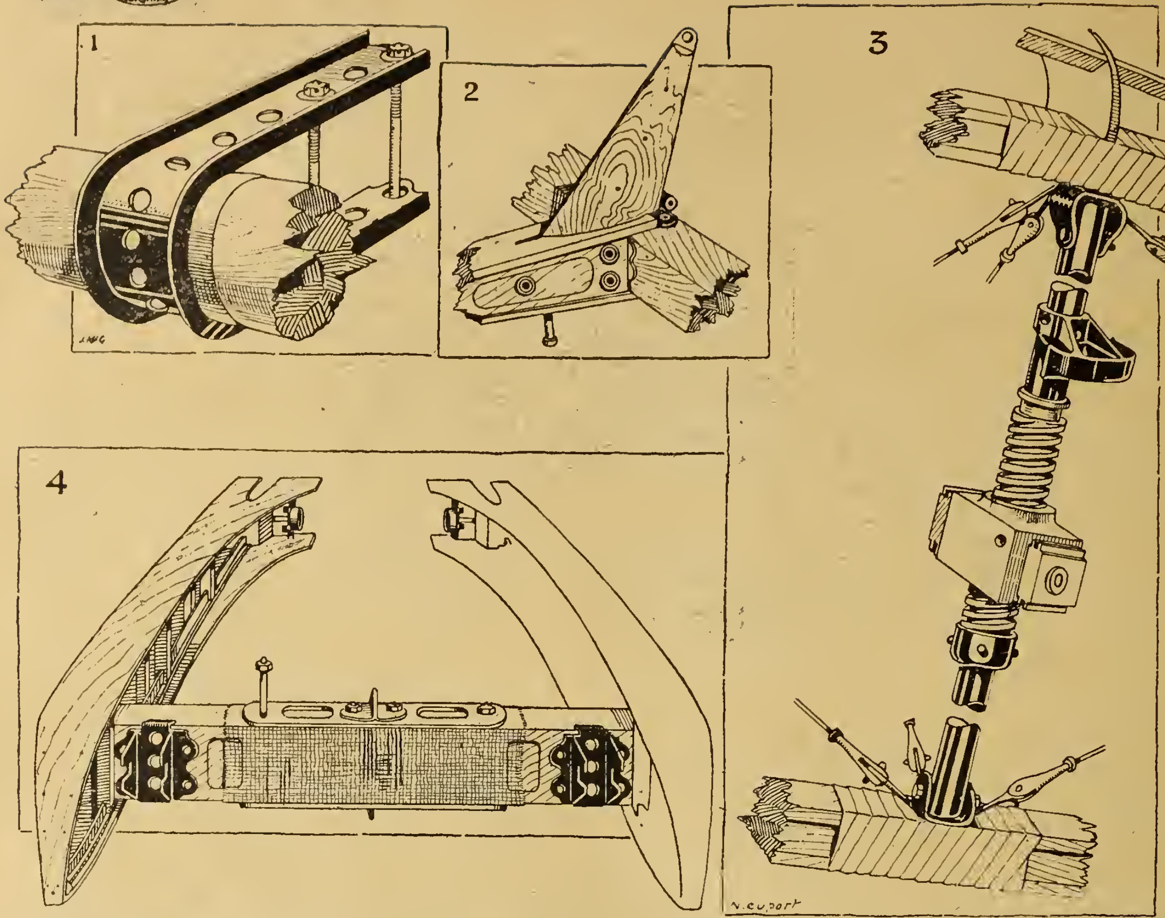
THE NIEUPORT NIGHTHAWK : Sketch of the cockpit, machine-guns, windscreen, etc.

The under-carriage is of the usual "Vee" type, with struts of wood, the apices of the vees being connected by two transverse members, also of wood, between which rests the axle, which is housed in a fairing of three-ply, the top of which is hinged to allow of the travel of the axle when the machine is taxying. Springing is by rubber cord shock-absorbers, and the axle is free to move in an opening cut in the spruce block which fills the angle at the lower end of the vees. Aluminium plates cover and reinforce the vees at their lower end. The method of attaching the under-carriage struts to the body is shown in two of our sketches. The front chassis strut is secured to the fitting on the engine bearer at the point where occurs the attachment of the lower *longeron*. The rear chassis strut is bolted to one of the *fuselage* strut fittings, as shown in the sketch. Both are pin-jointed, as will be seen, so as to adapt themselves to any small irregularity in the fitting up of the vees. To those who have had any experience of welding up together an under-carriage built of streamline steel tubes, in which the accuracy has to be on the right side of half a degree, this point will specially appeal.

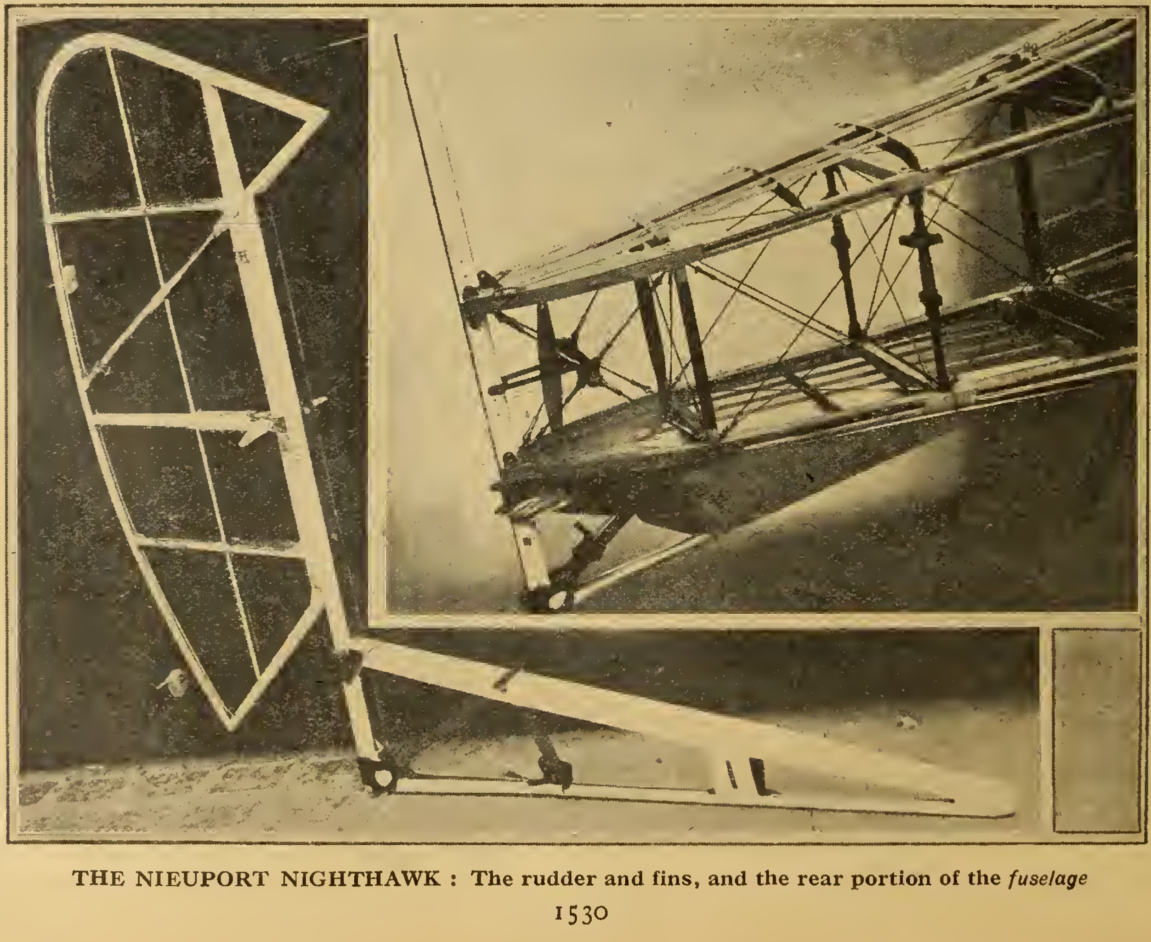
The tail skid is of similar type to that fitted on the S.E. 5 biplanes, steering with, but forming no part of, the rudder. The tail plane, which is of symmetrical cross-section, is so mounted as to be capable of having its angle of incidence altered during flight. The rear spar forms the hinge, and one of

The Nieuport Nighthawk : On the left the aluminium bracket which supports the control lever, and on the right the adjustable foot bar





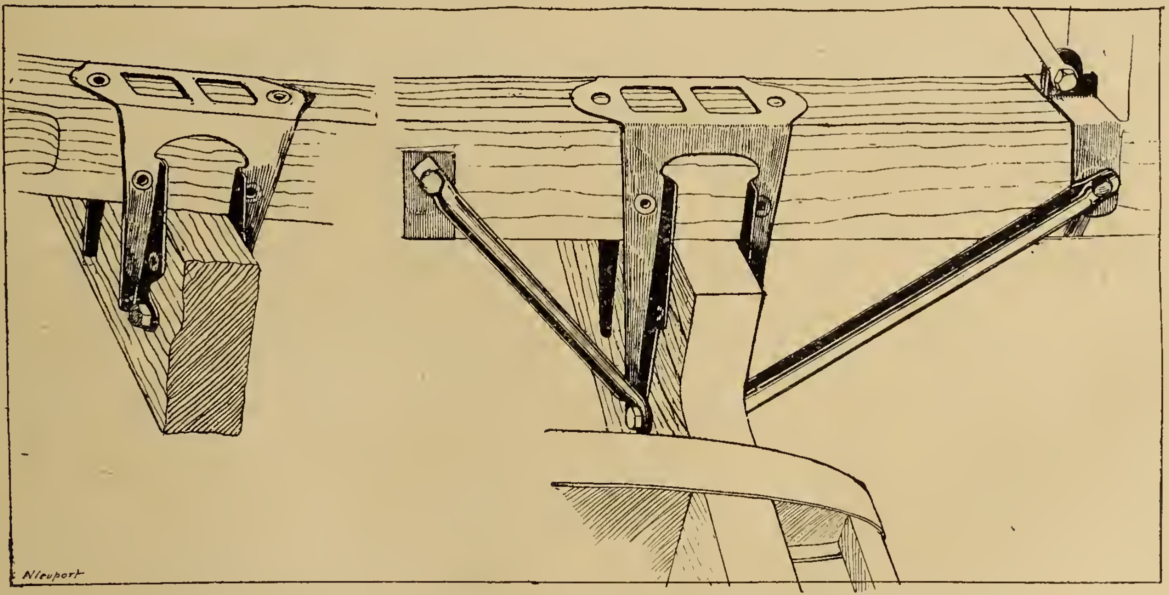
SOME TAIL PLANE DETAILS OF THE NIEUPORT NIGHTHAWK : 1. An elevator hinge ; 2. The elevator crank ; 3. One of the rotatable worms of the tail plane trimming gear ; 4. The roots of the tail plane. Note the lugs on the front spar which engage with the blocks on the worms shown in 3



THE NIEUPORT NIGHTHAWK : The rudder and fins, and the rear portion of the *fuselage* our photographs shows, incidentally, the manner in which the rear spar bearings are supported. Instead of being mounted on the vertical struts, the spar bearings occur between struts, and are pivoted on a short length of steel tube held in sheet steel lugs in the middle of the side-bracing. The elevator has a circular leading edge of wood, to which the elevator ribs are attached by wood blocks and aluminium strips. The U-clips which form the supports for the elevator leading edge are of channel section, as shown in one of our sketches. To protect the wooden leading edge from wear it is surrounded by a thin brass sheet. At certain points this brass binding is flanged so as to locate the elevator, the other bindings being smooth, thus allowing a fair amount of latitude in workmanship without endangering the smooth working of the elevator.

The vertical fins, of which there is one above and one below the *fuselage*, as well as the rudder, are of very light wood construction, the trailing edge of the rudder being of sheet aluminium bent to a U-section with small flanges turned inwards, which gives great lateral rigidity to the trailing edge.

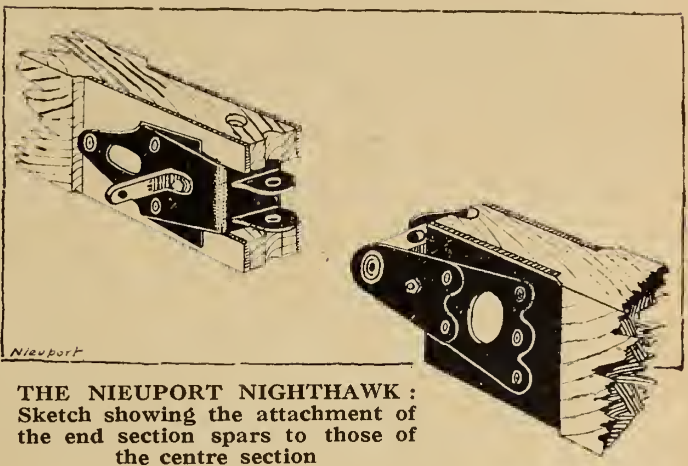
In general construction the main planes follow usual practice. The main spars are of spruce, spindled out to an I-section. The ordinary ribs are very lightly built, of spruce webs and flanges. The compression ribs are of I-section spruce, with additional flanges glued to top and bottom. In between the compression ribs that are in line with the interplane struts are other ribs of the box type, as there is a double bay of internal drag bracing between each pair of struts. As the rear spar is situated fairly far forward in the wing section, the *ailerons* are not hinged to the rear main spar, but to a false spar some distance farther back. *Ailerons* are fitted to both top and bottom planes, and the controls are in the form of R.A.F. wires inside the wings. These wires pass through fibre guides, and where they have to pass over pulleys on their way back to the crank levers a short length of stranded cable is used.



THE NIEUPORT NIGHTHAWK : Front and rear bottom spar attachments

The attachment of the end sections to the centre sections allows of a certain amount of play, as will be seen from one of the sketches. The ends of the centre section spars carry two horizontal lugs which pass on each side of the horizontal trunnion on the end of the end section spar. A vertical bolt secures the two together, and while the front spar trunnion is the full length of the distance between the sheet-steel lugs, that on the rear spar is somewhat shorter, so that any slight variation in the distance between the spars does not prevent the two parts from being bolted together.

An interesting feature of the centre sections is that they have a slight dihedral angle This does not extend over their entire length, the central portion being horizontal, while the ends are slightly turned up. The top centre section is supported by four tubular struts, streamlined with wood. The manner of securing the lower centre section spars to the lower *fuselage longerons* is illustrated in a sketch. The front spar is held by a simple clip, while the rear spar, which occurs between two vertical struts. has its support reinforced by sloping tubes going to the points on the *longeron* where occur the struts. In this manner there is no fear of the lower *longeron* deflecting under the load of the rear spar.



THE NIEUPORT NIGHTHAWK : Sketch showing the attachment of the end section spars to those of the centre section

The wing bracing is everywhere in the form of R.A.F. wires.. The only remarkable feature of the bracing is that in the outer bay there is only one anti-lift wire, running from the top of the rear inner strut to the bottom of the outer front strut. There are two lift wires, which, in the outer bay, are in the plane of the struts, while in the inner bay they run from front and rear chassis strut attachments respectively.

The main characteristics of the Nieuport "Nighthawk" are as follows: Weight, empty, 1,700 lbs.; useful load, 400 lbs.; total weight, 2 100 lbs.; load per sq. ft., 7·8 lbs.; load per horse-power, 6·6 lbs; speed at 5,000 ft., 150 m.p.h.; speed at 20,000 ft. 130 m.p.h.; climb to 20,000 ft. in 20 minutes; ceiling, 29,000 ft.; endurance, 3 hours at 20,000 ft., including climb; radius of action, 180 miles at 20,000 ft.

▣ ▣ ▣ ▣

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

FLYING SERVICES FUND COMMITTEE

A MEETING of the Flying Services Fund Committee was held on Thursday last, November 20, 1919, when there were present:—Group-Captain C. R. Samson, C.M.G., D.S.O., R.A.F., in the Chair, Squadron-Leader T. O'B. Hubbard, M.C., R.A.F., and the Secretary.

Applications for Assistance.—Forty-three applications for assistance were considered and Grants and Allowances were voted amounting to £478 10*s*.

THE FLYING SERVICES FUND

(*Registered under the War Charities Act*, 1916)

Administered by the Royal Aero Club

For the benefit of *Officers, Non-Commissioned Officers and Men* of the ROYAL AIR FORCE who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

Honorary Treasurer:

The Right Hon. LORD KINNAIRD.

Committee:

H.R.H. PRINCE ALBERT, K.G. (*Chairman*).
Mr. CHESTER FOX.
Squad. Leader T. O'B. HUBBARD, M.C., R.A.F.
Squad. Leader C. E. MAUDE, R.A.F.
Group Capt. C. R. SAMSON, C.M.G., D.S.O., R.A.F.

Secretary:

H. E. PERRIN.

Bankers:

Messrs. BARCLAYS BANK, LTD., 4, Pall Mall East,
London, S.W. 1.

Subscriptions:

	£	s.	d.
Total subscriptions received to Nov. 10, 1919 ..	16,530	8	1
Lieut.-Col. H. Moorson ..	0	10	6
Earl of Londesborough ..	5	0	0
J. L. Collins ..	5	5	0
H. Marnham ..	5	5	0
D. Henderson and Sons ..	10	10	0
William J. Watson Bourne ..	2	2	0
R. S. Hollidge ..	1	1	0
Sir John H. Irvin ..	2	2	0
Moxey Savon and Co. ..	50	0	0
Alison, Lady Ley ..	10	10	0
Wing-Com. H. Le M. Brock, R.A.F. ..	5	0	0
Maj. J. W. K. Allsop ..	1	1	0
Robert J. Foster ..	5	0	0
Mrs. MacVicker "In Memory of Lieut. J. E. C. MacVicker" ..	1	1	0
Lieut.-Col. A. G. Hamerton ..	1	1	0
J. Richardson ..	10	0	0
John Marnoch ..	21	0	0
Maj.-Gen. W. C. Black ..	2	2	0
Miss I. M. Brind ..	5	0	0
T. Gowland ..	5	5	0
W. O. Kennington ..	1	1	0
Total, Nov. 24, 1919 ..	£16,680	4	7

French Records

The Royal Aero Club has received from the Aero-Club de France the following French Records established during 1919:—

ALTITUDE

Aviator.	Place.	Date.	Height metres.
	Aviator Alone		
Jean Casale ..	Issy-les-Moulineaux	June 14, 1919	9,520
	Aviator and 1 Passenger		
Jacques Weiss ..	Villacoublay ..	Aug. 13, 1919..	9,000
	Aviator and 4 Passengers		
Bossoutrot ..	Toussus ..	April 1, 1919..	6,290
	Aviator and 13 Passengers		
Bossoutrot ..	Toussus ..	April 3, 1919..	5,990
	Aviator and 24 Passengers		
Bossoutrot ..	Toussus ..	May 5, 1919..	4,860

The Raymond Orteig $25,000 Prize
Paris–New York–Paris Cross Atlantic Flight

(*Under the Competition Rules of the Aero Club of America*)

A prize of $25,000 has been offered by Mr. Raymond Orteig of New York to be awarded to the aviator who shall cross the Atlantic in a land or water aircraft (heavier-than-air) from Paris or the shores of France to New York or from New York to Paris or the shores of France, without stop, within five years from May 28, 1919. (The flight may be made either way across the Atlantic.)

Qualification of Competitors.—The competition is open to persons of any Allied nationality holding an aviator's certificate issued by the International Aeronautical Federation and duly entered on the Competitors' Register of the Aero Club of America.

Entries.—The Entry Form, which must be accompanied by the Entrance Fee of $250.00, must be sent to the secretary of the Aero Club of America, 297, Madison Avenue, New York City, at least 14 days before the entrant makes his first attempt.

No part of the Entrance Fees is to be received by Mr. Raymond Orteig, the donor. All amounts received will be applied towards payment of the expenses of the Aero Club of America in conducting the competition. Any balance not so expended will be refunded to the competitors.

Starting Place.—Competitors must advise the Aero Club of America of the starting place selected, and should indicate as nearly as possible the proposed landing place.

The start or landing may be made from land or water. If a land plane is used, the point of starting or landing must be within 50 miles of Paris or New York. If a seaplane or flying-boat be used, the start or landing must be made from a point within 50 miles of New York and the start or landing may be from or on any point on the Coast of France. The time will be taken from the moment of leaving the selected starting place, in the case of land machines. In the case of starts made from the water, the time of start and finish will be taken from the moment of leaving or reaching land or crossing the coast line. In each case the pilot must report in person immediately to the Aero Club of America or the Aero Club of France.

All starts must be made under the supervision of an Official or Officials appointed by the Aero Club of America.

Identification of Aircraft.—Only one aircraft may be used for each attempt. It may be repaired *en route*. It will be so marked before starting that it can be identified on reaching the other side.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

SOME KITE-BALLOON EXPERIMENTS*

BY GRIFFITH BREWER

At the end of 1915 I was invited to compile and deliver a course of lectures on the Theory of Ballooning at the Royal Naval Air Station at Roehampton; and for the following three years I attended regularly at Roehampton, delivering two lectures daily and setting examinations for the officers under instruction to pass into the airship service and into the Kite-Balloon Service.

Every encouragement was given for questions to be asked on aerostatic problems after each lecture, my endeavour being to remove as many troubles in the minds of probationers as possible. The trouble which stood out above all others soon became apparent. What would happen to the observers in a kite-balloon in the event of the cable breaking owing to a high wind or to its being shot through? The questions put to me showed this to be the chief cause of anxiety, and it will be seen that the causes for this anxiety were well founded. In the first place there was the danger of the balloon bursting, owing to the rapid rise causing such a great expansion of gas, as to exceed the capacity of the valve to relieve the pressure before a bursting strain had accumulated. Then there was the danger of being carried into enemy territory owing to the length of time required to rise to the maximum altitude of say 8,000 ft. before equilibrium had been attained and the balloon could be brought down by valving. And in the case of breaking away at sea, of being blown so far away from the ship that the exigencies of war might prevent the balloon being followed successfully.

If this anxiety could be removed the observers would naturally work better and concentrate their attention on their observations, without worrying about the consequences in the event of the cable breaking.

Owing to the constructional difficulties and weight, the adoption of a very large valve to allow of the immediate discharge of the excess lift was out of the question; besides it would be necessary to discharge from 7,000 cubic ft. to 8,000 cubic ft. of gas to release the surplus lift and cause the balloon to descend, and five minutes' delay in doing this would be prohibitive. Considerable practice and good judgment would also be required in order to know when the right amount of gas had been discharged by valving.

If some means could be devised of immediately releasing the surplus lift in the event of the cable breaking, the balloon could then be brought down from the captive altitude without allowing it to rise to twice or three times that altitude before commencing the descent.

The problem, therefore, resolved itself into ascertaining the best method of placing at the pilot's disposal the power of suddenly releasing about 500 lbs. of lift. It was obvious that the sudden discharge of 7,000 cubic ft. of hydrogen would effect this result, but, that amount of gas having been discharged, the remaining 23,000 cubic ft. must be retained in order to safeguard against a dangerous speed of descent.

A Drachen balloon was placed at my disposal by the Admiralty for the purpose of the experiment, on the understanding that the alterations and experiments should be made at my expense, and no indemnity for risk attendant on these experiments would be given.

The alterations to the balloon were then made, and consisted in dividing the balloon into two compartments by means of an internal diaphragm in the form of a parachute. The aft compartment had a capacity of about 7,000 cubic ft., and in this compartment a rip panel was inserted at the upper forward end.

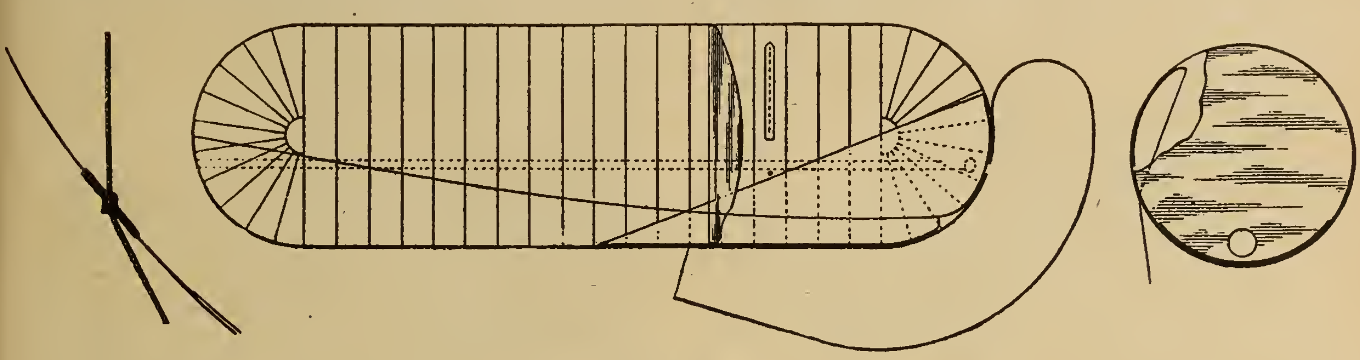


Fig. 1.

A circular aperture, 3 ft. in diameter, was made in the lower part of the diaphragm in order to permit of the free circulation of the gas between the forward compartment and the aft compartment, and I relied on the lift of the gas preventing the flow of the main bulk of the gas from the fore compartment after the gas should be discharged from the aft compartment.

Fig. 1 illustrates the general scheme of the arrangement.

Before making the experiment I thought it advisable to test the speed of descent which could safely be taken in landing. This was done by hoisting a balloon car up to a branch of a tree and, by a releasing attachment, dropping the car a measured distance to the ground. The effect of the drop on a man in the car could then be observed. I tried this experiment first with a fall of 4 ft., then 5 ft., and then 6 ft. This last fall was equivalent to a speed of fall equal to 1,200 ft. per minute, and I felt satisfied with the result, but did not desire to repeat the experiment from any

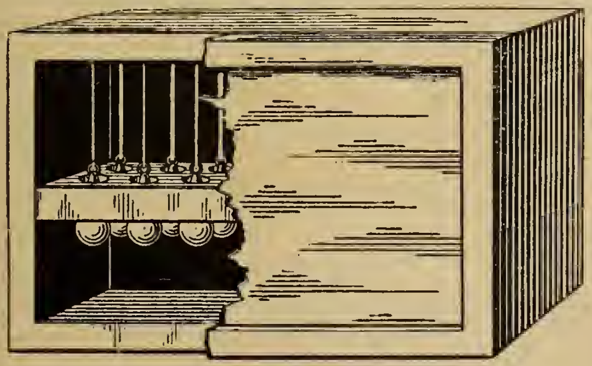


Fig. 2.

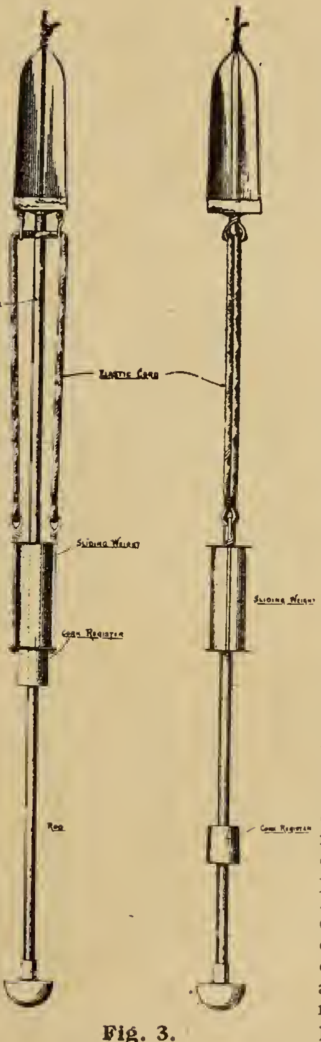


Fig. 3.

---

* Paper read before the Royal Aeronautical Society at the Royal Society of Arts, John Street, Adelphi, on November 26, 1919.

greater height of fall. Afterwards some younger enthusiasts tried the drop from 7 and 8 ft., when the commanding officer stopped further experimental drops for fear of broken legs resulting.

Two instruments for recording landing shocks were then made, as shown in the next two Figures.

The instrument illustrated in Fig. 2 consists of a number of 1 oz. weights suspended by threads in a box. One weight is suspended by a single thread, the next by two threads, the next by three threads, and so on, increasing one thread each until the sixteenth weight is suspended by sixteen threads.

When the box is in the car of the balloon, the shock of landing breaks some of the threads and lets the weights fall to the bottom of the box. The loose weights are then removed and the box is dropped from increasing measured heights until another weight breaks loose. It may then be assumed that the shock of landing was equivalent to the effect of a fall slightly less than the distance of fall in the later test.

The instrument shown in Fig. 3 has a lead weight sliding on a rod and supported by elastic. A cork is threaded on the rod and is normally held in position by friction. On the car landing, the lead weight is impelled downwards and extends the elastic and presses down the cork, which is left behind on the rod when the lead weight returns to its original position by the contraction of the elastic.

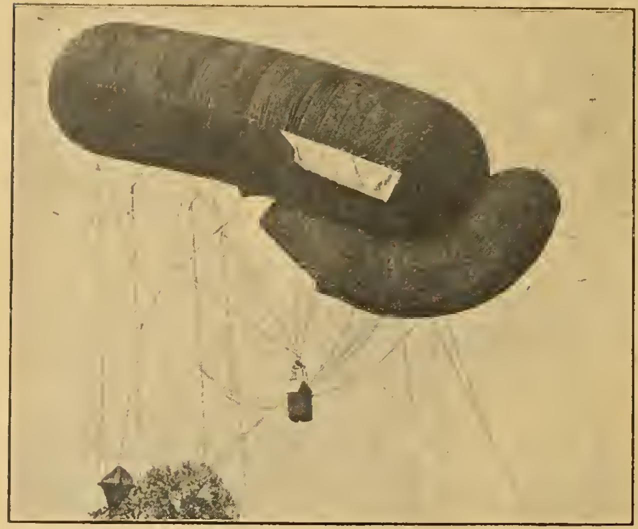


Fig. 4 : Rising on the cable.

The first experiments were defeated by minor accidents. The balloon fitted for me at Messrs. Spencer's works at Holloway was inflated with air in the open, and just as we were about to enter it for the purpose of adjusting the valve, a gust of wind caught the balloon and carried it over the fence into the next field, tearing it beyond repair.

The Admiralty then undertook the cost of further experiments. A second balloon was made at "Airships," at Merton, and inflated under cover, so we were able to make the necessary adjustments without risk of damage. It had been decided at the Admiralty that a successful descent should first be made in ballast, before making a descent with passengers. Accordingly, the balloon was inflated with hydrogen at Roehampton, and the car was loaded with ballast to represent the weight of two observers. The balloon was let up to 400 ft. and released by a slip shackle at the metallic V, and then a long rip cord was pulled—and broke. The balloon sailed away unripped, and we chased it in motor cars to the Merstham Tunnel, where it descended undamaged.

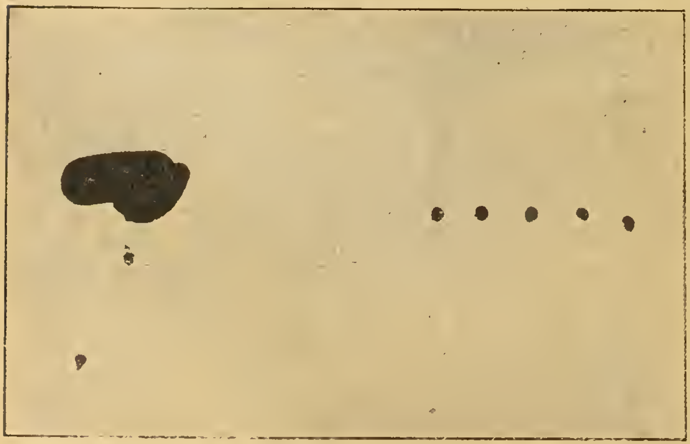


Fig. 5 : Released! Note parachute at top of released falling cable.

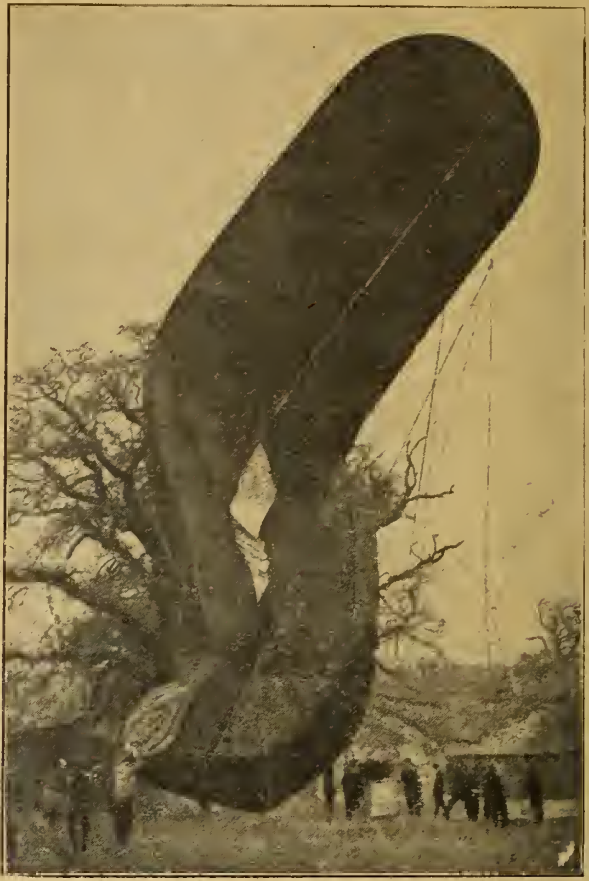
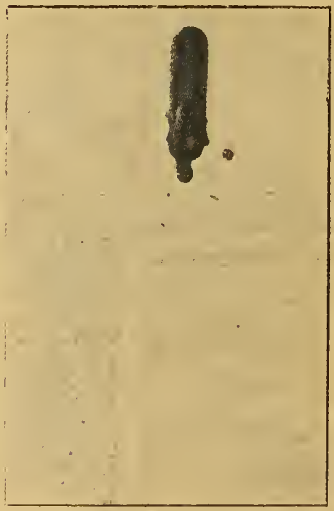
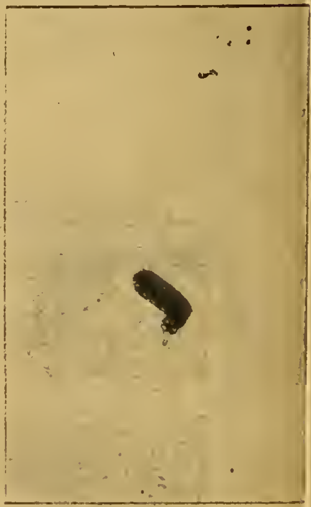


Fig. 6 : The first landing.

The next attempt was more successful. The same balloon



Second experiment.
Fig. 8 : Released at 1,200 ft.



Third experiment.
Fig. 9 : Released at 2,000 ft.

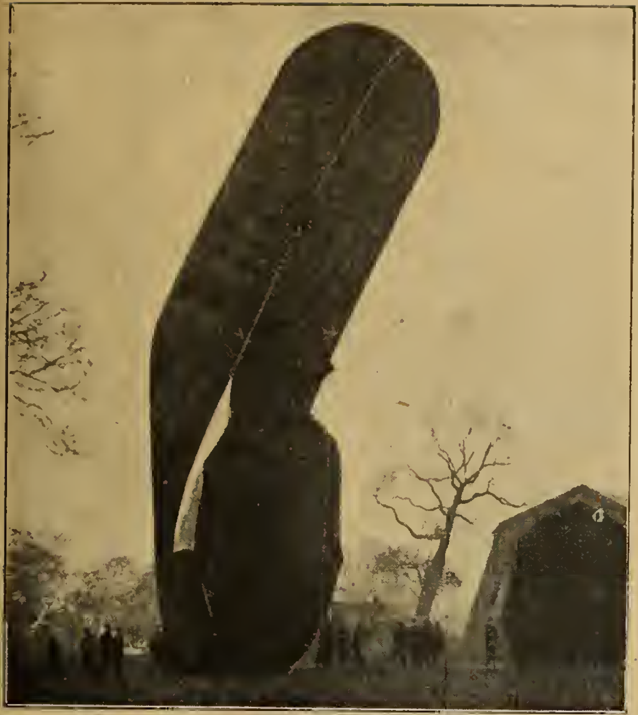


Fig. 7: The Balloon safely home.

was inflated at Roehampton and was let up to about 100 ft. The slip shackle was pulled from the ground, and the rip cords, of which there were two in case one failed, were then pulled. The balloon rose to about 500 ft. and descended quickly, but without apparent violence. The shock indicators showed the force of landing to have been equivalent to a fall of about 3 ft.

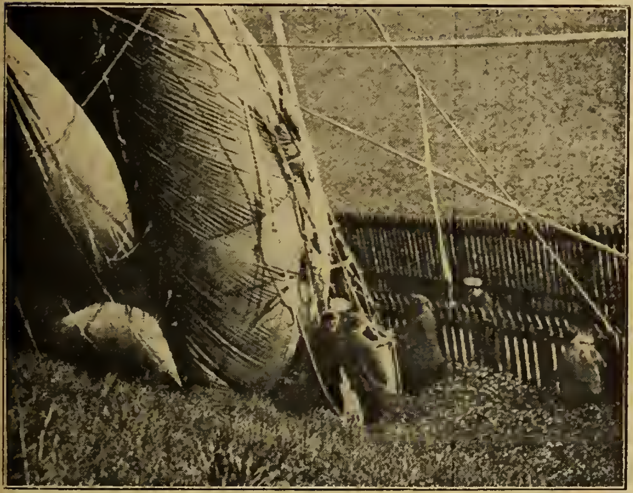


Fig. 10: After landing on Barnes Bridge.

This experiment was deemed sufficiently satisfactory, and permission was given for passengers to be carried on the next trial. Accordingly, on April 25, 1917, Major Max Spencer and myself were let up from the winch at Roehampton to 400 ft. in a wind of 21 m.p.h. On pulling the release, the cable dropped and the balloon rose quickly. Then we pulled the rip panel, and the balloon, after rising about another hundred feet, commenced to descend. No doubt I was somewhat nervous, so, finding the balloon descending quicker than we had expected, we threw all our ballast and landed in Richmond Park. There was no shock, the branches of an elm tree breaking our fall completely. We were on the ground fifty seconds after breaking away.

The second experiment was made by Major Dalziel and myself on May 4, 1917 (Figs. 4 to 7). The balloon was released from its cable at Roehampton at an altitude of 1,200 ft. After rising to 1,500 ft. the rip was pulled when the speed of ascent had reached 750 ft. per minute, and the descent commenced. We had previously decided that, unless we were scared by the speed of fall, we would throw no ballast, but take the bump with knees bent. We certainly came down rather hard, and, the wind being rough, we dragged some distance in Richmond Park and through a stream before we were caught by the men waiting to receive us. The time in the air was 2 min. 22 sec.

On the third experiment (Fig. 8) I was fortunate to get General Maitland to accompany me, and it was at his desire that the break-away was to be made as high as the balloon would lift the cable. The cable available was a heavy one, and we were let up to 2,000 ft., where the balloon refused to lift more weight. At this altitude, in a wind of 24 m.p.h., the release was operated and the cable dropped, being checked in its fall by a parachute attached to its top end.

The balloon, then free and relieved of the weight of the cable (Fig. 9), ascended until the speed-of-rise indicator marked 1,000 ft. per minute at 2,500 ft. and the rip was then operated. As the gas escaped from the aft compartment the angle of the balloon increased from 45°, its normal free angle, to about 80°, when the scoop of the tail approached the car and we could look down into it and see the interior rigging. As the balloon descended she slowly turned round, not quickly enough to give any sensation of giddiness, but continually changing the direction of view. The wind being from the south, our course was towards the Thames, which is only a little over a mile from Roehampton R.N.A. Station. There seemed every chance of the balloon descending in the river, so, not wishing to get wet, we put out a bag of ballast at 500 ft. and another at 200 ft. These saved us from the river, but not from Barnes Railway Bridge, the parachute lines of the balloon catching in the girders of the bridge and making the balloon captive, while the balloon descended on the electric railway. The stationmaster at Barnes Railway Station had previously been warned of the possibility of the balloon descending on the railway, so, when he saw it travelling in that direction, he stopped the traffic before the actual landing took place, and he then stood by the switch "to cut off the current in the event of anything happening." Nothing did happen, however, in spite of the car coming down between the two live rails, rolling first into one rail and then into the other, while the tail sat across the live and wheel rails. The balloon and the car curtsied up and down, and we had to

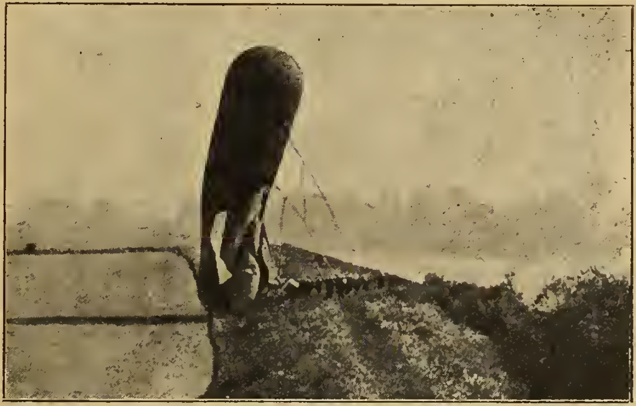


Fig. 11: Deflating.

Fig. 12: Maj. Dalziel, General Maitland and Griffith Brewer.

wait patiently for the breeze to lift us into a safer position. At last, after a few minutes, which seemed much longer, we rolled over the rails to the side of the embankment, where our crew, who had run up in the meantime, caught the car and carried it to safety down the embankment and into the field beside the river. There are few insulators better than a balloon car when it is dry, and the car on this occasion was as dry as the stationmaster's remark. I venture to think that we have to thank the dryness of that car for being able at a later date to congratulate General Maitland on his wonderful voyage to America and back in R34.

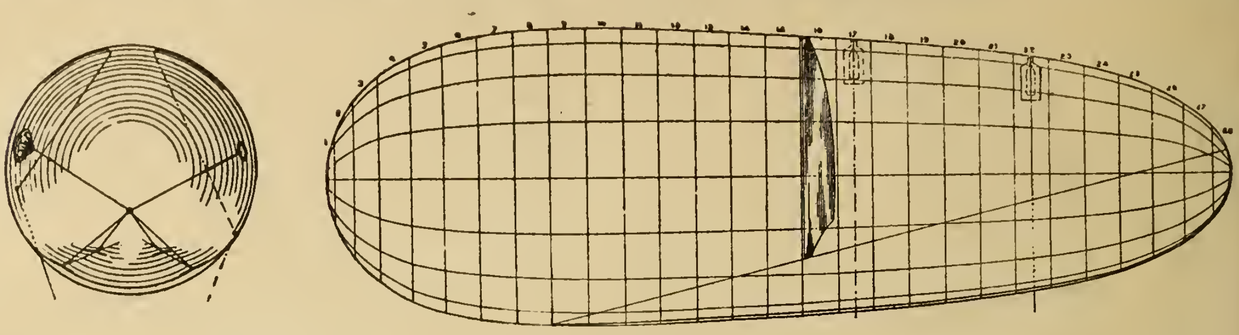


Fig. 13 : Longitudinal section of streamline balloon, fitted with arched diaphragm, and cross-section, showing port and starboard rips behind diaphragm

These three experimental flights seemed to have broken the run of ill-luck attending the first experiments, and I was now instructed to fit the invention to a streamline balloon, and, if possible, so arrange that the pilot should have the option either of descending quickly immediately on breaking away or of merely bringing the balloon to a state of equilibrium and then to continue as a free balloon (Figs. 10 to 12). I had already recognised that the quantity of gas discharged depended on the position of the rip panel in the aft compartment, and, consequently, by having two rip panels, one near the diaphragm and the other near the tail, the option of making a quick landing or of converting the balloon into a free balloon with an open neck would be at the discretion of the pilot.

It will be seen in Fig. 13 that the diaphragm has an open arch at its base completely spanning the ballonet. This arch was cut out after the fourth experiment and the diaphragm as first inserted for the third experiment had two 3 ft. holes in its base instead. The forward rip panel is close up to the diaphragm, while the aft rip is far back in the tail. In the position drawn in this diagram both rip panels would apparently let nearly the same quantity of gas escape, but the change in angle, on the balloon becoming free, increases as the gas escapes, because the tail is robbed of its lift and the lift then becomes concentrated in the forward end of the balloon. The aft rip panel is therefore very low in level when the balloon is inclined in this way, and becomes equivalent to the open neck used in free spherical balloons.

When the new balloon was completed it was decided that an attempt should be made to make a free run after checking the ascent. Major Moore accompanied me on this occasion, and we dropped the cable at 100 ft. By discharge of ballast the descent was checked and a new rise commenced, and then a free run commenced exactly as in a free spherical balloon except that during the ascents and descents the balloon gyrated slowly owing to the steering action of the deflated tail. A good landing was made 50 minutes later at Rickmansworth. This ascent was a joy-ride pure and simple, but we were reminded of the War by two incidents. While passing over Northolt Aerodrome an aeroplane flew up to us at 3,600 ft., and the pilot, cutting off his engine, enquired if we required assistance. We assured him that we were quite safe, and he then switched on and returned to the ground. After packing the balloon and on our way back to Roehampton an air raid was made over London and we had to return with the head lamps of the car extinguished.

With the object of reducing the weight of the diaphragm I now cut the lower half into the arch form shown in the diagram. It was hoped to dispense with the diaphragm altogether, but I hesitated without further trials to do this at the time.

The fifth trial was made in the company of Major Max Spencer, the balloon being first checked after ripping and then ballasted as a free balloon. The landing was made on Epsom Hills an hour or so later, the maximum altitude reached being 4,000 ft., with 100 lbs. of ballast remaining.

The trials were then complete, and I was extremely pleased to be informed by the R.N. Air Department that the " Brewer Rip " was becoming part of every naval kite-balloon and was a welcome addition from the pilot's point of view. The use in the Navy of the " Brewer Rip " continued for 16 months, during which I only made one demonstration at Roehampton in the company of Colonel Dunville. I was then informed that the system had been discontinued at the request of the Grand Fleet on account of the additional weight involved in the diaphragm.

A new balloon was accordingly constructed with the two rips as before, but with the diaphragm completely removed, and on October 4, 1918, Colonel Mackworth, Director of Balloons, made the first trial with myself in the undivided balloon. The forward of the two rips was now used for the first time and no ballast was thrown to check the drop. The trial was made at Roehampton and the ground contact, though fast, was not dangerously so.

It was then decided to make one more trial with the aft rip only, so as to show that the undivided balloon could still make a free run. (Fig. 14.)

Lieut.-Col. F. K. McClean accompanied me. The gas in the balloon was old gas taken from another balloon and the car was overweighted, both of us being above the average weight. We also carried parachutes for the first time. The result of this flight was not what we expected, and was a poor demonstration to my class of probation officers assembled on the ground to view the ascent. The balloon rose sluggishly after being released from the cable, and then, after ripping, fell fast, landing in some trees outside the Roehampton grounds, from which we were ignominiously rescued by our ground crew, who pulled us down from the trees.

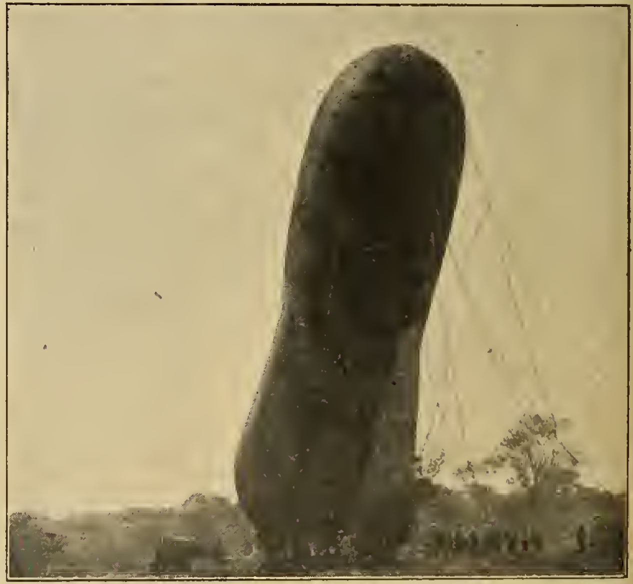


Fig. 14 : Streamline balloon landing tail down after ripping

This mishap necessitated a further trial, in which Capt. Jones accompanied me. This last experiment was completely successful, a free run of over an hour being made, ending up in the River Mole, near Leatherhead.

The Director of Balloons was now completely satisfied, and once again the "Brewer Rip" became standard for the Navy and for the first time also for Army balloons.

Apart from the actual object in view, these experiments were instructive in many ways. In the ordinary design and use of kite-balloons, the weights and gear are assumed to suit the captive position of the balloon when flying captive on its cable. Accidental break-away ascents, although fairly frequent, were always unexpected, and so opportunities to observe the change in conditions in free flight were difficult.

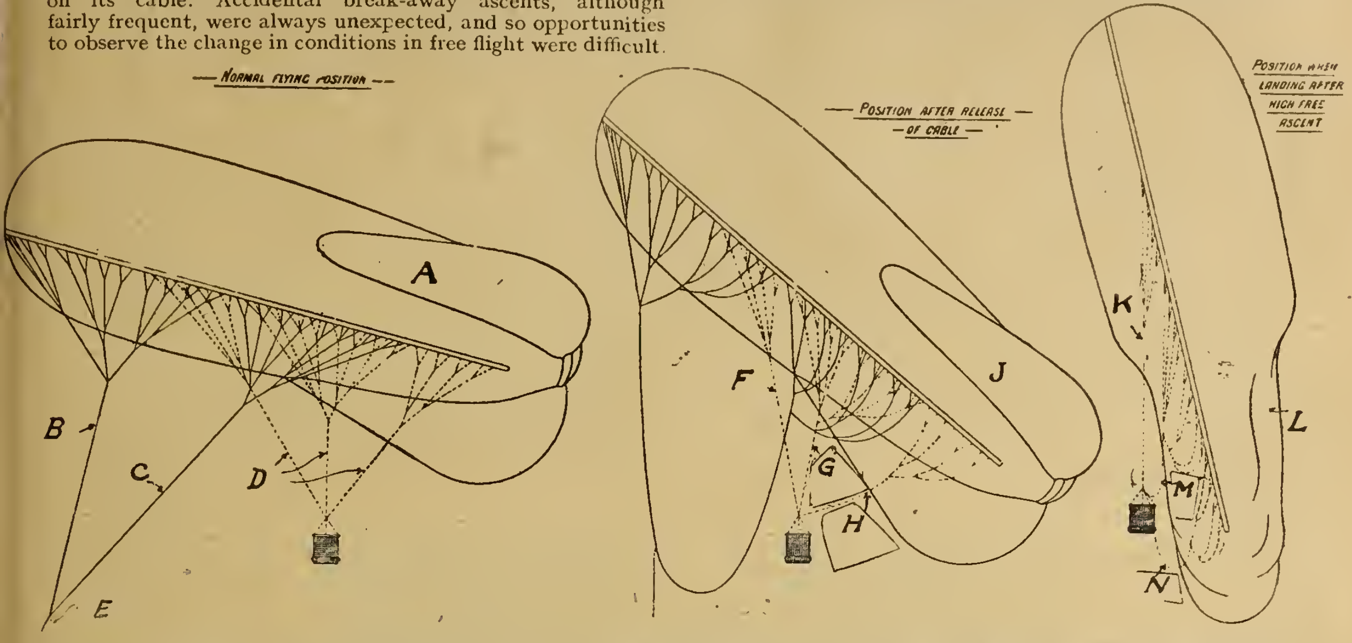

NORMAL FLYING POSITION
POSITION AFTER RELEASE OF CABLE
POSITION WHEN LANDING AFTER HIGH FREE ASCENT
A
B
C
D
E
F
G
H
J
K
L
M
N

Fig. 15: (A) Port fin giving dynamic lift to tail of balloon. (B) Rope transferring strain of fore-suspension to cable. (C) Rope transferring strain of aft-suspension to cable. (D) Ropes taking strain of car suspension. (E) Cable receiving strain. (F) Forward car suspension taking maximum strain. (G) Central car suspension taking little strain. (H) Aft car suspension taking no strain. (J) Port fin in free air giving no lift and commencing to deflate. (K) Forward car suspension takes all weight of car. (L) Empty folds of tail of balloon. (M) Slack. (N) Slack.

By breaking away intentionally we had opportunities of studying the change in conditions under less trying circumstances, and one thing we learnt was the effect of change in distribution of the car load on the rigging of kite-balloons when free.

The Navy system of running points causes the weight of the car to be carried by the forward car suspensions from eight points on each side of the balloon, *i.e.*, 16 points in all (Fig. 15). In the Army balloon the weight of the car is taken when the balloon is free, from one point on each side only, with the extreme probability of the attachments being torn off in succession. Kite-balloons should therefore be provided with running points on all the forward suspensions, although running points may be unnecessary in the central and aft points of the car suspension.

In order to illustrate this danger in kite-balloon rigging, I have here two diagram models (Fig. 16), one in which the points of the rigging are fixed and the other in which the points of the rigging are free to run. In each case the forward leg of the car suspension is divided by the third bridles into two points, from which the second bridles divide into four points, and then by the first bridles into eight points, which are attached to the rigging band. In the first model the points of connection are the running blocks used in naval balloons, and in the second model these points are fixed as in the Army balloon type. It will be seen that when the Navy model is inclined, the strain on the first bridles is equalised by the running blocks allowing the two arms of the bridles to change their proportion of length so as to divide the strain between them, thus allowing the eight points of attachment of the first bridles to each take its proper proportion of the weight of the car. In the Army model the whole of the strain when the model is inclined is carried on the forward bridle alone. In both models the same strength of cotton is used in the first bridles, and the weight representing the car is greater than can be supported by a single thread. By inclining the first model the weight is supported even in the extreme angular position taken up by the balloon when descending after breaking away, but in the second model a similar inclination of the balloon, bringing the weight on to each first bridle in succession, breaks them one after the other and allows the car to fall. I can leave you to imagine the satisfaction we experienced when making these experiments in observing that when the balloon became inclined to the extreme angle, we were supported by eight of these fine cords on each side of the balloon, instead of by a single fine cord on each side only.

In conclusion, I have to thank the Admiralty for permitting me to describe this invention, which forms the subject of a secret patent which I assigned to the Admiralty. Also I cannot too gratefully acknowledge the help extended by the Director of Balloons and from the Commanding Officer and staff at Roehampton. The officers who have taken part in these experiments deserve ample recognition, for it is one thing to test one's own invention in the air and quite another to stake one's life on the successful working of another man's invention.

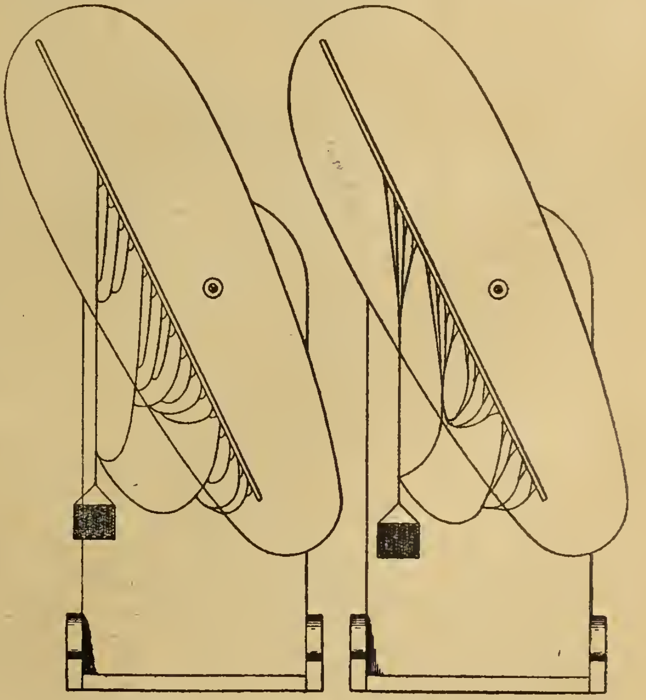


Fig. 16: Models 1 and 2. On left, unsafe rigging; on right, safe rigging.

AIRISMS FROM THE FOUR WINDS.

Now that the Waziris have been brought to a proper state of mind by our bombing methods, it should be noted as significant that one of the clauses in our terms to the obstreperous tribesmen is an undertaking on their part not to interfere with aeroplanes flying east of the Durand line.

- - -

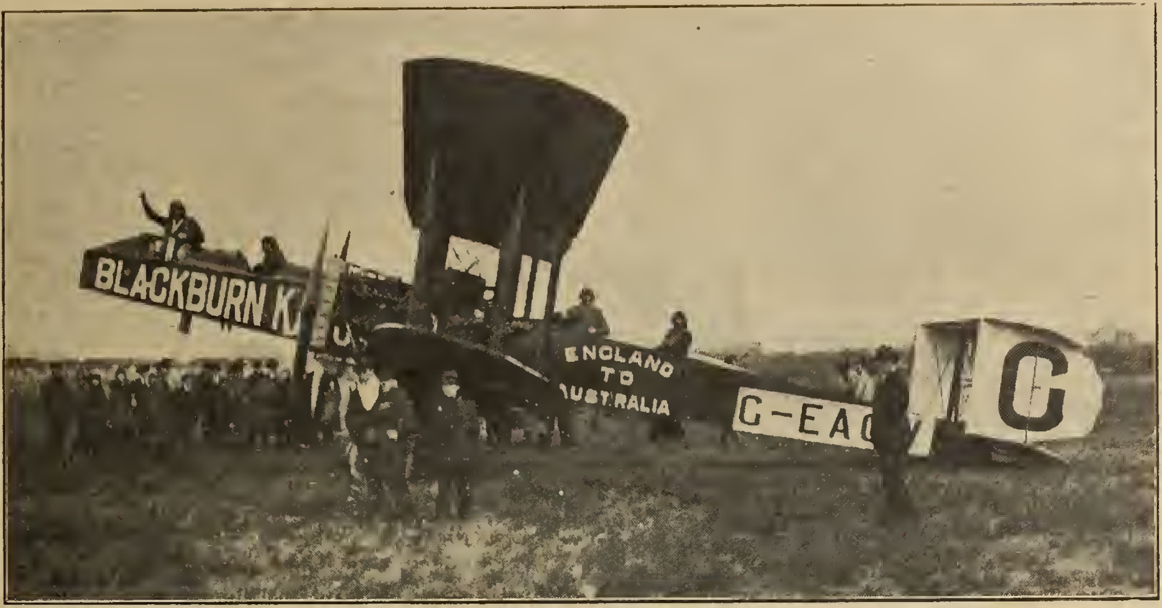
WE are getting on. M. Louis Gamblanc, an aeronautical engineer of Paris, who has just sold to the French Government his rights in a motor designed especially for work at a great altitude, in an interview with a press correspondent, has set out his views as to the most promising line of development for the aeroplane.

" To ensure speed and safety, air liners of the future will be aeroplanes capable of travelling at between 200 and 250 miles an hour at an altitude of 35,000 ft," M. Gamblanc says. " The problem at the present time," he emphasises, " is to obtain an aeroplane capable of travelling at great speed and yet able to land with safety. To obtain speed and safety together it is necessary to travel so high up that the atmosphere offers the minimum of resistance to the broad-winged surface which allows of safe and slow landing.

" Life is not possible at the ideal altitude, which I put at about 35,000 ft., without artificial respiration and heating being provided. But, properly equipped, I see no reason why aeroplanes should not reach 45,000 ft. and more. Aeroplane bodies in the future will have to be hermetically closed, and provided with apparatus for renewing the air."

No doubt in a measure in time he will prove to be right, but it's a good job the deal with the French Government had been completed, or goodness only knows what height this optimist might have soared to—in his mind.

MOST ANNOYING!—I. That too sudden turn!



THE FLIGHT TO AUSTRALIA: Start of the Blackburn Kangaroo from Hounslow on November 21

FRENCH actresses are proverbially so light and airy, that considerable lift should be given to the popularity of "dirigebling" by the adhesion of Mlle. Gaby Morlay, the Paris stage-favourite, to the practical side of the art. According to a report from the gay city, Mlle. Morlay has for a long time been interested in lighter-than-air flying, and has on many occasions taken lessons by the piloting of dirigible balloons. She has already, so it is stated, passed brilliantly all practical tests which are required for a pilot's certificate, and has now undergone her technical examination, which she has also passed with the greatest success, and thus becomes the first woman pilot of a lighter-than-air machine.

- - -

FOR fear posterity may have handed down to it a somewhat misleading historical Zep. item, it is, perhaps, well to record that "The Zeppelin," 15,200 tons, which is now to be handed back again by the Americans to Great Britain, is *not* a lighter-than-air craft—she is one of the eight German sea-going vessels lent by us since February for the purpose of transporting American troops.

- - -

FLYING to winter sports in Switzerland appears to be "catching on." Once or twice reference has been made to its progress, and a further instalment from a Berne correspondent of *The Times* gives the latest moves in this connection.

"The development of aviation," he writes, "has put a new aspect on the question of travelling in Switzerland. Thus there will be, on special occasions, an aeroplane passenger service between Zurich and St. Moritz, and civilian flying promises to be very popular at Lugano and elsewhere. I recently had the opportunity of flying from Zurich over the lower ranges of the mountains that form the western barrier of the Upper Rhine, and I would venture to predict that the advent of civil aviation in Switzerland will bid fair to rival in popularity all the other attractions of the country.

"At present, of course, the sport—for sport it most certainly is—is entirely undeveloped, for Switzerland is too small a country to have at its disposal a very large number of machines, and there are many difficulties to face. Thus the fact that Maj. Isler managed to land on the Jungfraujoch does not mean that landing at very high altitudes will henceforth prove a simple matter. Quite the contrary, for, as he pointed out to me, you have not only to land on a very confined and dangerous space, but, owing to the thinness of the atmosphere, you cannot shut off your engine and vol-

A Breguet tractor biplane about to land

plane down in the ordinary way; if you shut off your engine you will drop like a stone.

– – –

"However, these long, level Swiss valleys," he continues, "should easily be converted into splendid aerodromes, although at present most of them are spoilt for flying purposes by telegraph and telephone wires. The military aviation authorities are co-operating with private firms, and are placing the conveniences of the military aerodromes at Dübendorff, near Zurich, at their disposal. A new aerodrome, of which great things are to be expected, is being constructed at Thun, on the shores of the lake, and the factory there is turning out a considerable number of machines, including the new Swiss 'Haefeli D.H. 5.'

"There are 'flying weeks' near many of the chief towns, and, in order to popularise flying among the Swiss people, a novel scheme has been adopted. In the streets of Berne and other cities you will find lists of recent civilian passengers. And what can be finer than to have your name printed on such a list for all the townsfolk to see?"

– – –

What a chance for notoriety!

–

Those air-raids again! Last week another victim, a solicitor, was sentenced to six months in the second division at the Old Bailey for bigamously marrying a woman whom he met while sheltering from an air-raid.

– – –

An excellent idea for a War memorial has been carried out in Lenham Church, Kent, where the brass-bound propeller blades of an aeroplane have been placed to commemorate the memory of those who, by the air, paid the full penalty of the War.

– – –

More aerial postage stamps. Two new varieties have just been added from Japan, where they were issued in connection with an experimental air post between Tokyo and Osaka. They consist of the ordinary 1½ and 3 sen postage stamps, distinguished by the addition of a device representing a monoplane in flight, in the form of an overprint. The overprint is in red on the 1½ sen and in black on the 3 sen. Something like 100,000 copies of these special postage stamps were sold by the Imperial Japanese post office in the two cities.

– – –

Today (Thursday) Air-Marshal Sir Hugh Trenchard will, with six other recipients, be placed upon the Honorary Degrees Roll at Cambridge.

– – –

We are glad to see Lord Montagu of Beaulieu to the fore again in giving attention to the Imperial future of aviation. In an able letter to the Press, Lord Montagu sums up shortly the past of the Air Force, and then handles the "future," during which he once more endorses the chief points of danger ahead, should our Government at the present moment fail to rise to the necessities of the future.

– – –

Here is the "history" section of Lord Montagu's advocacy:—

"The proposal of the Government to put the Royal Air Force again under the War Office should be resisted by every one who has the future of the Air Services at heart, or remembers the past history of the previous bad system now proposed to be revived.

"First of all, I desire to allude to the past. When I was a member of the War Air Committee, with Lord Derby and others, in the spring of 1916, my experience then of the difficulties in regard to supply and administration which arose from the dual control of the Air Force by the Navy and Army, and the impossibility of harmonious working, led me to resign as a protest against the waste of time, lives, and money under the old system, and in order to bring to public notice that the independence of the Air Service was essential for its progress and proper efficiency. The same reasons which led the Government to accept this view hold good today.

"The Air Force should remain independent, free to work out its own salvation, to create and carry on its own traditions, and alone to be responsible for its own efficiency in offence and defence throughout the Empire.

"Then, as now, some Cabinet Ministers and some exalted naval and military authorities were bitterly opposed to the independence of the new force, and some of these authorities had either actively hampered or passively resisted the progress of the Air Force since its early days. Later on three factors compelled the Government to grant the Air Force independence:—

"(1) The pressure of both Houses of Parliament and public opinion.

"(2) The need of an Air Force for war purposes larger than that which could be controlled by either the Admiralty or the War Office.

"(3) The weighty and explosive arguments in London and elsewhere of the Zeppelins, which showed every one that war in the air was a very real and increasingly important part of the great European struggle.

"Thus the first Air Ministry and independent Air Force was formed under Lord Cowdray in the autumn of 1917."

– – –

And then follows a warning and an appeal:—

"Now what of the future? It would be madness to imagine that the need of an efficient Air Force will be less in future. It will be far, far greater. Both by sea and land, air power will become more and more important actually and relatively every year, both in peace and war. And the possibility of sudden, blinding, annihilating attacks by an enemy, without a declaration of war—an enemy panting for vengeance—will grow with every year. Has the War Office knowledge, time or ability to think out the special problems of the air, or administer efficiently this novel, peculiar, and wonderful force, whose pilots must always be pilots before they are sailors or soldiers, brave beyond telling, and reckless in initiative to the verge of insubordination? Of the two, I would rather put them under the Admiralty, where initiative is understood, and insubordination, if successful, winked at.

"And it should be enough for most people to know that Gen. Seely has resigned on this most important question of principle. There has never been a more capable Chief of the Air Ministry, one with more vision, experience, practical knowledge, and belief in the future of the Air Force. He has been Secretary of State for War, still is a member of the Imperial Defence Committee, and has worked the Air Force under both systems, dependent on the War Office and independent of it.

"And, finally, let us remember that while we are all war weary, war is still possible, even probable, in the future. Germany is crippled on the sea and on land. In the air she can build up—and is building now—a force for peaceful commerce which in 24 hours could be used for war with deadly effect. The first week's air warfare may decide the next war.

"Any independent Air Ministry, though its estimates and *personnel* be small, is preferable to no Ministry at all, and to the overshadowing and deadening influence of another Department. Three years ago I wrote, 'One element, one Service.' That is as true a motto today as then."

The stained glass window in St. James's Church, Spanish Place, in memory of fallen airmen

THE ROYAL AIR FORCE

London Gazette, November 18

Flying Officer J. Edelsten is granted a permanent commn. (A.); Aug. 1.

The following temporary appointment is made :—

Staff Officer, 3rd Class :—(P.) Flight. Lieut. D. F. Massy; Sept. 1 (substituted for notification in *Gazette* of Oct. 10, wherein this officer's initials were shown as " D. P.").

Flying Branch

The following Lieuts. are graded for pay and allowances as Capts. whilst employed as Capts. (A.) :—W. Henderson to May 16; (Hon. Capt.) I. G. Roberts to Sept. 6; May 1.

Sec. Lieut. F. Thomasson, D.F.C., to be Lieut.; Feb. 24.

Pilot Officer E. A. Siegrist to be Flying Officer; Sept. 10.

Pilot Officer T. Q. Harvey relinquishes the grading for pay and allowances as Flying Officer on ceasing to be employed as Flying Officer (O.); Oct. 21.

Flight Cadet H. H. Bracher is granted a temp. commn. as Sec. Lieut. (O.); Aug. 8, 1918 (since killed).

The following relinquish their commns. on ceasing to be employed :—Sec. Lieut. (Hon. Lieut.) P. R. Cook; July 8, 1918 (substituted for notification in *Gazette* of Aug. 5). Maj. H. Wyllie, O.B.E. (Capt., Wilts. R.), Capt. C. R. Robbins, M.C., D.F.C. (Lieut., R.F.A.); Oct. 31. Lieut. H. J. Bullock (Lieut., Norf. R.); Nov. 5. Lieut. (Hon. Capt.) R. E. Wilson (Capt., Hamps. R.); Nov. 6. Sec. Lieut. (Hon. Lieut.) A. Cox (Lieut., R. Welsh Fus.); Nov. 8.

(Then follow the names of 130 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—P. J. Casey (caused by wounds); Nov. 10. W. A. Horan (Lieut., S. African F. Art.) (caused by wounds); Nov. 14. H. E. Hyde (contracted on active service); Nov. 16.

The following Sec. Lieuts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank :—G. R. Newton-Bridle; July 25 (substituted for notification in *Gazette* Aug. 1). H. Frew; Nov. 6. V. M. Mitchell; Nov. 12.

Sec. Lieut. C. F. Lawson is antedated in his appointment as Sec. Lieut. (O.); July 29, 1918.

The notification in *Gazette* of Nov. 11 concerning Lieut.-Col. G. C. St. P. De Dombasle is cancelled.

The notification in *Gazette* of Oct. 3 concerning Sec. Lieut. J. A. Peterson is cancelled.

The notification in *Gazette* of Oct. 28 concerning Sec. Lieut. L. E. G. Judge is cancelled.

The notification in *Gazette* of Aug. 22 concerning Sec. Lieut. H. Toms is cancelled. *Gazette* of Aug. 5 to stand.

Administrative Branch

Sqdn. Ldr. (actg. Group Capt.) W. P. Alexander to be Sqdn. Ldr. (from Aug. 1 to 31), and relinquishes the actg. rank of Group Capt.

Maj. R. H. Howell to be Maj., from (S.O.); June 21, 1918.

Lieut. A. E. Burrowes is graded for purposes of pay and allowances as Capt. whilst employed as Capt.; from May 1 to Aug. 9.

Flight-Lieut. H. C. Jones relinquishes the grading for pay and allowances of Sqdn.L dr. on ceasing to be employed as Sqdn. Ldr.; Oct. 14.

Flight-Lieut. H. W. M. Paul, O.B.E., M.C., to be Flight-Lieut., from (S.O.); Oct. 15.

Lieut. (Hon. Maj.) C. A. Cutbill to be Lieut. (Hon. Maj.), from (S.O.); Nov. 26, 1918).

Pilot Officers to be Flying Officers :—J. Earl-Willson; Aug. 17; F. W. Garley; Oct. 1.

P.F.O. L. F. Joyner is granted a temp. commn. as Sec. Lieut.; Sept. 12, 1918 (substituted for notification in *Gazette* of Sept. 5).

M. W. Binns is granted a temp. commn. as Sec. Lieut.; Dec. 7, 1918.

Lieut.-Col. (actg. Col.) A. W. C. McFall, O.B.E. (Lieut.-Col., ret. Mil.), relinquishes his commn. on ceasing to be employed, and is permitted to retain the rank of Col.; Sept. 18 (substituted for notification in *Gazette* of Oct. 10).

The following relinquish their commns. on ceasing to be employed :—Lieut. S. J. Stokes; Oct. 30. Lieut. A. H. Bottrell (Lieut., R. War. R.); Oct. 31. Capt. B. G. M. F. Nixon (Capt., Indian Army); Nov. 8.

(Then follow the names of 33 officers who are transfd. to the Unemployed List under various dates.)

Lieut. T. Rumney (R.A.) relinquishes his commn. on account of ill-health contracted on active service; Nov. 7.

Sec. Lieut. B. L. Levi resigns his commn., being physically unsuited for duties of Pilot or Observer, and is permitted to retain his rank; April 4 (substituted for notification in *Gazette* Nov. 8, 1918).

The notification in the *Gazette* of Sept. 16 concerning Sec. Lieut. T. Norman Drake is cancelled. The notification in the *Gazette* of Oct. 28 to stand.

The notifications in the *Gazettes* of May 27 and June 17 concerning Maj. R. H. Howell are cancelled.

The notification in the *Gazette* of Nov. 7 concerning Sec. Lieut. C. O. D. Kidd is cancelled.

Technical Branch

Flight-Lieuts. to be Flight-Lieuts., Grade (B.) from (S.O.) :—Flight-Lieut. L. Auker, O.B.E.; Nov. 1. (Hon. Sqdn. Ldr.) E. J. Sayer, M.C.; Nov. 8.

The following Lieuts. are graded for purposes of pay and allowances as Capt. whilst employed as Capts., Grade (A.) :—W. F. Floyd, from May 1 to July 31; C. F. Blunt; July 17.

Lieut. (Hon. Capt.) D. A. English is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (B.); May 1.

Lieut. J. A. Rutherford to be Lieut., Grade (B.), from (A. and S.); July 1, 1918 (substituted for notification in the *Gazette* of Aug. 23, 1918).

Flying Officers to be Flying Officers, Grade (B.), from (S.O.); Nov. 1: H. J. Birtles, E. H. Eldridge.

Sec. Lieut. E. Hague to be Lieut.; April 19.

Sec. Lieut. W. Parkinson to be Lieut.; Jan. 16, without the pay and allowances of that rank prior to April 9.

Sec. Lieut. H. W. Nicholl to be Lieut.; April 19, without the pay and allowances of that rank prior to May 1 (substituted for notification in the *Gazette* of May 24).

Pilot Officer J. W. Caddy to be Flying Officer; Oct. 1.

Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts., Grade (A.) :—H. H. Weller; May 1. (Hon. Lieut.) D. Sinclair, from May 1 to Oct. 14.

Pilot Officer A. E. Gliddon to be Flying Officer without the pay and allowances of that rank; Oct. 1.

Pilot Officer (actg. Sqdn. Ldr.) J. W. Tattersall relinquishes the actg. rank of Sqdn. Ldr. on ceasing to be employed as Sqdn. Ldr., Grade (A.); Oct. 8.

Sec. Lieut. C. H. N. Nunn relinquishes the grading for pay and allowances as Lieut., Grade (B.); May 13 (substituted for notification in the *Gazette* of Oct. 3).

(Then follow the names of 42 officers who are transfd. to the Unemployed List under various dates.)

Lieut. H. J. Dolan relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Nov. 7.

Lieut. A. Ward (Sec. Lieut., Extra Reg. Empld. List) resigns his commn. Nov. 19.

The notification in the *Gazette* of Oct. 17 concerning Pilot Officer E. Parrett is cancelled.

Medical Branch

Capt. J. A. Giles to be actg. Maj. whilst employed as Maj.; July 2.

Flight-Lieut. G. Cranstoun to be actg. Sqdn. Ldr. whilst employed as Sqdn. Ldr.; Sept. 4.

(One officer transfd. to Unemployed List.)

Dental Branch

S. G. Smith is granted a temp. commn. as Lieut.; July 1, 1918 (substituted for notification in *London Gazette* of June 28, 1918, in which he is shown under " Medical " Branch).

Memorandum

The following Prob. Flight Officers are granted hon. commns. as Sec. Lieuts. :—A. C. Law; Nov. 30, 1918. J. Cumberbirch; Dec. 10, 1918. B. M. Bell; Feb. 3. E. E. Mays; Feb. 12. A. W. Brayley; Feb. 14. G. R. A. Booker; Feb. 18. J. A. H. Chancellor; Feb. 22. W. J. Costello; Feb. 27. L. H. K. Ingham; March 8. J. H. Allen, W. E. W. Holder; March 14. W. M. Cowper; March 20. C. W. Brown; April 8. G. L. H. Byrne; April 15. H. V. Glover; April 16. A. J. Barrett; April 18.

(Then follow the names of five Cadets who are granted hon. commns. as Sec. Lieuts.)

Group Capt. A. M. Longmore, D.S.O., is placed on the half-pay list; Oct. 20.

The following Temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed :—T. G. Green, W. E. Pickerill, W. J. Speller, H. T. Woodsmith; Sept. 16.

(Then follow the names of six officers who are transfd. to the Unemployed List under various dates.)

Lieut.-Col. J. D. Mackworth, C.B.E. (R.W. Surrey R.) relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Oct. 24 (substituted for notification in the *Gazette* of Nov. 7).

Lieut.-Col. G. R. A. Holmes, C.M.G., O.B.E., relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Nov. 12.

London Gazette, November 21

Flight-Lieut. J. C. Brooke, D.S.C. (S.), is granted a permanent commn. in the rank stated with effect from Aug. 1.

The notification in *Gazette* of Aug. 1 appointing Capt. T. E. Longridge (S.O.) to a permanent commn. is cancelled.

Flying Branch

Sec. Lieut. G. R. Fleming to be Lieut.; April 25, 1918.

Pilot Officer R. Nicholson to be Flying Officer; Oct. 1.

Sec. Lieut. E. W. Richardson (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (O.); Aug. 8, 1918.

P.F.O. W. J. Densham (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A.); June 13, 1918 (since killed).

Sqdn. Leader M. G. B. Copeman is placed on the h.p. list; Nov. 22.

The following relinquish their commns. on ceasing to be employed :—Sec. Lieut. W. W. Baker (Sec. Lieut., Hamps. R.); Sept. 6. Lieut. A. W. Frazer (Lieut., S. Wales Bord.); Oct. 9 (substituted for notification in *Gazette* Sept. 30). Lieut. D. C. Birch (Lieut., North'n R.); Oct. 21. Capt. J. W. Havers (Lieut., R.N.); Sec. Lieut. C. A. Howe (Lieut., R.A.); Nov. 1. Capt. N. Grabowsky-Atherstone, A.F.C. (Lieut., R.N.); Capt. G. S. Greenland (Lieut., R.N.); Nov. 3. Lieut.-Col. R. C. S. Hunt (Comdr., R.N.); Nov. 4. Lieut.-Col. H. M. Meyler (Capt., Bord. R.), Lieut.-Col. H. L. Woodcock (Comdr., R.N.); Nov. 7. Capt. G. F. M. Warner (Capt., R. Berks. R.); Nov. 10.

(Then follow the names of 100 officers who are transfd. to the Unemployed List under various dates.)

Capt. A. C. Wilson (Lieut., 12th Lcrs.) resigns his commn.; Nov. 22.

Capt. L. H. Wilkins, D.S.C., relinquishes his commn. on account of ill-health contracted on active service, and is granted rank of Maj.; Nov. 13.

Lieut. R. Main relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; Sept. 29.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—W. L. Watt (contracted on active service); March 10 (substituted for notification in *Gazette* of Jan. 31). J. H. F. Baker; Oct. 11 (substituted for notification in *Gazette* of July 22).

Lieut. A. I. Campbell-Robertson (Lieut., Hsrs.) relinquishes his commn. on account of ill-health contracted on active service; Nov. 14.

Sec. Lieut. W. G. Greenaway, M.C., relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; Nov. 11.

Lieut. H. M. Edwards-Evans, M.C. (Lieut., R.W. Fus.), resigns his commn.; Nov. 22.

The notification in *Gazette* of Oct. 24 concerning Lieut. R. Main is cancelled.

The notification in *Gazette* of Aug. 19 concerning Lieut. E. T. Rogers is cancelled.

Administrative Branch

Flight-Lieut. C. Mason to be Flight-Lieut., from (S.O.); Nov. 3.

Flying Officer V. Stranders to be Flying Officer, from (S.O.); Sept. 8 (substituted for notification in *Gazette* of Oct. 21, wherein this officer was shown under " Flying Branch ").

Pilot Officer W. Ranger to be Flying Officer; Nov. 3.

The following relinquish their commns. on ceasing to be employed :—Maj. R. Cockburn, O.B.E. (Maj., Suff. R.); Aug. 15. Lieut. R. A. Knott (W.O.R.N.); Oct. 31. Capt. T. G. Southwood (Lieut., R.N.); Nov. 6. Lieut. N. C. Buckton (Lieut., E. Lancs. R.); Nov. 11. Lieut. H. Hammond, M.C. (Lieut., Dorset R.); Nov. 11.

(Then follow the names of 32 officers who are transfd. to the Unemployed List under various dates.)

HONOURS

The King has granted unrestricted permission for the wearing of the following decorations, conferred for valuable services rendered in connection with the War :—

CONFERRED BY THE PRESIDENT OF THE FRENCH REPUBLIC

Croix de Commandeur, Legion d'Honneur.—Maj.-Gen. Sir FREDERICK HUGH SYKES, G.B.E., K.C.B., C.M.G. (Ret. List).

Croix de Guerre, avec Palme.—Flying Officer Arthur ROWAN (Salonica), Flight Lieut. CHARLES ERNEST SHERWIN, M.C. (R.E., T.F.) (Aden).

CONFERRED BY THE PRESIDENT OF THE PORTUGUESE REPUBLIC

Chevalier, Military Order of Avis.—Capt. BERNARD PURVIS BROACKES CARTER, D.F.C. (France).

CONFERRED BY THE KING OF ROUMANIA

Chevalier, Order of the Crown.—Sec. Lieut. GEORGE ERCOLE, late R.A.F.

CONFERRED BY THE SULTAN OF EGYPT

Order of the Nile, 3rd Class.—Wing Comdr. CHARLES STUART BURNETT, C.B.E., D.S.O. (H.L.I.) ; Wing Comdr. NORMAN GOLDSMITH, O.B.E. (R.A.) ; Squad. Leader ERIC LEWIS CONRAN, M.C. (21st Lcrs.) ; Maj. (Temp. Lieut. Col.) ROBERT HALL, O.B.E. (Capt., R.W. Fus.).

Order of the Nile, 4th Class.—Capt. ALBERT JOHN GORDON ANDERSON (Lond. R.) ; Capt. LIONEL MUNDY BAILEY, A.F.C. ; Flying Officer ROBERT CHARLES JENKINS, M.C. (D.C.L.I.) ; Squad. Leader CHARLES HENRY NICHOLAS A.F.C. (S.W. Bordrs.) ; Flying Officer DAVID NORRIE THOMSON, M.C. (Glas. Yeo.).

◆ ◆ ◆ ◆

PERSONALS.

Deaths

Lieut. DENNIS HENRY STACEY GILBERTSON, 6th Northamptons and 70th Squad., R.A.F., who was previously reported missing on September 4, 1918, and is now officially presumed killed in action on that date at Ecaillon, was the only son of A. Stacey Gilbertson and Mrs. Gilbertson, of Mangrove, Hertford, and 41, Earls Avenue, Folkestone.

Capt. BASIL GRAHAM HOMFRAY KEYMER, D.F.C., Italian Croce di Guerra, R.A.F., who was killed in action on October 24, 1919, in South Russia, at the age of 20, was the eldest son of Rev. Basil N. Keymer, C.T.F., and Mrs. Keymer, of 1, Belvedere Road, Scarborough.

Lieut. JAMES HAMILTON SPENCE, R.G.A. and R.A.F., who was reported missing on July 16, 1918, and is now officially presumed killed on that date, at the age of 20, was the only son of Mr. and Mrs. Hamilton Spence, Stoke Abbott, Beaminster, Dorset.

Married

Lieut. WILLIAM ERNEST STATON, M.C., D.F.C., R.A.F., elder son of Mr. and Mrs. W. N. Staton, of Hatton, Burton-on-Trent, was married on November 15, 1919, at Holy Trinity, Northwood, to NORAH CARINA, second daughter of Mr. and Mrs. R. D. WORKMAN, of Overdene, Northwood, Middlesex.

Mr. HENRY WINKWORTH, late Queen's Bays and R.A.F., was married on November 19 at St. James' Church, Spanish Place, to Miss MARGOT DONALD.

To be Married

The marriage arranged between Capt. CUTHBERT G. BELLORD, late R.A.F., eldest son of Mr. E. J. Bellord, and MARGARET ISABEL, elder daughter of Sir Alexander CARDEW, K.C.S.I., and Lady Cardew, C.B.E., will take place quietly at St. James's, Spanish Place, at 1.15 p.m. on December 9.

The engagement is announced between Maj. ERIC CREWDSON, M.C. (late R.E. and R.A.F.), younger son of Mr. and Mrs. Francis William Crewdson, of Gilling Grove, Kendal, Westmorland, and MARY STUART, only child of Maj. Evan W. H. FYERS (Reserve of Officers), Wellington Club, S.W., and granddaughter of the late Lieut.-Gen. Sir William Augustus Fyers, K.C.B.

The engagement is announced between JAMES ROY FIELD, late R.A.F., younger son of Mr. W. F. and Mrs. Field, of The Highlands, Enfield, and JOYCE CLÈLIE, only daughter of Dr. and Mrs. A. Campbell Elliott, of Cranford, St. Annes-on-Sea.

A marriage has been arranged, and will shortly take place, between Squad.-Leader J. B. GRAHAM, M.C., A.F.C., R.A.F., son of the late Malcolm Graham, Yankalilla, South Australia, and LILLIAS, widow of Capt. C. H. BODINGTON, Royal Horse Guards, elder daughter of Mr. and Mrs. C. May Somerville, 49, Holland Park, W.

The engagement is announced between Capt. EDMUND PARFITT HARDMANN, D.F.C., son of the late John Bernard Hardman, of Edgbaston, Birmingham, and Mrs. Hardman, of 25, Fitzgeorge Avenue, London, and BETTY, youngest daughter of the late Percival White BUSHBY and Mrs. Bushby, of Torquay, and youngest stepdaughter of Capt. Arthur P. James, R.N., of Braydon Hall, Minety, Wiltshire.

The marriage arranged between Flight-Lieut. ALEX. J. LONG, R.A.F., only son of Mr. and Mrs. W. Alex. Long, Bank House, Herne Hill, and CHRISTINE A. TARRANT, younger daughter of Mr. S. G. Tarrant, of Great Marlow, Bucks, and the late Mrs. Tarrant, of Tulse Hill, will take place very quietly at St. Stephen's Church, South Kensington, at 12 o'clock on November 29.

The engagement is announced between Capt. S. TREVOR RAVENSCROFT (late Lancs. Hussars and R.A.F.), third son of Mr. and Mrs. S. Ravenscroft, of Broughton Grange, Cartmel, Lancs., and Brathay, Oxton, Cheshire, and MARJORIE, youngest daughter of the late Mr. Henry JENKS, of Barrow Hedges, Carshalton, Surrey, and Mrs. Jenks, Dunairds, Birnam, Perthshire.

A marriage has been arranged, and will take place very shortly, between Air-Commodore T. I. WEBB-BOWEN, C.B., C.M.G., R.A.F., and VIOLET, elder daughter of Mr. and Mrs. C. A. HADLEY, of Johannesburg, South Africa.

The engagement is announced between Capt. P. H. YOUNG, R.A.F., M.S., Halton Camp, Bucks, and JEAN, younger daughter of Mr. H. JAMESON, Craigard, Perth, N.B.

Items

Sir WILLIAM and Lady JOYNSON-HICKS, with their daughter left for India on November 22, travelling to Marseilles to join the s.s. *Mandala*. Sir William is travelling under medical orders, and will not return till the spring.

The will of Mr. HENRY HICKS, of Bedford Avenue, Bexhill, and formerly of Plaistow Hall, Kent (father of Sir William Joynson-Hicks, Conservative M.P. for Brentford and formerly for North-West Manchester), has been proved at £139,134. He left £500 to the Homes for Aged Poor.

The will of Lieut. TREVOR HAWKINS, R.A.F., of Aberdare, who died intestate, has been proved at £100.

◆ ◆ ◆ ◆

An Avro in Iceland

CAPT. CECIL FABER, of the Danish Aviation Co., and late R.A.F., one of those gallant neutrals who felt the call of honour to fight in the British ranks during the War, has just returned to this country from Iceland, where he has been flying a standard 504 K Avro. He commenced flying at Reykjavik on September 3, and in three weeks 140 passengers were taken up, including several old ladies. There was no mishap of any sort, and none of the spares for either machine or engine had to be used. Consequently, the first impression made on the islanders has been distinctly good. Iceland seems to offer a good field for the commercial use of aircraft. All the towns are on the coast, and communication is by steamer. It now takes two days' steaming to get about a third of the way round the island. By air the same journey may be made in four hours. The chances of aquatic aircraft seem to be particularly good.

AVIATION IN PARLIAMENT

R.A.F. Reserve

LIEUT.-COL. POWNALL asked the Secretary of State for War whether, in connection with the organisation of the Territorial Force, he will consider the advisability of arrangements being made by which civil aviators can be formed into a branch of the Territorial Force Reserve, in order that their services may be utilised in case of national emergency ?

Mr. Churchill : No such proposal has been considered in connection with the organisation of the Territorial Force, but the question of the formation of a Royal Air Force Reserve is at present under consideration.

Airmen Under Sentence

MR. LUNN, on November 17, asked the Under-Secretary of State to the Air Ministry what is the number of men of all ranks now serving sentences of more than three months' duration for military offences ?

Mr. Churchill : The number of airmen serving sentences of more than three months' duration for Air Force offences is twenty-eight.

Transport Officers

MR. RAPER asked the Under-Secretary of State to the Air Ministry whether he is aware that the Civil Aviation Transport officers have far more responsibility than officers holding a corresponding rank in the Royal Air Force ; and why the Royal Air Force officers of equivalent rank receive considerably higher pay, free medical attention, and qualify for pensions ?

Mr. Churchill : In reply to my hon. friend's question, it is recognised that Civil Aviation Transport officers have considerable responsibility, but not necessarily more than that of officers holding a corresponding rank in the Royal Air Force. Further than this, Civil Aviation Transport officers do not have the additional risk incurred in flying, and have not executive command of a fighting or other Service unit. I may add that the rates of pay have been under revision, and revised rates on an increased scale have recently been sanctioned by the Treasury.

Mr. Raper asked the Under-Secretary of State to the Air Ministry whether the Civil Aviation Transport officers' agreements are for six months only and terminable at one month's notice on either side ?

Mr. Churchill : The reply to my hon. friend's question is that Civil Aviation Transport officers are appointed for six months, and that their agreements are terminable on three months' notice on either side thereafter.

Mr. Raper asked the Under-Secretary of State to the Air Ministry whether it is laid down that only ex-pilots and ex-observers shall be eligible for appointments as Civil Aviation Transport officers ?

Mr. Churchill : While it is the general intention to appoint ex-pilots and ex-observers as Civil Aviation Transport officers, it is not intended that this ruling should be absolutely binding, as this might eliminate exceptionally suitable candidates who may not have had practical experience of flying.

Hounslow Aerodrome

MR. RAPER asked the Under-Secretary of State to the Air Ministry whether there is any intention of discontinuing the use of Hounslow Aerodrome as a control aerodrome ?

Mr. Churchill : I cannot make a statement with regard to the future of Hounslow Aerodrome at present. The question is now under consideration.

Married Officers (Allowances)

MR. T. THOMSON asked the Under-Secretary of State to the Air Ministry whether he is aware that the regulations governing the issue of lodging and fuel allowances to married officers are not the same in the Air Force as in the Army, and that in the former case a married officer under the rank of major who was under thirty years of age when the present regulations came into force is treated less favourably than an officer serving under similar conditions in the Army ; and, if so, is he prepared to reconsider the matter with a view to putting officers of both branches of the Service on the same footing ?

Mr. Churchill : The scheme of emoluments for the Royal Air Force must be taken as a whole, and a comparison of particular items with particular items in the arrangements of other Services is misleading. There are, however, points of difference in the system of allowances which are now being considered, one of these being the question whether all officers married at the date of the Order may draw lodging allowance irrespective of age.

Milton Depot (Dismissals)

MR. A. SHORT asked the Under-Secretary of State for the Air Ministry whether he is aware that 800 ex-Service men are under notice of dismissal from the Royal Air Force Depôt at Milton ; whether any effort is being made to secure these men other employment ; and whether, in view of the hardship involved in throwing these men out of employment at the beginning of the winter months, he will consider the possibility of retaining their services until the spring or, alternatively, make the process of reduction more gradual ?

Mr. Churchill : The reply to the first part of the hon. gentleman's question is in the affirmative. The future strength of the Royal Air Force has now been fixed, and it will be possible to release Royal Air Force personnel from redundant stations elsewhere to serve at Milton. The reply to the second part is that efforts are being made to obtain other employment for the men discharged by giving them as long notice as possible, and by forwarding the names and trades of the men under notice both to the Ministry of Labour (locally and at headquarters) and to the Disposals Board of the Ministry of Munitions, the latter of whom, I understand, is likely to require a number of men of the type now being discharged. The case of the men is receiving my close attention, and efforts are being made to reduce the alleged hardship by the granting of increased notice of discharge.

Civilians Training at Farnborough

VISCOUNT WOLMER asked the Under-Secretary of State to the Air Ministry whether civilians are still being trained as pilots at the Royal Aircraft Establishment, Farnborough, while certificated pilots are at present willing to fly and are not allowed to do so ?

Mr. Kellaway : I have been asked to answer this question. A certain number of civilians are employed at the Royal Aircraft Establishment on special research work. In order to obtain the fullest advantage from their work, it is necessary that some of them, at any rate, shall actually take up and fly machines themselves. At the present time one civilian is so employed and three more are under training. Apart from this special work, all flying tests or experiments are carried out by R.A.F. pilots.

Flying Boats

LIEUT.-COL. BURGOYNE, on November 18, asked the Under-Secretary of State to the Air Ministry whether it is proposed to encourage the development of flying boats as distinct from seaplanes ; and, if so, what steps have been taken towards such encouragement ?

Capt. Guest (Joint Parliamentary Secretary to the Treasury) : The reply to the first part of my hon. and gallant friend's question is in the affirmative ; and to the second part that three different types of experimental boat seaplanes are on order, and that, as already announced, one of the prizes in the British Aircraft Competition for 1920 is for a boat or float seaplane.

Mr. Billing : Have the Admiralty been consulted as to the possible requirements of these seaplanes, or are experiments conducted without the co-operations of the Admiralty ?

Capt. Guest : I understand that the Admiralty have not been consulted.

Mr. Billing : Having regard to the fact that all flying boats are essentially operative with the Navy, will he see that they are consulted ?

Capt. Guest : I will refer to the Secretary of State.

Civil Aviation

LIEUT.-COL. BURGOYNE asked the Under-Secretary of State to the Air Ministry what competitions have been organised by the Government for the development of civil aviation ; do these competitions pay regard to the possible military value of the designs to be entered ; and does he consider that it is possible in the future development of flying to combine the dual functions of both war and peace with practicability ?

Capt. Guest : The reply to the first part of my hon. and gallant friend's question is that three competitions are being organised for the year 1920. They are to be open to small aeroplanes, large aeroplanes, and seaplanes respectively, the seaplane competition being framed with the object of developing a type of aircraft capable of alighting on and rising from land as well as water. The total prizes amount to £64,000. It is also under consideration whether, in addition to these, at a later date, a fourth competition should be organised for a large type of flying boat not required to possess amphibious qualities.

The reply to the second part of the question is that the above competitions are designed with a view to the attainment of safety and comfort of air travel. It is expected that a number of valuable lessons will be learned as the result of them, and many of these will undoubtedly be of great use from a military point of view. Where, however, military requirements diverge from safety requirements, the latter will be given the preference. In regard to the third part of the question, it seems probable that the design of civil and military aircraft will diverge as time goes on. But, whatever class of aircraft is experimented with, certain improvements are sought for ; those may be in regard to aerodynamic qualities, method of construction, reliability of engines or petrol installation, etc., and the knowledge thus gained can be used equally in designing new civil or military aircraft.

Royal Air Force Camps, Shropshire

CAPT. SIR B. STANIER, on November 19, asked the Secretary of State for War whether it has yet been settled which of the four camps used during the war by the Air Force in Shropshire are to be kept as permanent camps and which are to be dismantled ?

Capt. Guest (Joint Parliamentary Secretary to the Treasury) : It is assumed that Shrewsbury, at which there is an Aircraft Acceptance Park and a Mechanical Transport Repair Depôt, but no aerodrome, Shawbury and Ternhill are the four camps referred to. Owing to the unavoidable delay in deciding the future size of the Royal Air Force, it has not been possible to settle the fate of many stations. It is, however, possible to say that either Shawbury or Ternhill will shortly be relinquished, and that in all probability the Mechanical Transport Repair Depôt at Shrewsbury will be kept, while the Aircraft Acceptance Park will be disbanded. Decisions on all these points will very shortly be reached.

Continental Air Mails

MR. GWYNNE asked the Postmaster-General what is the present charge to the public per letter for delivering mails to the Continent by air, in addition to the postal fees ; what is the similar charge made by France and Germany for air mails outside their country ; what charges are made by the transport company to the Post Office ; and what profit the Post Office makes on these transactions per letter ?

Mr. Pease : A special fee of *2s. 6d.* per ounce in addition to the ordinary foreign postage is charged on correspondence accepted for transmission by the Air Mail Service from London to Paris. The special fee charge by the French Post Office in the reverse direction is 3 francs per 20 grammes. I am unable to state the charges levied in Germany for any similar service. Payment is made to the British company performing the London to Paris service at the rate of *2s.* per ounce ; and the remainder of the fee is intended to cover the cost of the special treatment of the correspondence and its express delivery.

Royal Air Force

LORD HUGH CECIL, on November 20, asked the Prime Minister whether his attention has been called to the anxiety expressed by some members of this House in regard to the relation between the War Office and the Air Office now existing, and the consequent effects upon the Royal Air Force ; whether the Government will make a full statement of their policy in regard to the Air Ministry and the Royal Air Force ; and whether they will fix a day for a full discussion of that policy ?

The PRIME MINISTER : My attention has been called to a Resolution to that effect carried at a meeting of Members of this House. There has been no change whatever in the policy of the Government in regard to the Air Force, and I see no need for any discussion at present. If, however, there should be any general desire for such a discussion, my right hon. friend will, I am sure, try to arrange it, but the pressure of business is so great that it will be difficult to find time.

Anti-Aircraft Station, Shipbourne.

MR. BENNETT, on November 21, asked the Secretary of State for War whether he will, in fulfilment of an assurance given in July last, give renewed orders for the removal of the anti-aircraft station at Shipbourne, Sevenoaks, and thus enable the villagers to resume the use of the village green for their customary sports ?

Mr. Churchill : There was both a light and a gun station at Shipbourne. The former was handed over to the Disposal Board on October 31, and the latter has been cleared of anti-aircraft equipment, and is in process of being handed over to the Board. Only huts remain to be moved, and this is a matter for the Disposal Board.

MODELS

As announced in the last issue of "FLIGHT," arrangements have now been made for the revival, commencing with our next issue, of the Model Section of "FLIGHT." Mr. F. J. Camm, whose work in connection with models is so well known, will contribute articles exclusively in these columns, the first of them appearing in the next issue (Dec. 4) of "FLIGHT." To avoid disappointment, orders for the regular delivery of "FLIGHT" each week should be placed with newsagents at once.

CORRESPONDENCE

CAUSE OF BRITISH AEROPLANE ACCIDENT IN UNITED STATES.

[1984] Some interesting data has just come to hand from Washington, D.C., in connection with the performance of the Rolls-Royce engined "Bristol Fighter," which was entered as a competitor in the recent American Trans-Continental race, and was piloted by Brig.-Gen. L. O. Charlton, C.M.G., D.S.O., the British Air Attaché at Washington.

This race started on October 8 last. The first day witnessed a number of accidents, amongst which was the forced landing of the above-mentioned Bristol Fighter. Some misleading reports stated that the reason of the machine making a forced landing was due to engine trouble.

In response to our enquiries, we have now received a letter from Brig.-Gen. Charlton, reading as follows:—

"Many thanks for your letter of October 9, and it was, as you say, a great disappointment for me to have been put out of the Trans-Continental event at such an early stage, more especially as I consider that I had the best machine and engine in the race.

"It is not quite correct to say that I had carburettor trouble. What happened, actually, was that, owing either to bad luck or bad management, some water got in the petrol, with the usual consequences of a forced landing in not very favourable country. *I attribute no blame whatever to the engine*, and hope, in fact, to have it in the air again before many days elapse."

We venture to hope that you may be able to publish this communication.

For Rolls-Royce, Ltd.,
C. Johnson,
Managing Director.

November 19, 1919.

THE R.A.F. AND DISCIPLINE

[1985] In your issue of 20th inst. you publish the views of a Chaplain, late of the Royal Air Force, and of an ex-Flight Leader, on the discipline, etc., of the R.A.F. I have no desire to enter into the controversy as to whether a separate Force is or is not a good thing. But the question of the discipline of the Force is one of supreme importance so long as that Force exists, and perhaps you may be willing to publish the views of one who is not a Regular soldier, but as a Reserve officer lived and fought with the Regular battalions until he was invalided out. That record should, I think, free me from the charge of being "closely fettered by the rusty chains of obsolete etiquette." Yet, without some first-hand knowledge of the Regular Army, one is surely not qualified to express an opinion on it.

The etiquette and discipline of the Regular Army seem to me to be based on the old Wykamist motto, "Manners Makyth Man" and on "Esprit de Corps"—two very inspiring slogans, I venture to think.

When I later became a Technical Officer in the R.A.F., I found both discipline and etiquette very slack. So far as the latter goes, one was ready to excuse much in war time. But in peace there is time to improve things, and it is to be hoped that Air Marshal Sir Hugh Trenchard will take the matter in hand. I shall be very much surprised if he does not.

Etiquette is, I think, an important aid to discipline. But there is a broader discipline which cannot safely be relaxed even in war time. "Ex-Flight Leader" writes as if the R.A.F. were no more than so many pilots and aeroplanes flying in formation and fighting in the air. I have come across a number of pilots who seemed to take that view, forgetting all the essential ground organisation. Pilots when in the air may prefer a "comrade" as a leader, and such a comrade may be the best leader for manœuvres and fighting. That does not make him the best man to take command on the ground. During the war the technical and administrative officers were, as a rule, not flying men, though sometimes they were crashed pilots. In the future, I understand, they are all to be crashed pilots, but they will none the less form a separate class inside the Force. There are also the rank and file, aircraftmen, or whatever the latest denomination is. My experience is that, as a rule, the gallant young pilots were not good at the task of commanding men who did not fly. They were too young and had not enough experience of the world and of men. That is to say, those who had never been in any other service were not strong on discipline. Those who had served an apprenticeship in the Army had learnt the principle of the matter. Pilots who had had this experience maintained an admirable spirit of brotherhood-in-arms with ground officers in a similar position—*esprit de corps*, in fact—and they knew how to command the mechanics of their flight. Others seemed to find it difficult to hit the happy mean between bullying and slackness. But most pilots were too young to be entrusted with a command such as that of a station. It was not lack of ability, merely of experience, and the tendency (mentioned above) to think of the Force as composed merely of pilots and aeroplanes.

The remedy which I should suggest is that R.A.F. officers, on passing out of their Cadet College, should be attached for a time to an Army unit. A precedent for this can be found in the system by which officers of the Indian Unattached List are (or at least were) attached to British units in India before being posted to an Indian regiment.

As for the drawbacks attendant on the youth of the R.A.F. commandants, that question will rectify itself in time, now that war casualties have been eliminated and the Force has become a Regular Force. But it is very important to lay sound foundations now, if the edifice which is to be built on them is to be a fair and good one. Cheap witticisms about the traditions which helped in no small degree to make the "Old Contemptibles" what they were do no good of any sort to the Royal Air Force.

Hampstead. A. R. S.

* * *

COMPANY MATTERS

Joseph Owen and Sons

The report to June 30 last shows a profit as the result of the year's trading, after payment of debenture interest and providing for depreciation, of £19,914, against £72,171; dividends 8½ per cent. on the preference and 28½ per cent. on the ordinary shares, against 7½ per cent. and 23 per cent. respectively, the carry forward being £19,870, subject to excess profits duty, income-tax and managers' commission.

* * *

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl.=cylinder; I.C.=internal combustion; m.=motors.

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published November 27, 1919

11,244. J. B. G. Colbran. Level-indicator for aircraft. (134,234.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published November 27, 1919

9,017. Sopwith Aviation and Engineering Co. and C. H. Davies. Self-gripping bracket for use in aeroplane construction. (134,242.)
14,112. P. Salmon and W. S. Smith. Control of variable-pitch propellers. (134,258.)
14,172. L. Choquet. I.C. engine with rotary cylinders. (119,453.)
17,425. C. and C. H. Blair. Machine for making laminated spars, etc. (134,278.)
18,075. J. Robinson. Wireless direction-finding arrangements. (134,342.)
19,513. G. Jordan. Table for aeroplane construction. (134,383.)
20,751. L. Pilichowski. Planes of aeroplanes. (134,409.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xxxix, xl, xli, and xlii).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT
The Aircraft Engineer and Airships
36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates*:—

United Kingdom	s.	d.	Abroad*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 571 (No. 49, Vol. XI.) DECEMBER 4, 1919 [Weekly. Price 6d Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**
These rates are subject to any alteration found necessary under abnormal conditions
**European subscriptions must be remitted in British currency.*

CONTENTS

Editorial Comment

PAGE
- General Seely and Air Policy .. 1545
- Following It Up .. 1546
- How to Get It .. 1546
- Commercial Airships .. 1548

Flight—and the Men: Mr. J. D. North .. 1547
Eastbourne from the Air .. 1549
The U.S. Navy HS-1L and HS-2L Flying Boats .. 1550
Royal Aero Club: Official Notices .. 1553
Some Handley Page Commercial Flying Data .. 1554
Flight Aspects of Supercharging. By B. Thomson .. 1555
Report on Variation of Horse-Power with Altitude and Compression Ratio .. 1559
Airisms from the Four Winds .. 1563
The Royal Air Force .. 1567
Personals .. 1569
In Parliament .. 1569
Model Aeroplanes .. 1571
Side-Winds .. 1573
Company Doings .. 1574

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Dec. 19 to ... Jan. 4, 1920.	Paris Aero Show.
July, 1920	S.B.A.C. International Aero Exhibition at Olympia
1920	
June 1 ...	Air Ministry Competition (Small Type Aeroplanes)
Aug. 1 ...	Air Ministry Competition (Seaplanes)
Sept. 1 ...	Air Ministry Competition (Large Type Aeroplanes)

EDITORIAL COMMENT

General Seely and Air Policy

HAVING resigned his position as Under-Secretary of State for Air for reasons which most right-thinking people fully agree with and endorse, Gen. Seely is pursuing the subject of the Government's air policy with considerable pertinacity and skill. He gave private notice of a question to the Prime Minister recently, asking: "Whether the air policy of the Government in relation to the Air Ministry is the same as it was on November 14, 1917, when the present Lord Privy Seal stated that the whole of the Air Service must be independent of either the Admiralty or the Army Council; why the Secretary of State for War is now President of both the Army Council and the Air Council; and whether the Air Council is now independent of, or depended upon, the President of the Army Council."

Mr. Lloyd George fenced with the question, and said that the air policy of the Government was the same as when Gen. Seely accepted the position from which he recently resigned. The Army Council, he said, had absolutely no control over the Air Force. Lord Hugh Cecil aptly interpolated that it was not independent of the *President* of the Army Council, which is, after all, the point now at issue. The Prime Minister's answer is most certainly far from satisfactory. To put it plainly, it is begging the question absolutely, and while we should hesitate to say that it was intended to be deliberately misleading, it was undoubtedly calculated to lead the unthinking off on a false trail. How on earth *can* the Air Force be completely independent of the Army Council when it is subject to the President of that Council? The answer is too perfectly obvious to be missed—the Air Force and the Air Ministry are in the position of being merely departments of the War Office. We do not doubt either the ability or the *bona fides* of the present Secretary of State. To do so would be to ignore altogether his unquestionably great services to the State.

But we do take exception to the duality of office, which must of necessity mean that either the War Office or the Air Ministry must suffer in consequence of his being unable to allot sufficient time to the services of both. Nor can there be any two opinions as to which it is that is suffering. When we regard the fact that at the Air Ministry there seems to be an utter absence of policy, due to the want of a strong guiding hand, and then look at the War Office, where there is every indication of a vigorous policy at work, we are forced to the conclusion that Mr. Churchill finds that the work of Whitehall occupies all his energies while that of Kingsway has to go by default.

Following It Up

Having failed to obtain satisfaction from the Prime Minister through question and answer in the Commons, Gen. Seely has followed on with a long, temperate, and well-reasoned letter to the *Times*. In this he recalls the speeches made in both Houses at the time of the introduction of the Air Force Bill in November, 1917. Possibly the most telling of the extracts from these speeches quoted by Gen. Seely is one from that delivered by Lord Curzon, then as now the Leader of the Government in the House of Lords. What he said was this :—

"The noble and learned viscount, Lord Haldane, made another observation which was perfectly true. I will give in substance what he said. He told us that this is not only a War measure but a post-War measure, too. Nothing could be more true than that remark. Astonished as we all have been by the scale and magnitude of the development of air service in the war, it ought by no means to be supposed that that development will cease with the War. On the contrary, every one of us knows that there are futures which lie before the Air Service—into which I need not enter to-night—which will render it not only for years to come, but permanently, a necessary part of what I may call our Imperial organisation. This Air Ministry is not wanted for France, Flanders, Salonika or the East only, but it is required as a part of the material and mechanical resources of the country."

In the Commons Lord Birkenhead, then Attorney-General, said :—

"It is the spirit and object of this Bill that the Air Service shall be recognised as an entirely distinguishable service, that those who are responsible for it shall form a new and important Department answerable to Parliament and responsible for the service for which it so answers to Parliament, and with complete control unfettered by any other service over all those who belong to it."

In some respects this is even more definite than Lord Curzon's very clear exposition of the purposes of the Bill. The Air Force was to be constituted as an "entirely distinguishable Service . . . with complete control unfettered by any other service over all those who belong to it." How does the existing arrangement whereby a single Secretary of State administers the War Office and the Air Ministry square with these statements and protestations ? Not at all, so far as the plain person is able to discern. As Gen. Seely proceeds to point out, in the face of all this the Prime Minister endorses a plan by which the air is placed under the Secretary for War. As he says, not only is this proceeding contrary to the decision of Parliament, but it is in itself a fantastic arrangement. No man can possibly be a responsible Minister at the head of two wholly independent Services. One must be subordinate to the other, and the work of one or both must suffer. In view of the facts, the Prime Minister's statement that our air policy remains unchanged is inexplicable to the plain man, for it is clearly at variance with the facts. To make such a statement at all, says Gen. Seely, is to trifle with the House of Commons and the country. Wherein we entirely agree, though it may be pointed out that trifling with Parliament and the country by the present Prime Minister and his colleagues seems to be quite a usual thing. For cynical disregard of the wishes of the country and its elected representatives we doubt if there has ever been in constitutional history an administration to equal the present.

Gen. Seely argues that there are three possible alternatives which lie before the Government, one of which they must accept. They must either :—

1. Abolish the Air Ministry and again divide up the Air Force between the Navy and the Army, and hand over the immense possibilities of civil aviation to some existing Government Department.

2. Create a Ministry of Defence, to which the Ministers of Land, Sea and Air should be responsible.

3. Free the air entirely from control by the head of another Department.

Unquestionably Gen. Seely is right when he says that the first plan would be resisted to the utmost by all who care for our future position in the air. The second would have the immense advantage of securing a proper co-ordination of our War efforts, but must take long to achieve. The third is to abide by the decision of Parliament and the declarations of Ministers. He concludes : "If the Prime Minister and his colleagues do not abide by the statements then made (November, 1917), Parliament and the country have a right to be informed what reasons they can give for a reversal of the policy which they then announced as being vital to the safety and well-being of our country and our Empire."

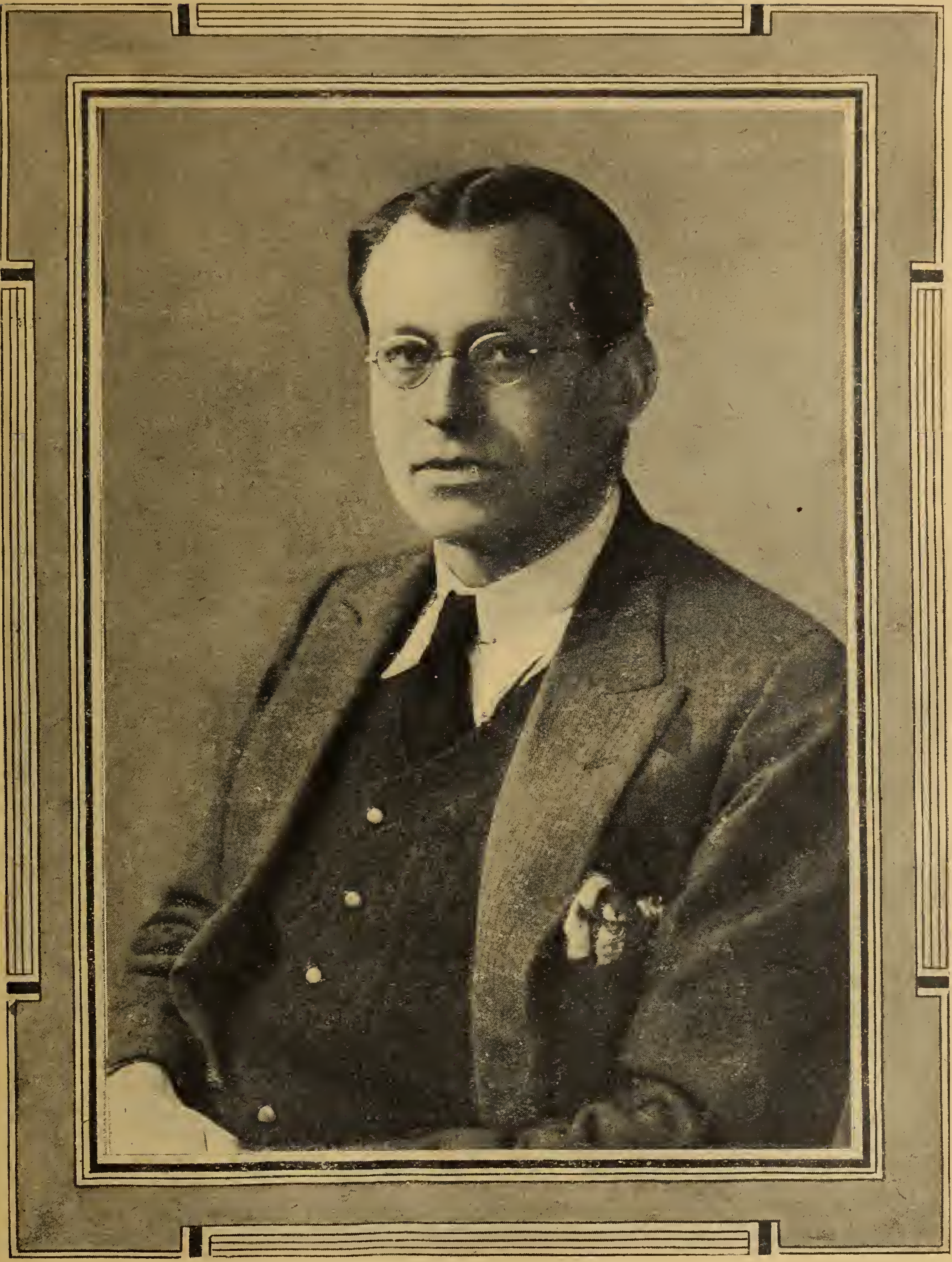
◆ ◆ ◆

How to Get It

We need hardly say we are most heartily in agreement, all along the line, with Gen. Seely. It is unthinkable that we can go back to the bad old system of the two separate Air Services. That, as he says, would be resisted to the utmost by all who have concerned themselves with air policy. We are beginning to think that this is really what the Government have in mind, in spite of half-hearted assertions that there is no change in policy. If that is not the case, we really cannot see why there should be so much objection to the appointment of a separate Secretary of State to the Air Ministry. It surely cannot be that economy is at the bottom of it and that the real motive is to save the salary of another Minister. That would be absolutely ridiculous, but on reflection we are not so sure but that it would be in keeping with some of the acts of "economy" which have foolishly pared down the small but essential things, and have at the same time thrown millions down the sewers. Unless it is that, it seems reasonably clear that the Prime Minister has given another "Parliamentary answer" to Gen. Seely's question.

The latter is right when he contends that Parliament and the country have a right to know what is to be done. The question is, How is the Government to be forced into giving the information ? The issue can be forced when next year's Air Estimates come before the House, but that is a long time to wait, and in the meantime aviation, civil and military, is languishing, not so much because the vaunted Government "encouragement" is not forthcoming, but because of the manifest want of policy to which we have more than once called attention in the pages of Flight. It is true the Premier said that if it was the general desire of the House to have a discussion on the subject the Government would find time, and this would seem to offer the necessary opening. But he did not say *when* the Government would find the time, and it is time that is the very essence of the contract. The whole movement of aviation wants to know, demands to know, what the policy of the Government is to be. The Air Force, being a fighting Service, is inarticulate, but we do know that it is as

Flight—And the Men



"Flight" Copyright

Mr. J. D. NORTH, Manager and Chief Designer, Messrs. Boulton and Paul, Aviation Department anxious to know what the future holds for it as is the civilian side.

All those who value the prestige of Parliament are resentful at the cavalier way in which the House is treated by the Government, and if, for no other reason than that, want to know exactly what is meant by the many conflicting changes of front.

And the country at large, having been treated two years ago to a heated controversy on the respective desirability of one Air Service or two, and having heard and seen what was done and the reasons therefor, is now profoundly disquieted by the spectacle of Ministers going back on their protestations and pretending at the same time that they have done nothing of the sort.

We sincerely trust that the air party in the House will take the earliest possible opportunity of pressing for a full discussion of the whole subject.

◆ ◆ ◆

Commercial Airships

We understand that very shortly a concrete scheme is to be put forward for the approval of the Government in connection with commercial airships. This is the outcome of the conference held some months ago at Australia House between Gen. Seely, representing the Air Ministry, and the heads of certain of the big shipping and armaments interests. It is, we believe, the intention, if the plans are approved—as there is little doubt they will be—of starting experimental airship services early in the coming year. To a great extent these will probably be more in the nature of propaganda services than by way of a real commercial attempt to make such services pay. Those who are behind the movement take the very sound view that before commercial success can be assured the travelling public must be educated up to the safety, reliability and punctuality of the big airship. They are therefore content to feel their way for the first year, at the same time carrying out this very necessary work of education.

Later, they naturally intend to make a serious bid for a substantial proportion of the traffic eastwards to Egypt and India, and as they are certain that airships can be run as a paying proposition on fares that will compete with the steamship lines, they are sanguine of success. For our own part, the Eastern routes appear to have so much in favour of success for the airship lines, that we have no hesitation in subscribing to the belief held by those who intend to pioneer the services. We foresee the time, and that before very long, when the voyage between England and India will be performed without a stop in five days.

There is absolutely no reason why this should not be done by the bigger rigids, and that it will be done there is no room to doubt. What this would mean to Anglo-Indians coming home on short leave scarcely needs pointing out—it would mean an extra month in England as compared with the steamer routes. Then, assuming that the airship lines would secure at least a portion of the mail contracts, the additional facilities such lines would afford to the transaction of business would be almost incalculable.

But we are anticipating. It will, we understand, be now only a matter of a week or two before an authoritative pronouncement is made, and we shall then be able to speak with more certainty of the future of these projected services.

AERODROMES AND LANDING GROUNDS

The Air Ministry announces that the following lists of aerodromes are issued as an addition to or amendment of the lists already published:—

List A.—*Service stations only available for Civil use in emergency*

Amendments

The following aerodromes have been transferred to List E, and are now published in that list:—

Aerodrome	Nearest Railway Station	Nearest Large Town
Tangmore	Drayton	Chichester.
Tresco (S)	Penzance	St. Mary's.

References (S) Seaplane station.

List C.—*Aerodromes temporarily retained for Service Purposes*

Amendments

The following aerodromes have been transferred to List E, and are now published in that list:—

Aerodrome	Nearest Railway Station	Nearest Large Town
Collinstown	Portmarnock	Dublin
Crail	Crail	Crail
Ford Junction	Ford Junction	Arundel
Gullane	Gullane	North Berwick
Helperby	Brafferton	Ripon
Lincoln	Lincoln	Lincoln
Port Meadow (Oxford)	Oxford	Oxford
Tadcaster	Thorrer	Tadcaster
Throwley	Charing	Faversham
Upper Heyford	Lower Heyford	Bicester
Whitley Abbey	Coventry	Coventry
Witney	Witney	Oxford

List D.—*Aerodromes licensed as "Suitable for Avro (504 K) and similar types of Aircraft" only. Except in very few instances accommodation does not exist. The licences have also in the majority of cases been issued for limited periods only.*

Aerodrome	Location	Nearest Town
Ipswich	Priory Heath	Ipswich
Kidderminster	Somerleyton Avenue	Kidderminster
West Timperley	Lies to N.W. of Timperley	Altrincham

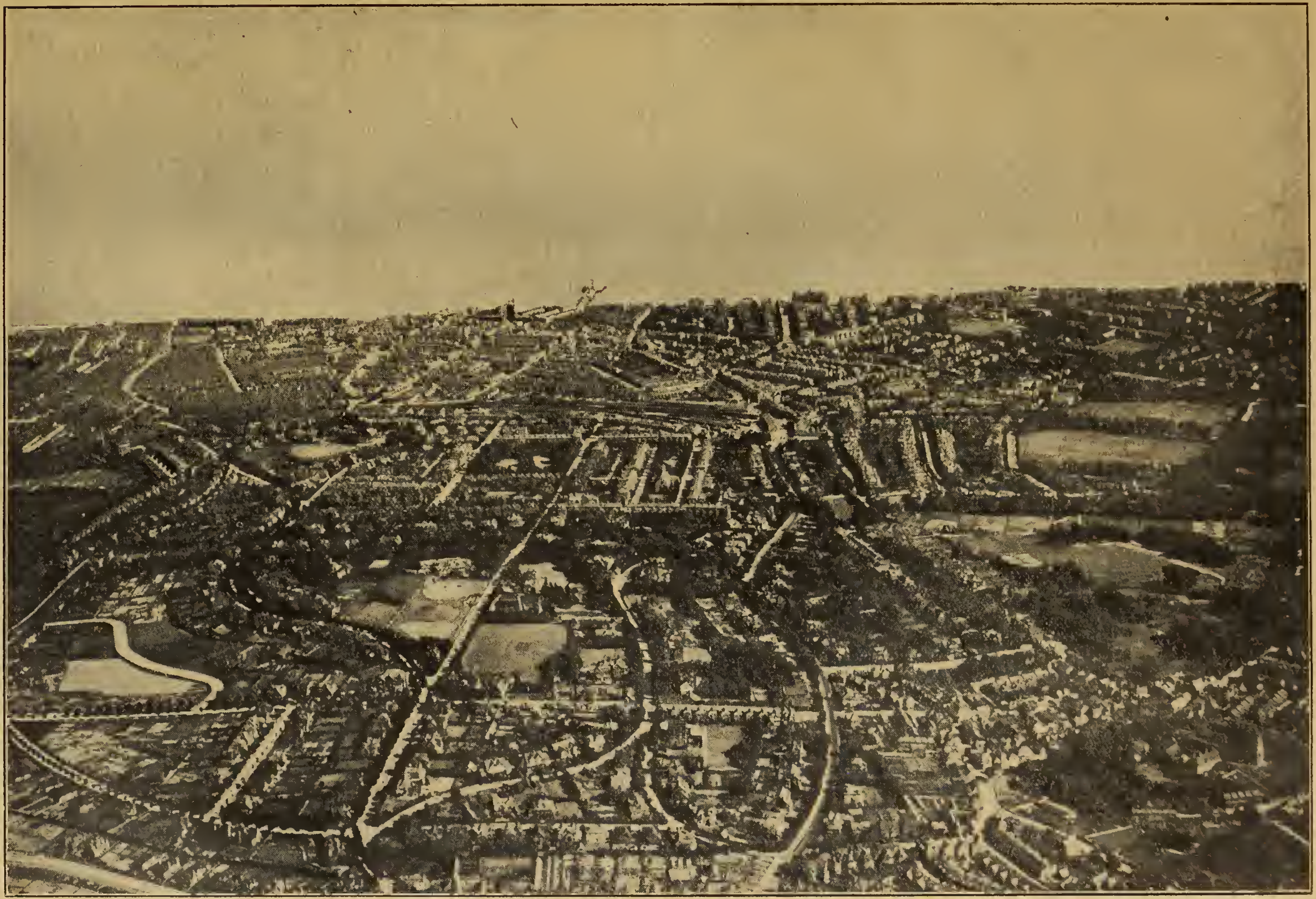
List E.—*Stations no longer in use by the R.A.F.*

These stations have been passed to the Government Property Disposal Board. They will be relinquished as soon as the Government property thereon has been disposed of. In many cases the aerodromes are now under cultivation, but it is probable that the sites still form the best emergency landing grounds in the immediate neighbourhood.

Aerodrome	Nearest Station	Nearest Town
Anglesey (A)	Llangefni	Holyhead
Collinstown	Portmarnock	Dublin
Crail	Crail	Crail
Ford Junction	Ford Junction	Arundel
Gullane	Gullane	North Berwick
Helperby	Brafferton	Ripon
Hythe	Hythe	Hythe
Lincoln	Lincoln	Lincoln
Port Meadow (Oxford)	Oxford	Oxford
Tadcaster	Thorrer	Tadcaster
Tangmere	Drayton	Chichester
Throwley	Charing	Faversham
Tresco (S)	Penzance	St. Mary's.
Upper Heyford	Lower Heyford	Bicester
Whitley Abbey	Coventry	Coventry
Witney	Witney	Oxford

References—(A) Airship station. (S) Seaplane station.

The Camera and the 'Plane

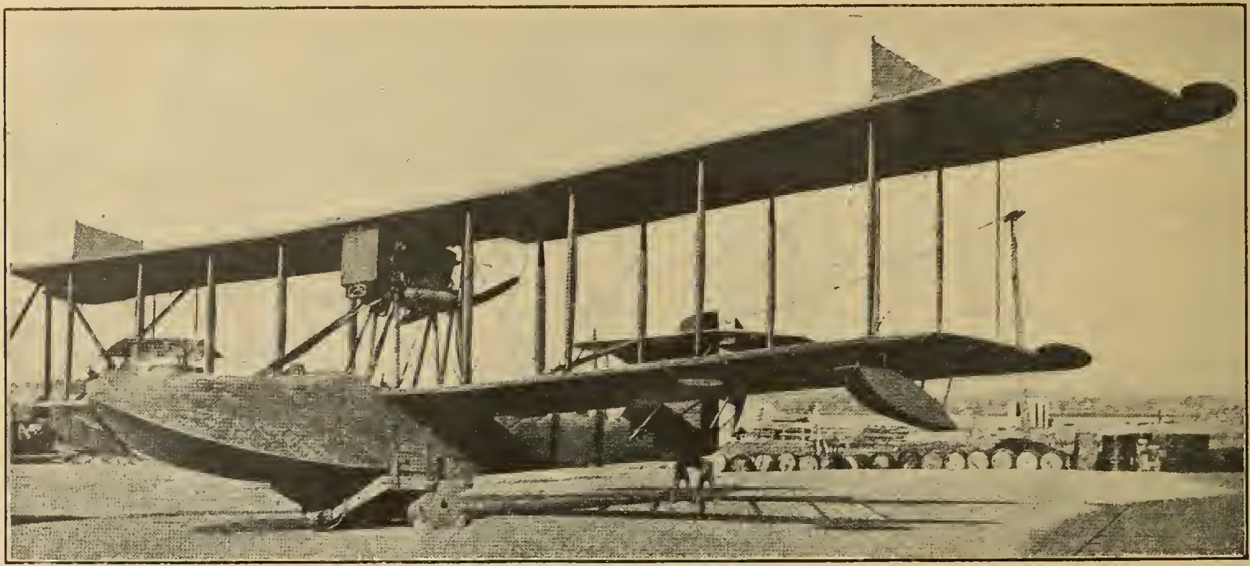


"Flight" Copyright

Eastbourne as seen from the hinterland, from an Avro 'plane, showing the "set-out" of this beautiful seaside town

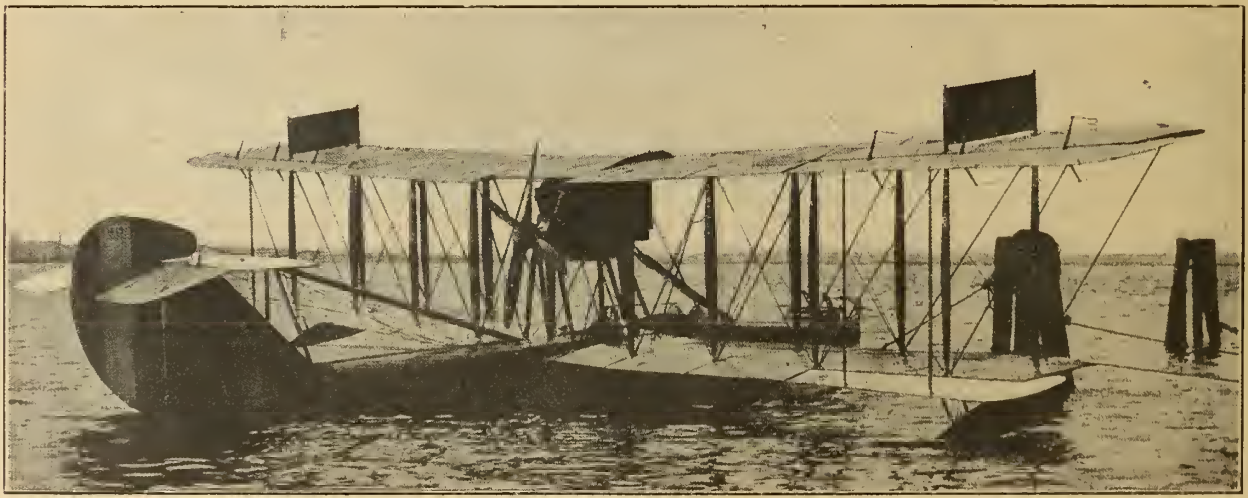
THE U.S. NAVY HS-1L AND HS-2L FLYING-BOATS

A very successful type of flying-boat for coastal patrol work was put into quantity production by the United States Navy during the War, the Curtiss Aeroplane and Motor Corporation and the Standard Aero Corporation turning out most of the machines between them. There are two models of this flying-boat, the HS-1L and the HS-2L, but the only difference between them is that the latter model is 12 ft. greater in span than the 1L, and has a larger rudder. Apart from this and minor details, therefore, both models are identical, so that the following description and illustrations of the HS-2L apply equally to the other model. The additional wing surface of the HS-2L is obtained by inserting a 6-ft. panel between each outer extension and the centre section. All the other parts—except, of course, the rudder—required to convert the 1L to the 2L are duplicates of other parts already on the former model, and the following is a list of the parts and alterations required in converting the 1L to 2L:—(1) Four 6-ft. panels, complete with hinges, and standard HS-1L wing-post fittings. (2) Upper centre section panel, with unrouted spars. [These are routed in the 1L.] (3) Front centre section lift wires changed from two $\frac{3}{16}$-in. to two $\frac{1}{4}$-in. non-flexible cable, and rear lift wires from two $\frac{3}{16}$-in. to two $\frac{7}{32}$-in. non-flexible cable. (4) Two 7-ft. front interplane struts $2\frac{5}{8}$ by $6\frac{5}{8}$ ins., and two 7-ft. rear $2\frac{3}{16}$ by $5\frac{1}{2}$ ins. (5) Four $\frac{1}{8}$-in. stagger wires, with turnbuckles and end connections. (6) Larger size rudder, having 26·5 sq. ft. area instead of 19·6 sq. ft. (7) *Aileron* control cables lengthened.



Three-quarter front view of the U.S. Navy HS-2L flying-boat

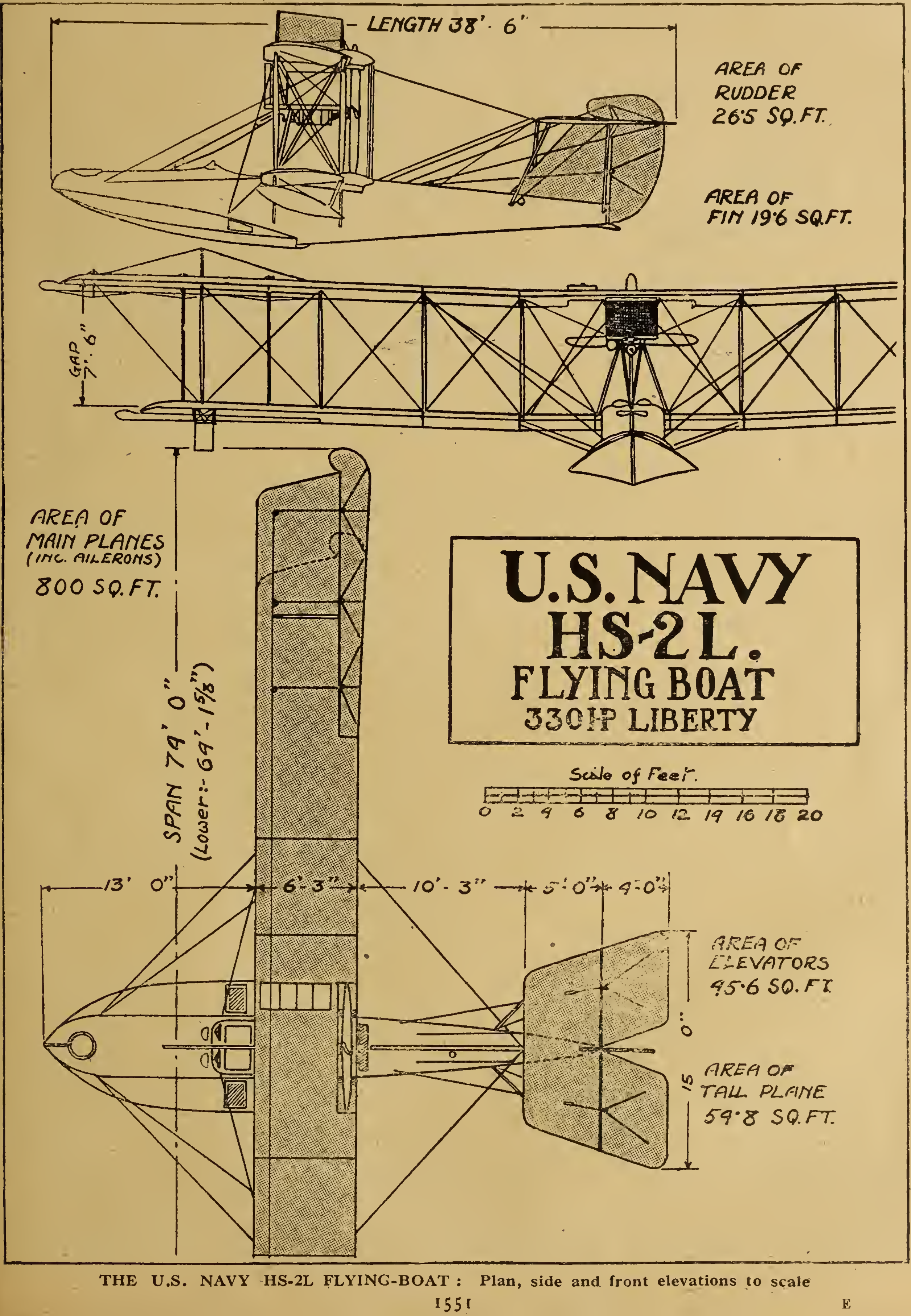
The main planes, which have neither stagger nor sweep-back, have the R.A.F. No. 6 wing section, and comprise a centre or engine section, the lower panels of which being divided by the hull and attached to small "sidewalk" panels built integral with the hull; 24 ft. outer extensions, which in the case of the L1 are mounted direct to the centre section; and, in the L2, 6 ft. intermediate sections. The centre section surfaces are "straight," but the outer sections are set at a dihedral angle of 2°. Balanced *ailerons* are fitted to both upper and lower planes, the upper *ailerons* having a maximum chord of 2 ft. 2 ins., and span of 17 ft. $8\frac{1}{2}$ ins., whilst the lower ones have a maximum chord of 1 ft. 10 ins. and a span of 12 ft. 9 ins. The main spars are spaced 4 ft. apart, the front spar being located 9 ins. from the leading edge. The fabric is sewn to the wings with the seams laid diagonally or normal to the leading edge. It is doped with two coats of cellulose acetate, two to four coats of cellulose nitrate, two coats of anti-actinic grey wing enamel on the top and vertical surfaces, and one coat of the latter on the under surfaces. All the strut fittings are of steel stampings and forgings, the main spars are of spruce, and the trailing edges of flattened steel tubing. The compression ribs are of solid pine, and the intermediate ribs of lightened pine.



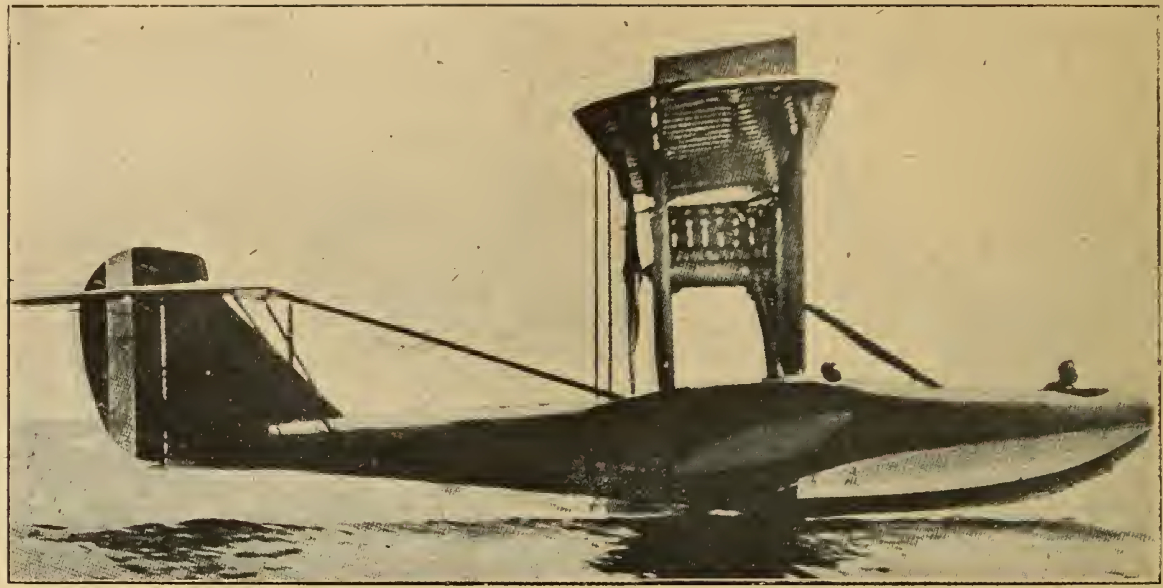
Three-quarter rear view of the U.S. Navy HS-2L flying-boat

The tail is of the non-lifting type, mounted high up on the stern above the fin. The elevators are divided and unbalanced, whilst the rudder is balanced.

The hull is similar in form and construction to the other flying boats of the H-12 and F-5L type. It has an overall length of 34 ft. 5 ins., a width of 4 ft. for the main body and 8 ft. across the planing fins. The planking is of pine or cedar, made up of $\frac{3}{16}$-in. outer layer and $\frac{5}{32}$-in. inner layer, with



THE U.S. NAVY HS-2L FLYING-BOAT: Plan, side and front elevations to scale



Side view of the U.S. Navy HS-2L flying-boat

fabric in between. The frames, keel and stern post are of ash, whilst the keelson, deck stringers and floors are of pine or cedar. The chine stringers are also of pine, or Port Orford cedar, and the seam strips are Spanish cedar. The bulkheads are of three-ply waterproof veneer. The hull itself is finished with low visibility grey wing enamel, and all metal parts are enamelled.

The power plant consists of a single twelve-cylindered, low-compression Navy type Liberty, developing 330 h.p. at 1,700 r.p.m., and driving a four-bladed pusher screw. The engine is carried on laminated ash-spruce-ash bearers mounted above the hull on streamlined steel tubing, braced with non-flexible tension cables. The main fuel tanks, having a capacity of from 110 to 125 galls., are located in the hull at the centre of gravity, a gravity tank of about 30 galls. capacity being mounted on the top plane centre section.

Dual control is fitted, consisting of an inverted U ash frame equipped with two 16-in. hand-control (*aileron*) wheels. The rudder-bars are of ash, mounted on bronze blocks. The throttle and ignition levers are located in the cockpit, on a diagonal bridge between the two seats.

All bracing cables are galvanised, non-flexible. The centre-section and intermediate cables in the 1L are $\frac{3}{16}$ in., the outer cables being $\frac{5}{32}$ in. All flying cables are doubled.

The following is a general specification of the HS-1L, and, in brackets, HS-2L :—

Span, upper	62 ft. 0 ins. (74 ft. 0 ins.)
Span, lower	52 ft. 1⅝ in. (64 ft. 1⅝ in.)
Chord	6 ft. 3 ins.
Gap	7 ft. 6 ins.
Overall length	38 ft. 6 ins.
Height	14 ft. 7¼ ins.
Angle of incidence, upper	5½°.
Angle of incidence, lower	4°.
Dihedral	2°.
Area, main planes—	
Upper	307 sq. ft. (380 sq. ft.)
Lower	241 sq. ft. (315 sq. ft.)
Ailerons	105 sq. ft.
Total surface	653 sq. ft. (800 sq. ft.)
Area of tail plane	54·8 sq. ft.
Area of elevators	45·6 sq. ft.
Area of fin	19·6 sq. ft.
Area of rudder	19·6 sq. ft. (26·5 sq. ft.)
Area of non-skid	16 sq. ft.
Weights, 1L—	
Hull (including sockage)	1,265 lbs.
Wings, tail, bracing, etc.	1,400 lbs.
Engine and equipment	1,336 lbs.
Ordnance equipment	560 lbs.
Electrical equipment	53 lbs.
Navigation equipment	32 lbs.
Crew and fuel	1,090 lbs.
Accessories	52 lbs.
Miscellaneous	112 lbs.
Total weight	5,900 lbs.
Total weight, HS-2L	6,223 lbs.
Useful load, HS-2L	1,864 lbs.
Loading per sq. ft.	9·03 (7·77)
Loading per h.p.	17·9 (18·85)
Maximum speed	91 m.p.h.
Minimum speed	53 m.p.h. (55 m.p.h.)
Climb, 500 ft./3 mins. (1,800 ft./10 mins.)	

◆ ◆ ◆ ◆

Prince Albert Enters the Craft

UPON the occasion, on Tuesday last, of the initiation into Freemasonry, Navy Lodge No. 2,612, at Princes' Galleries, Piccadilly, Prince Albert was presented as "Lieut. H.R.H. Prince Albert Frederick Arthur George, K.G., R.N. (Flight-Lieut., R.A.F.)," and his equerry, who was received into the Order at the same Lodge the same evening, as "Surgeon Lieut.-Comdr. Louis Greig, M.V.O., R.N. (Wing-Comdr., R.A.F.)."

Future of the Air Ministry

MAJOR-GENERAL SEELY and Lord Hugh Cecil have put down the following motion for an early day in the House of Commons :—

"That it is inexpedient that the same person should hold the two offices of Secretary of State for War and Secretary of State for Air."

Lord Montagu of Beaulieu has likewise given notice that he will, on December 10, call attention in the House of Lords to the recent resignation of Major-General Seely, M.P., the Minister specially in charge of that Ministry, and move for papers.

Aviation in the French Chamber

BOTH Capt. Fonck and Capt. Heurteaux, who were successful in the recent elections in France, have made it clear that they do not intend to take part in general politics. They enter the Chamber with the sole aim of making aviation the most important factor in the new order of things, and to ensure that France shall take, and keep, the place which she ought to occupy among other nations in this respect.

Airmen Subject to Army Act

AN Order of the Army Council and the Air Council just issued provides that officers and airmen of the Royal Air Force acting with the military forces under or within the Command of the General Officer Commanding-in-Chief the British Army of the Rhine shall in all respects be subject to the Army Act while on active service as if they were officers and airmen attached to the Army.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

SPECIAL COMMITTEE MEETING

A SPECIAL Meeting of The Committee was held on Wednesday, November 26, 1919, when there were present :—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Lieut.-Col. Spenser D. A. Grey, D.S.O., Squad.-Leader T. O'B. Hubbard, M.C., R.A.F., Lieut.-Col. F. K. McClean, Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., and the Secretary.

Presentation to Sr. Guido Janello.—A silver bowl was selected for presentation by the Royal Aero Club to Sr. Guido Janello for his notable flight in the Jacques Schneider Competition at Bournemouth on September 10, 1919.

British Record.—The following British Records were granted :—

Pilot.—Capt. G. W. Gathergood.

Machine.—Airco 9 R (Aircraft Manufacturing Co., Ltd.).

Motor.—450 h.p. Napier "Lion" (D. Napier and Sons, Ltd.).

Date.—November 15, 1919.

Distance in a Given Time—Closed Circuit

Time.	Distance.		k.p.h.	m.p.h.
¼ hour	57·09 kil.	35·47 miles	228·36	141·89
½ ,, ...	115·35 ,,	71·67 ,,	230·70	143·35
1 ,, ...	232·57 ,,	144·51 ,,	232·57	144·51
2 ,, ...	403·13 ,,	250·49 ,,	201·56	125·24

Greatest Speed

Distance.	Time. h.	m.	s.	k.p.h.	m.p.h.
5 kils. ..	0	1	14·85	240·48	149·43

Speed—Closed Circuit without Alighting

Distance.	Time. h.	m.	s.	k.p.h.	m.p.h.
5 kils. ..	0	1	$24\frac{1}{5}$	213·77	132·84
10 ,, ..	0	2	$36\frac{1}{5}$	230·47	143·21
20 ,, ..	0	5	$25\frac{1}{5}$	221·40	137·57
30 ,, ..	0	8	$13\frac{1}{5}$	218·97	136·07
40 ,, ..	0	11	1	217·85	135·37
50 ,, ..	0	13	$9\frac{3}{5}$	227·96	141·65
100 ,, ..	0	26	$7\frac{4}{5}$	229·62	142·68
150 ,, ..	0	38	44	232·35	144·38
200 ,, ..	0	51	$37\frac{1}{5}$	232·47	144·45
250 ,, ..	1	4	29	232·61	144·54
300 ,, ..	1	17	11	233·21	144·91
350 ,, ..	1	29	$50\frac{4}{5}$	233·72	145·23
400 ,, ..	1	42	32	234·07	145·44

Timekeepers.—A. V. Ebblewhite and A. G. Reynolds.

Official Observers.—Harold E. Perrin and Capt. J. C. Brooke, D.S.C.

Distance in a Straight Line without Alighting

Aviator and One Passenger

Pilot.—Capt. Sir John Alcock.

Machine.—Vickers-Vimy-Rolls (Messrs. Vickers, Ltd.).

Motor.—Two 350 h.p. Rolls-Royce Eagle 8 (Messrs. Rolls-Royce, Ltd.).

Date.—June 14-15, 1919.

Distance.	Kils.	Miles.
St. John's, Newfoundland, to Clifden, Co. Galway	3,041	1,890

Great Britain to Australia Flight.—The following additional entry was reported :—

Pilot and Navigator.	Crew.	Machine.	Engine.
Lieut. Raymond John Paul Parer, A.F.C.	Lieut. J. C. McIntosh (2nd Pilot)	F.E. 2B	200 h.p. Beardmore.

Death of M. Deutsch de la Meurthe.—The death of Monsieur Henry Deutsch de la Meurthe on November 23, 1919, was reported, and it was unanimously resolved that messages of sympathy be sent to Madame Deutsch de la Meurthe and the Aero Club of France.

The Secretary reported that he had arranged with Mr. Pierre Marechal to represent the Royal Aero Club at the funeral.

THE FLYING SERVICES FUND

(*Registered under the War Charities Act, 1916*)

Administered by the Royal Aero Club

For the benefit of *Officers, Non-Commissioned Officers and Men* of the ROYAL AIR FORCE who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

Honorary Treasurer:

The Right Hon. LORD KINNAIRD.

Committee:

H.R.H. PRINCE ALBERT, K.G. (*Chairman*).
Mr. CHESTER FOX.
Squad. Leader T. O'B. HUBBARD, M.C., R.A.F.
Squad. Leader C. E. MAUDE, R.A.F.
Group Capt. C. R. SAMSON, C.M.G., D.S.O., R.A.F.

Secretary:

H. E. PERRIN.

Bankers:

Messrs. BARCLAYS BANK, LTD., 4, Pall Mall East, London, S.W. 1.

Subscriptions:	£	s.	d.
Total subscriptions received to Nov. 24, 1919..	16,680	4	7
W. J. Leonard	5	0	0
Capt. D. E. B. K. Shipwright	1	1	0
Mrs. Alfred Amos	0	10	0
Maj.-Gen. The Rt. Hon. J. E. B. Seely, C.B., D.S.O., M.P.	10	0	0
T. W. H. Mitchell	100	0	0
Total, December 1, 1919	16,796	15	7

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

W.R.A.F. Old Comrades' Association

ALL officers and other ranks of the W.R.A.F. who are serving, or have served during the War, will be interested to know that a W.R.A.F. Old Comrades' Association has been formed.

At the inaugural meeting held on Saturday, November 29, at 3 p.m., at Birkbeck College, Commandant Dame Gwynne-Vaughan, who was in the chair, was elected president, and late Assistant Commandant Thompson and Chief Section Leader Seale, hon. secretaries. A central committee was also elected to sit in London, and it was also decided to try to form branches of the association all over the country.

It is felt that a great number of friendships were made between women serving in the Corps during the War period and afterwards, and that some opportunity should be afforded for the periodical renewal of these friendships, and it is the object of the Association to do this and to foster, as far as possible, the *esprit de corps* that existed in those days.

Apart from its social side, the Association proposes to adopt practical means to assist members in obtaining employment; to help those who are in need of assistance, to endeavour to get suitable cases into homes, hospitals, etc., and to make arrangements, during their convalescence, for members who have been ill. Another possible development will be the exchange of hospitality between country members and those living in town.

Such an Association would not only preserve the spirit of comradeship that was one of the most admirable features amongst all ranks of those who served in the W.R.A.F., but should encourage preparedness to help the country in time of need, should such occasion arise.

Those wishing to join or help in the formation of branches should write to the Secretary, W.R.A.F., O.C.A., 5, Red Lion Yard, Waverton Street, W. 1.

SOME HANDLEY PAGE COMMERCIAL FLYING DATA

AFTER some seven months' experience in running commercial aeroplane services, Messrs. Handley Page, Ltd., have compiled an interesting summary dealing with their experiences during that period, extracts from which are published below.

The machines used are of the famous twin-engined Handley Page type which for three years carried out the British heavy night bombing over enemy territory. The trappings of war have been removed and comfortable cabins for the accommodation of passengers and freight have been substituted.

The records of the Handley Page aeroplanes from the inauguration of civilian aviation on May 1 until November 19 of this year are as follows :—

Total number of passengers carried ..	3,932.
Total amount of freight	33,901 lbs.
Mileage flown	56,180 miles.

Royal Passengers.—This has been accomplished without one serious mishap, and it includes long flights in rain, snow, fog and gales. Amongst the passengers carried have been the King of Greece, the Prince of Wales, the Crown Prince of Roumania, Crown Prince of Sweden, Lord Milner, the Lord Chancellor, Mr. Bonar Law, and the Emir of Faisul.

On the London to Paris daily service from September 2 to November 26 of this year 569 passengers and 10,979 lbs. of freight have been carried, the total distance covered being 29,100 miles.

The people who have been taking advantage of the speedy journey of less than three hours to and from Paris can be roughly divided into three classes. There is the joy rider, who undertakes the aerial tour solely for the interest and thrill it provides. Women constitute a large number of this type of traveller. Then comes the commercial man who desires to visit a trade show, inspect an important exhibition of goods or conduct urgent business, the success of which depends on personal interviews in distant towns with a minimum amount of delay.

Finally the receipts of the passenger-carrying aeroplanes benefit from the patronage of officers or business men who have missed train and boat connection, and cannot reach the Continent at the hour they desire without utilising the speed which aircraft affords. War pilots who still have a craving for flying are among the passengers who travel to and from the Continent by air.

Women's Dress for Brussels.—On the London to Brussels air service from September 26 to November 26 of this year, 569 passengers and 21,130 lbs. of freight and mails have been carried over a total distance of 16,630 miles.

Owing to restrictions, it is only during recent weeks that it has been possible to carry freight to Belgium, but since these have been relaxed the demand of the Brussels shopkeepers for ladies' wearing apparel has resulted in quantities of this form of freight being carried by air.

The unique view of the Flanders battlefields, which is enjoyed by travellers on the London-Brussels air service, has resulted in several passengers making the journey in order to view the Ypres salient, the shell-scarred wastes of the Menin Road and Paschendaele Ridge.

The freight which has been carried on the London-Paris-Brussels air services ranges from straw hats to razor blades. Ladies' clothing has been carried in large quantities, for fashion quickly adopted the aeroplane as the speediest means of transferring the latest ideas in dress from capital to capital.

A well-known actress had a delicate robe flown from Paris for her use in a new play. Crêpe de Chine tea-gowns, boudoir caps, feathers and furs appear frequently on the transport bills of the company.

Commercial men are using the aeroplane largely for the quick conveyance of samples of goods, or new inventions, to interest Continental buyers. Samples of rice, electrical apparatus, commercial drawings and printing material were amongst the goods which of recent weeks crossed the Channel in the freight holds of the Handley Page aeroplanes.

Consignments of cloth, drapery, carpets and handkerchiefs are being carried to Belgium for sale in the stores of that city and Antwerp. Manufacturers in the North of England are utilising the service for the rapid conveyance of their products to the Continent. To hasten delivery Handley Page commercial machines have been flying from and to Brussels in pairs, which is the first stage in a future scheme to run daily formations of commercial aeroplanes to carry freight and passengers on the Continental air services.

Handley Pages Abroad

In addition to the Paris-London and London-Brussels air services, Handley Page machines have done valuable pioneer work abroad by demonstrating the capabilities of aeroplanes for long cross-country journeys. We publish below brief references to some of these flights.

In South Africa.—Capt. S. Wood, the representative of Handley Page, Ltd., is in Cape Town preparing to establish an aerial passenger and mail service throughout South Africa, and to that end he is obtaining a number of machines from England. Capt. Wood, who has seen a good deal of service in Europe, stated to a Press representative: "We want to start a daily service between Cape Town, Pretoria, Johannesburg and Durban. The complete journey from Cape Town to Johannesburg, including stoppages at Kimberley, Bloemfontein, and possibly other places, would occupy approximately 13 hours. We should use the well-known Handley Page bombing machines. We are expecting a consignment of machines, and then we shall undertake experiments, air investigations and exhibition flights. It will be our purpose to accustom people to air flights and to convince them of its safety. We shall give exhibitions in Cape Town and other towns."

In Greece.—Capt. William Shakespeare, M.C., writes from Athens: "I have the pleasure to report the successful completion of the first civilian trans-Europe flight. I arrived at Athens after the most trying and unpleasant stage of the journey from London. Taking advantage of what seemed to be good weather at Valona, I left in the early morning, and made quite good time under good conditions to Prevesa.

"Shortly afterwards I landed at Tatoi, having done the journey from Valona in 4½ hours. This, I was afterwards told, was a record time. The people—Greek and English flying officers—were very surprised to see us as the weather had been practically impossible all day; in fact, five minutes before we landed an R.A.F. H.P. machine, securely picketed, had been picked up by the wind and blown completely on its back, being a nasty mess of wreckage which was spread out in front of us.

"*Greek King's Three Flights.*—Needless to say after the buffeting I had received, I was greatly relieved to make our final landing; in fact, we were all pleased with ourselves at the successful completion of this long journey, although it had taken longer than we expected. This fact was due to conditions over which neither I nor the mechanics had any control. Altogether, the machine had been out in six whole days' rain. The engines, with the attention they received, stood very well.

"On the day fixed for the inspection by H.M. the King of Greece, the Press turned up in copious numbers. We initiated them into the mysteries of the H.P. and trans-Europe flight.

"I did two flights of Press people over Athens, and all went home very pleased with the machine, the new 'sensation,' and themselves. On these trips we did some pamphlet dropping over the city.

"Saturday, November 1, was a memorable day, for H.M. the King of Greece turned up and inspected the machine. He was greatly interested, and finally I persuaded him to come up for a flight. Since that occasion His Majesty has had two further flights, the last trip being from Athens to Corinth."

Six Hundred Mile Night Flight in America.—The four-engine Handley Page aeroplane which was entered for the Atlantic flight is arousing considerable interest amongst American Army and civilian flying experts. The machine, piloted by Maj. H. G. Brackley, flew recently from Parrsboro', Nova Scotia, to Greenport with 12 passengers, covering a distance of 600 miles in 11 hours. Hundreds of Americans waited half the night in the rain for the machine to arrive, the landing ground being illuminated with flares and searchlights similar to those which formed a beacon of welcome for the British airship R 34.

The flight was accomplished in wind, rain, and darkness; which made the task of Admiral Mark Kerr, the navigator, a difficult one. Whilst over New England coast in darkness and torrential rain the many lighthouses along the sea-shore were utilised as guiding landmarks.

FLIGHT ASPECTS OF SUPERCHARGING

By B. THOMSON, B.Sc., A.C.G.I.

Much has been written, more said, and a certain amount of work actually done towards the provision of what is called a supercharger aero engine, but as yet the problem has been dealt with almost wholly from the engine builder's point of view. Aerodynamic scientists of so high a reputation as Mr. Bairstow have touched on the subject so far as to indicate that a gain in aeroplane performance is to be expected, but the average person interested in flight is still left with a somewhat hazy idea as to how much gain may be anticipated and where that gain occurs.

It is proposed to discuss these questions in the following article, leaving aside all technical considerations of the engine, a subject admirably dealt with by Mr. Spencer, of McCook Fields, in the published article of the U.S.A. Bureau of Standards, to which the reader is referred. It is sufficient to note here that the effect of supercharging is to reduce the loss of b.h.p. at high altitudes to a small amount.

The flight aspects of supercharging have been divided into three sections :—

(*a*) The aeroplane, (*b*) the propeller, (*c*) the working conditions. Mathematical symbols have been cut to a minimum and curves used to demonstrate the arguments employed. The figures put forward do not represent any particular machine, but it is thought they show a good average design and reasonable accuracy for the purposes intended.

Before proceeding to these arguments it is necessary to define what is meant by the word efficiency. Given equal reliability, transport efficiency may be written as—

$$\text{Working efficiency} = \frac{\text{Total weight carried}}{\text{Actual tractive effort to keep in motion at speed used.}}$$

For an aeroplane the L/D ratio at which the machine is actually flown.

CURVES ON MACHINES, Figs. 1 *to* 3.

The first curve to be considered is Fig. 1. It represents an L/D or working efficiency curve for an aeroplane plotted to a base $\sqrt{\frac{Ky_{max}}{Ky}}$ corresponding to speed range.

Ky_{max} = maximum lift coefficient = ·55.
Ky = lift coefficient.

The L/D curve is deduced from the curve given by Capt. Barnwell in his lecture to the Aeronautical Society. Aspect ratio 9 to 1, no stagger and ·8 gap/chord ratio. The curve being redrawn to satisfy equation $L/D = \frac{K_y}{K_x + \cdot 015}$, where ·015 is an allowance for body resistance.

The machine may be taken to have any surface loading giving any desired landing speed corresponding to the wing section used.

The landing speed is taken as unity and the top speed found by multiplying the landing speed by the speed range. For example—

Speed range, 3.
Landing speed, 47·8 m.p.h.
Top speed = 47·8 × 3
= 143·4 m.p.h.

The value of this curve is the striking way it shows up the loss of efficiency at high speeds in the modern aeroplane. The maximum L/D for the machine shown is 9·9, but the limits imposed by the man, the conditions of aerodromes, and the structural necessities of the machine tie us down to a landing speed that in practice can hardly be allowed to exceed 55 m.p.h., and, if a top speed of 120 m.p.h. is to be obtained, corresponding to a speed range of 2·18, the L/D drops to 5·2, only some 52½ per cent. of the highest efficiency possible.

Now, the practical speed range of an aeroplane may be taken as the multiple of the landing speed at sea-level necessary to give the top speed at the altitude at which the machine is worked.

It is well known that the landing speed increases on aerodromes situated at considerable heights, but very few aerodromes are more than 5,000 ft. up, and at that altitude the increase is only some 10 per cent., so that it is not important

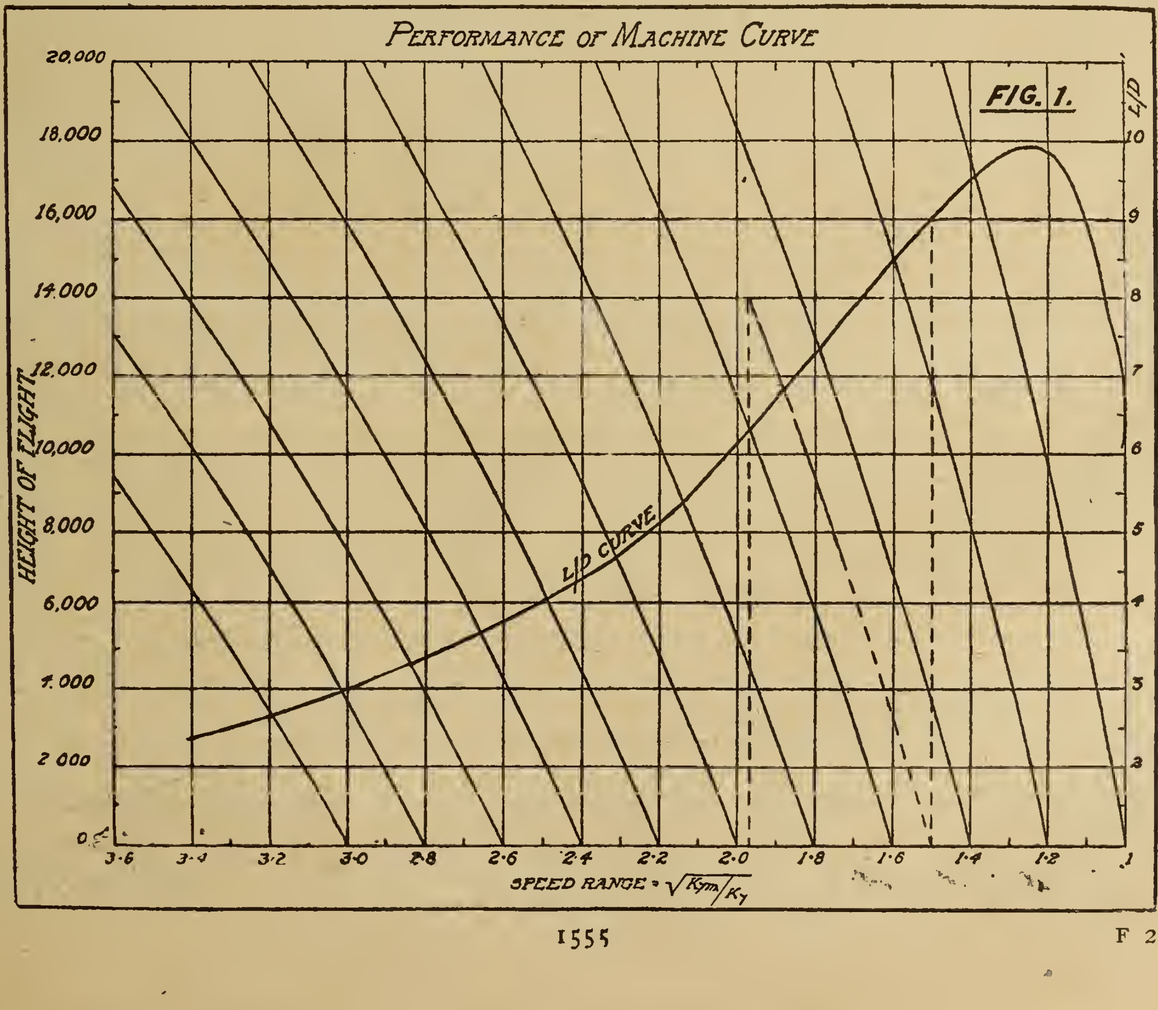

PERFORMANCE OF MACHINE CURVE

FIG. 1.

But in connection with supercharging the factor causing the above phenomena is of extreme importance. This is that if a machine be driven through the air at a constant L/D (equivalent to a constant angle of attack) the speed of level flight increases with the altitude inversely proportionally to the square roots of the varying air densities.

To show this increase the writer has superimposed on Fig. 1 a series of curves of the form $\frac{1}{\sqrt{\rho}} \sqrt{\frac{Ky_{max}}{Ky}}$ where ρ = air density at any height.

A scale of heights of flight has been marked on the left-hand side of the diagram, and from each of the speed range numbers a curve has been drawn proportional to the increase of speed with height when flying at the L/D immediately above the speed range number. To make the above clear it has been assumed that the machine is to be flown at an L/D of 9·0, approximately 90 per cent. of its maximum efficiency. Follow the dotted line from the L/D scale to the point where the L/D curve is cut for the second time, the first cut can be neglected, it merely concerns "getting off," the speed range number immediately below this is 1·5. From 1·5 a dotted curve is interpolated between the speed increase curves running from 1·4 and 1·6 and the curve has been run up to 14,000 ft., corresponding to a speed range of 1·965—see vertical dotted line. What this means is that we can maintain an efficiency of 90 per cent. with a speed range of 1·96 by going to 14,000 ft., but if we try to keep this efficiency at sea-level our speed range is only 1·5, or, conversely, if we are to maintain a speed range of 1·96 and work at sea-level we have to be content with an L/D of 6·3, corresponding to an efficiency of 64 per cent.

Any test pilot knows that the top speed of an aeroplane falls off very little up to some few thousand feet below her ceiling, the air speed indicated falls more rapidly, but that is another matter. The curve shows the reason for this. Take the normal engine and machine made to fly at 1·96 speed range at ground level, her L/D is 6·3, but if she is still flying at the same speed by the time she has reached 14,000 ft. her L/D has become 9·0, the engine loss of power having been balanced by the gain in efficiency of the machine.

In the above respect a supercharger-engined machine is in a very much happier position. If she is flown at a constant L/D her resistance remains the same at any altitude, but her speed increases, and the increase in power required to drive her is only proportional to this increase of speed. No other vehicle than the aeroplane has this property of being able to increase its speed with an only proportional increase of power.

It is true that as the horse-power provided by a supercharger motor only remains constant or is subject to a slight decrease, the actual gain in top speed at high altitudes will not be so great as the curves appear to indicate, but it will be very considerable.

The following figures are calculated from the curves of Fig. 1 :—

	Ordinary engine.	Supercharger.
Landing speed (sea-level)	50 m.p.h.	50 m.p.h.
Top speed, 1·96	98 m.p.h.	98 m.p.h.
Height of flight	Sea-level	14,000 ft.
L/D at top speed	6·3	9·0
Resistance per 10,000 lbs.	1,590 lbs.	1,110 lbs.
Propeller h.p. required	416	291
Engine h.p. at 70 per cent. propeller efficiency	595	415

Summarising the evidence of the curve Fig. 1, we see that :—

(*a*) Owing to the low landing speed imposed on aircraft by natural limits, high speed at low altitudes involves a poor L/D ratio ; only some 60 to 65 per cent. of the possibilities of the machine being utilised.

(*b*) When flying at a given L/D, high altitudes give a most valuable increase in flight speed with no increase in resistance and an increase of power only proportional to the increase of speed.

(*c*) It explains the curious fact that the modern aeroplane, in spite of greatly reduced horse-power, is able to maintain a practically constant top speed up to a high altitude.

To enable a quantitative comparison of the gain from supercharging to be made, the curve of Fig. 2 has been drawn. It is based on Fig. 1 and calculated from it, and shows directly the connection between speed in m.p.h. and loading in pounds per b.h.p.

The lower curve is drawn for a normal-engined machine working at 2,000 ft., the upper for the same machine having a supercharged engine and working at 14,000 ft., in each case the basis of comparison is shaft horse-power and the same propeller efficiency, 74 per cent., has been assumed.

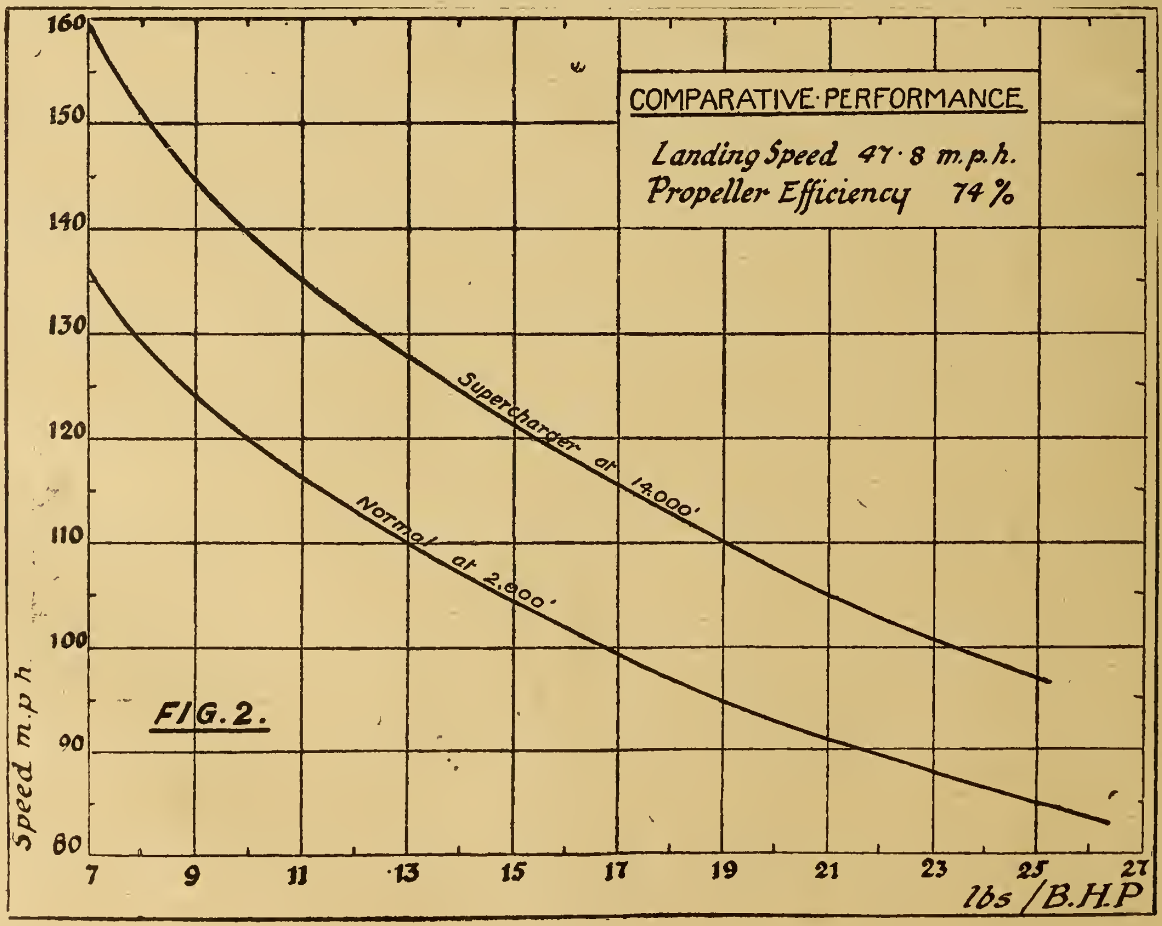


FIG. 2.

The gain in speed for a given loading and the gain in loading at a given speed show up very clearly. To further elucidate the matter Fig. 3 has been prepared. It shows these gains as direct percentage increments. It is interesting to note that the speed gain at given loading is approximately constant at 16 per cent., about half the per cent. increase in speed between sea-level and 14,000 ft. when flying at a constant L/D. The loading gain increases from 37 per cent. to nearly 60 per cent., being of far more importance the higher the speed concerned.

THE PROPELLER.

A technical consideration intimately uniting the engine and aeronautical designer on the subject of supercharging is that of propeller design. If a machine having a supercharger engine be fitted with a propeller suitable for low altitudes, the engine will over rev. at her working height. Two proposals have been put forward for getting over this :—

(*a*) To provide the propeller with blades, the pitch of which can be increased at heights so as to utilise the greater horse-power available with the supercharger engine as compared with the ordinary motor.

(*b*) To provide a variable-speed gear-box so that the engine revs. can be kept approximately constant, those of the propeller being varied.

Both solutions are subject to disadvantages, the variable-pitch propeller offers the sweeter working mechanism, though the space into which the gear has to be fitted is small and the parts will be subject to centrifugal stresses.

The gear-box will always present the difficulty of changing gears and is likely to be cumbrous. So far as the writer is aware, it has not got further than the patent specification stage, but the variable propeller has been got into the air.

In discussions on the variable propeller, the pitch is usually regarded as being increased at high altitudes, and it is contended that this will cause a loss of efficiency large enough to counterbalance the gain due to the use of the supercharger engine.

This attitude in regard to the problem is misleading, and comes from the excessive value given to climb by war conditions. Any propeller designed for a supercharger engine will be designed to give its best at the working height selected, and the question is not that of any loss of speed and efficiency at heights, but of sacrifice of climb low down.

The variable propeller will have a normal pitch at high altitudes and a fine pitch at low. Its diameter will have to be greater than that of the ordinary type, but there will be no loss of top speed, only of climb.

So also the variable-speed screw will have a normal number of revolutions at heights and a lower rate of revolutions near the ground.

In both cases the loss of climb will be due to the propeller not having so good a form for working at climbing speeds as the normal air screw.

The real disadvantages to be faced, then, are the increase of propeller diameter and weight and the loss of climb involved. Practically the most serious consideration is the loss of climb.

To give some quantitative opinion on this point the writer has assumed the extreme case of a supercharger machine fitted with a fixed propeller designed to utilise the engine horse-power at 14,000 ft. On coming down to ground level the revolutions of, and horse-power supplied to, the propeller have been assumed to drop and the forward speed to be reduced all in such proportion as to keep the angle of attack of the blades constant.

Thus the condition of maximum efficiency at working altitude has been combined with a condition at sea level much worse than that which would be realised in practice by either variable pitch or variable-speed propeller.

The results of the calculations are as follow :—

Weight of machine	600 lbs.
Characteristics those of curve Fig. 1.	
B.h.p., normal at sea-level	400
Supercharger at 14,000 ft. ..	380

Performance.

	Normal.	Supercharger.
Height, top speed.		
Sea-level	105 m.p.h.	
14,000 ft.	..	122 m.p.h.
Climb—		
Sea-level	725 ft./min. —	474 ft./min.
14,000 ft.	580 ..	605
Time to 14,000 ft. ..	21·5 mins. ..	26 mins.

It will thus be seen that under very disadvantageous conditions the supercharger does not lose excessively. In practice better figures will be realised for the initial climb, with a corresponding reduction in the time to working height.

It is not improbable that for machines with light power loading the conditions assumed in the foregoing case may be accepted ; for commercial work it is a question of balancing the length of flight and time of cl.mb to the working height.

Propeller mathematics are lengthy, involved and liable to error, and for that reason no attempt has been made to give anything more than an indication based on extreme limits. For commercial work the important part of the gain is in the direction of speed, climb being of secondary importance so long as enough is available to enable the machine to handle well when getting off the ground and keep the time taken to get to working height within reasonable limits.

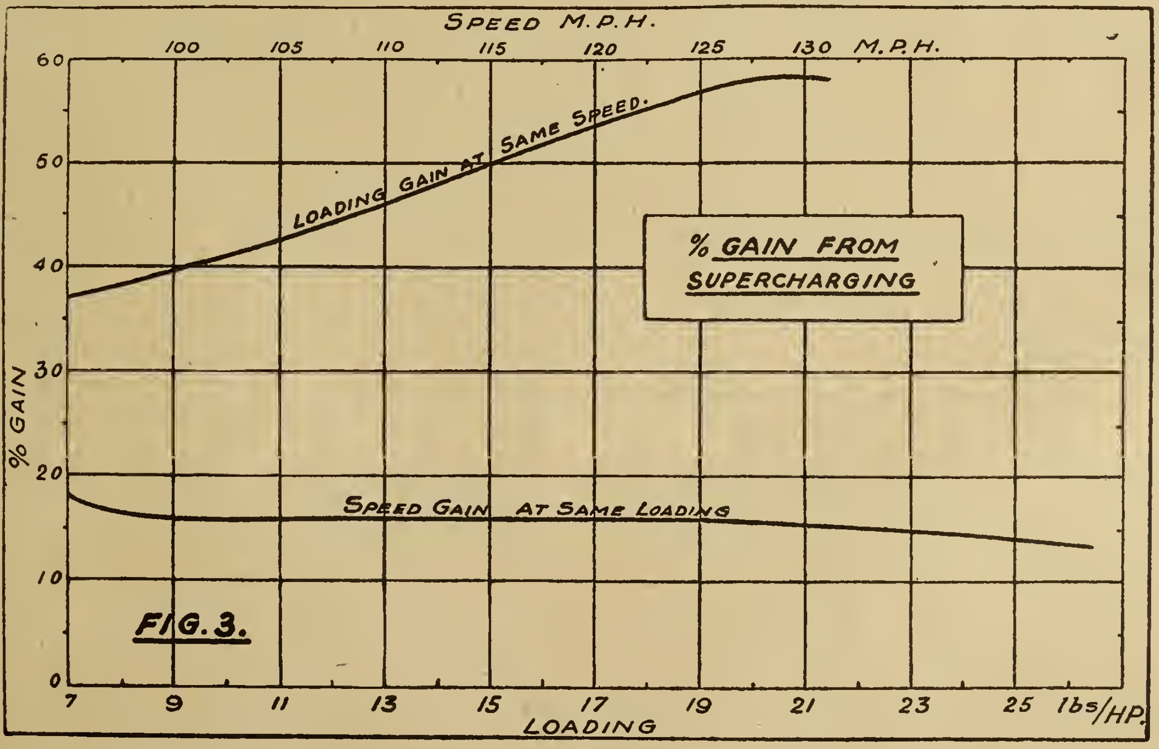


FIG. 3.

WORKING CONDITIONS.

Certain practical working considerations have to be taken into account. The first is the man.

Fourteen thousand feet has been selected as a working height throughout these notes, because, so far as the writer's experience goes, a normal healthy man can work at this height pretty continuously, but if he is called upon to fly regularly at greater heights a really strong constitution is necessary.

The second is that of keeping a course above the clouds in bad weather. It would appear probable that the very remarkable work done in extremely bad weather (the writer speaks from personal observation) by the Paris-London service has largely been due to the pilots working the machines having learnt to know literally every inch of the ground covered, so that an occasional glimpse caught through clouds and mist is enough to give them their position. This will not be possible when working at 14,000 ft., and far more reliance must be put in navigation and directional wireless.

The third is the time taken on the climb.

In the working of commercial aircraft the machine is taken straight off the aerodrome, put on her course and kept at high speed, very little time being wasted in climbing, as 3,000 to 4,000 ft. seems to be the normal altitude. With a fast, high-powered machine this means that her speed is reduced for climbing for only a couple of minutes, but the supercharger machine will be on the climb for a much longer period, a serious matter on a short flight, but her higher speed at altitude makes it of less importance where long-range work is concerned. Further increased wind speeds will have to be encountered at high altitudes, but on a year's service these will probably balance out.

The financial considerations influencing the use of supercharging will mainly be those of engine cost, the decision lying between the use of motors of large dimensions flimsily built and sturdier engines worked at a higher duty. There is regrettably little data upon which to form an opinion, but the determining factor must be reliability and a heavy engine working at low altitudes seems to be more reliable than a light one at high. A very faint indication upon which to base an engine policy, but the only one available. On the whole, the writer is inclined to believe that the engine costs of working per b.h.p. hour delivered will not be largely affected by the use or otherwise of supercharging.

In concluding these notes, the writer feels how little justice they do the next great problem facing aeronautical design, an art upon which peace has forced a totally new set of conditions. His object has been to give some simple indications of the outlines of the problem comprehensible to those whose mathematics have grown rusty—something that may hasten its solution by an increase of general interest.

Speed is the one thing aeronautics has to sell, and that is a valuable commodity, but to obtain it efficiency cannot be thrown away in any direction, and the modern high-speed aeroplane has a very low efficiency.

Flight at high altitudes increases the efficiency of the machine, but reduces that of the normal engine, and supercharging is the means whereby that deficiency may be made up. It offers high efficiency of both engine and aeroplane without excessive loss on the propeller: the three in one on which flying depends.

◆ ◆ ◆ ◆

"AEROPLANE STRUCTURES"

'A MISTAKE in any design may, of course, cause loss of life, as, or example, in the collapse of a bridge, but more often it entails financial loss only. Mistakes in the design of aeroplane structures, however, nearly always mean accidents which are fatal or result in serious bodily injury to at least one or two men. There is, therefore, no room for error in this branch of engineering, and a sound knowledge of theoretical structures becomes imperative if successful designs are to be produced." This brief extract from the book entitled "Aeroplane Structures," by A. J. S. Pippard & J. L. Pritchard, puts in a few sentences the *raison d'être* of the work, and the authors have presented the numerous problems which confront the "stress merchant" in as simple as possible a manner, consistent with accuracy. The authors have, as Mr. Bairstow points out in his introduction to the book, taken a leading part in applying the new methods of stress calculation which the special conditions relating to aeroplane structures have rendered necessary, and they are therefore singularly qualified to write a work on this immensely important subject.

In the first chapters the authors briefly, but clearly, deal with mechanics of flight, the detail structure of an aeroplane, the evolutions of an aeroplane in flight, which determine to a great extent the stresses in the various units, and which must be clearly understood by the designer in order to make allowance for the sudden loads which violent manœuvres may throw on the wings or other units. The chapters on elastic properties of materials, and on bending moments, shear forces, stresses in beams, etc., which form this *résumé* will be found familiar by many from Morley's "Theory of Structures," but only such general problems as have direct bearing on the aeroplane structure have been included.

From this point the book deals entirely with aeroplane structure problems, the chapters being devoted to such subjects as forces on main plane structure, in all its aspects, internal forces in the *fuselage*, forces and loads on control surfaces, landing loads, the partially disabled aeroplane, and some general considerations in aeroplane design. The authors then proceed to detailed design, such as spars, struts, ribs and fittings, all of which are dealt with in a most lucid and interesting manner. A chapter is devoted to practical testing of all sorts of specimens as well as of complete wing structures.

Left until last is a fascinating chapter devoted to an excellent statement of the "Principle of Least Work," a method which is shunned by the majority of engineers, but which, under the clear and logical guidance of the authors, becomes almost easy. Certainly its application is quite easy, even if the derivation of the method should appear somewhat difficult to follow. As the method is one which is likely to come into general use, especially when we come to metal construction, its clear statement in the present book is extremely opportune, and a study of this chapter should enable the student to find the stresses in structures which are statically indeterminate—*i.e.*, which are redundant.

There are several appendices: one giving a number of tables for calculating spar stresses by the method of Mr. Arthur Berry, of King's College, Cambridge; another, abridgements of materials specifications issued by the Air Ministry, and another a series of tables of characteristics of aerofoils.

Messrs. Pippard and Pritchard are to be congratulated on the extremely efficient way in which they have presented the various problems, and we venture to think that the book will soon become a standard work on aeroplane structural design. "Aeroplane Structures" is published by Messrs. Longmans, Green and Co., of Paternoster Row, and the price is 21s. net.

◆ ◆ ◆ ◆

The England-Australia Flight

STEADY progress is being made by Capt. Ross-Smith and his companions on the Vickers-Vimy-Rolls which they are flying to Australia. They arrived at Delhi at 4.15 p.m. on November 25, and at 5 p.m. on November 27 they reached Allahabad, which place they left at 8.30 a.m. the next day for Calcutta.

Capt. Matthews and Sergt. Kay on the Sopwith "Wallaby," were reported to have arrived at Vienna on Nov. 29. They were making their way to Belgrade, and had to land owing to bad weather and lack of petrol. Capt. Matthews said his journey had been hampered by ground mists, but he hoped to make faster time when he was out of Europe.

The Blackburn Kangaroo, which left Hounslow on November 24, left Romilly at 9.40 a.m. on November 25. It was delayed, but eventually arrived at St. Raphael at 4 p.m. on November 28. It left at 9.30 a.m. and, fighting against head-winds and rain, landed safely at Pisa. Resuming the flight next day, Rome was reached at 4.45 p.m., the 120 miles from Pisa taking four hours to cover owing to head-winds.

The Frenchman Poulet arrived at Calcutta on November 26, and left for Akyab (Burma) on November 28.

Arrangements have been made by the Australian Federal Government to furnish each pilot engaged on the Europe to Australia flight, on reaching Java, with the daily weather forecast of the Port Darwin area.

REPORT ON VARIATION OF HORSE-POWER WITH ALTITUDE AND COMPRESSION RATIO*

THE following report is based upon the results of a series of tests conducted at the Altitude Laboratory of the Bureau of Standards. In this laboratory the engine under test is installed in a concrete chamber having insulated walls and from which the air may be partially exhausted by mean of a blower, thus reducing the barometric pressure within the chamber to a point corresponding to the pressure at any desired altitude. At the same time, by passing the air, as it enters the chamber, over a series of refrigerating coils, the temperature may be regulated during the tests. The power of the engine is absorbed by an electric dynamometer placed outside the chamber and connected to the engine by a shaft and coupling. Measurements of power are made by weighing the torque on the dynamometer field. A complete description of this apparatus and methods of observation was published in the issues of FLIGHT for October 16 and 23, 1919.

A stock Hispano-Suiza, 8-cylindered engine, rated at 150 horse-power, and built by the Wright-Martin Aircraft Corporation, New Brunswick, New Jersey, was used in making these experiments. This engine is furnished with three sets of pistons, designated as "low," "high," and "extra high" compression, the ratios of compression, that is $\frac{\text{cylinder volume}}{\text{clearance volume}}$, being approximately 4·7, 5·3, and 6·2 respectively. All of the tests were run on a single grade of gasoline designated as "X," with a Claudel carburettor, which was adjusted by hand in each case to give the maximum power. All the results are based upon an engine speed of 1,500 r.p.m. In the earlier tests the horse-powers were corrected to 0° C., while in the later ones they were corrected to standard temperatures for given barometric pressures as will be described in a subsequent paragraph.

Tables I, II and III give the results of a number of tests using the three different sets of pistons, the horse-powers deduced from these tests having been corrected to 0° C. The data contained in these tables are plotted in Fig. 1.

As it is desirable to obtain the relations existing between barometric pressure and horse-power developed under the actual conditions of flight, the observed horse-power must be corrected from the temperature during the test to the mean temperature encountered in actual flight at the given barometric pressure. To obtain this relation between temperature and barometric pressure, use was made of the information contained in Aeronautic Instruments Circular, No. 3, issued by the Bureau of Standards, resulting in the temperature-

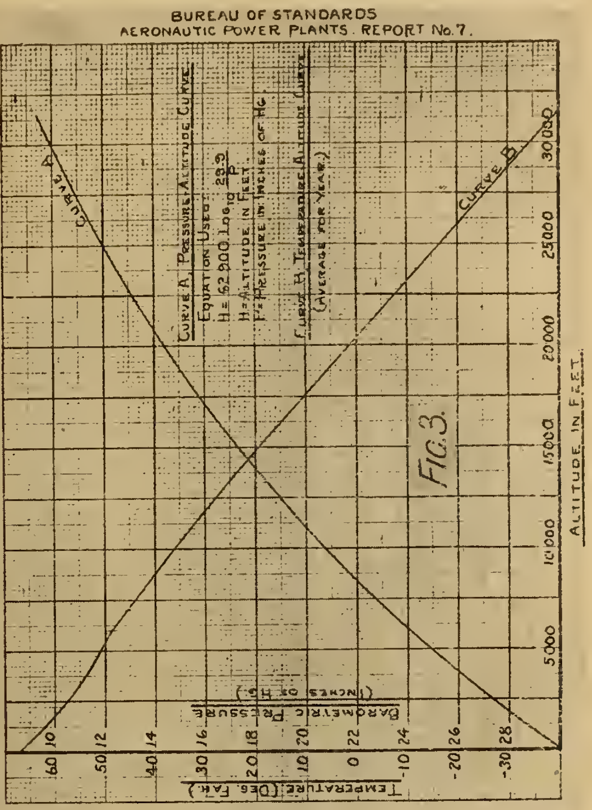


FIG. 3.

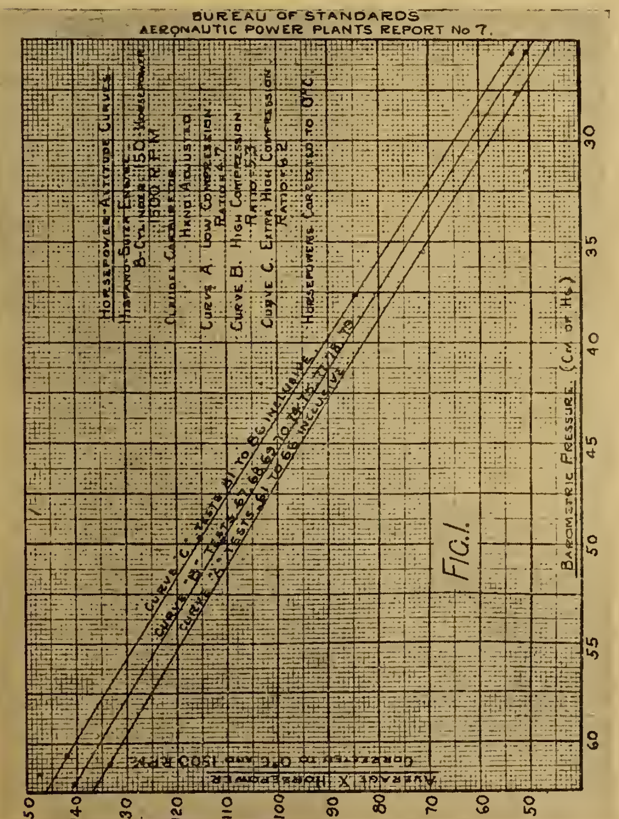


FIG. 1.

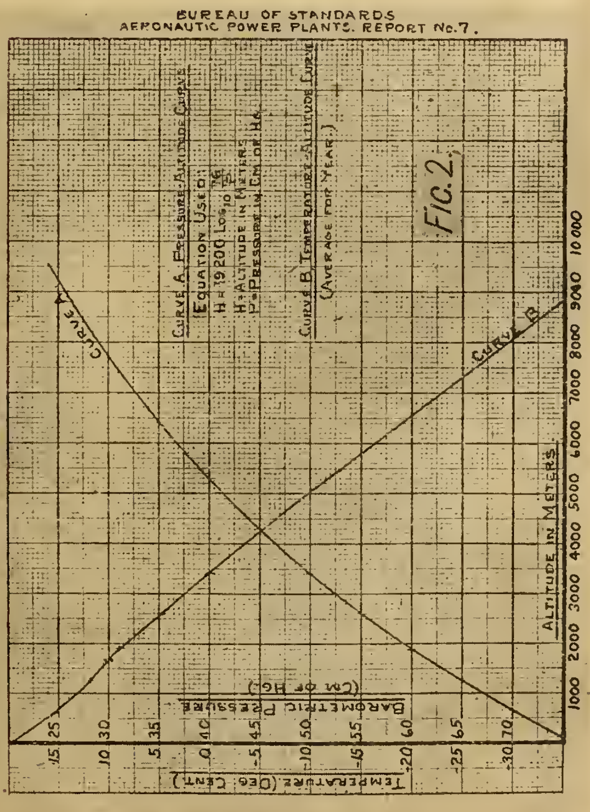


FIG. 2.

---

* From experiments carried out by the American Bureau of Standards, which corresponds to our National Physical Laboratory.

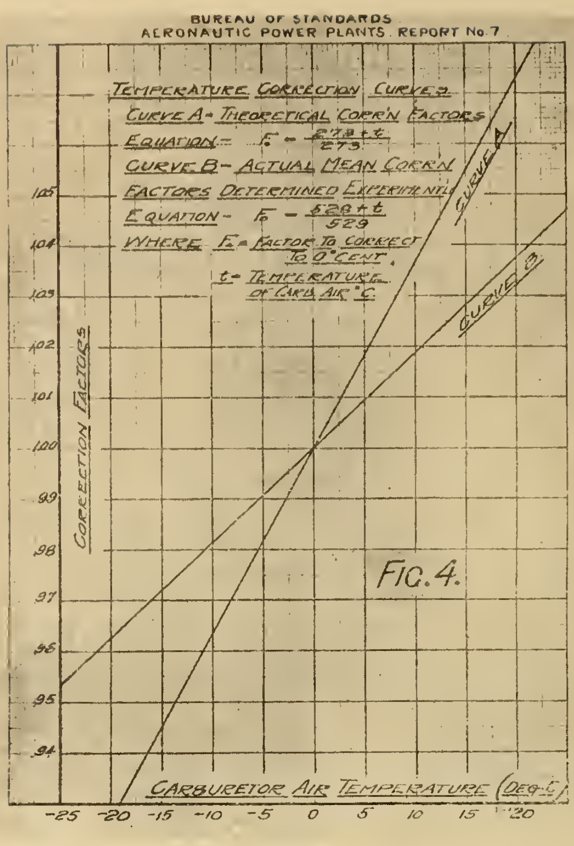


FIG. 4.

altitude curves marked "B" in Figs. 2 and 3. The curve in Fig. 2 is in metric, and that in Fig. 3 in English units.

To correct a given horse-power, HP_o, at a given barometric pressure from 0° to some temperature, t, at the same barometric pressure, we may make use of the following relation:

$$HP_o = HP_t \times F_o \qquad (1)$$

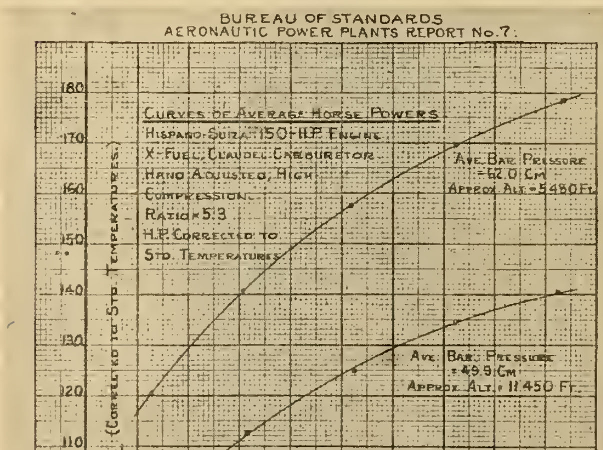


FIG. 5.

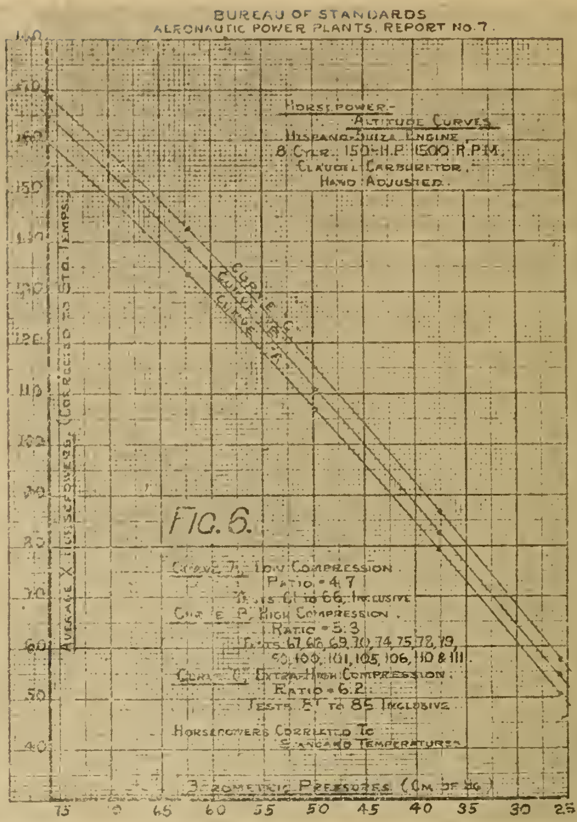


FIG. 6.

In which—

HP_o = horse-power at 0° C., at the given barometric pressure.

HP_t = horse-power at temperature t degrees Centigrade at the given barometric pressure.

F_o = correction factor to reduce horse-power from t degrees to 0° C.

Values of F_o for any given temperature, t, may be obtained from curve B, or its equation, both of which are given in Fig. 4, which is a mean curve of correction factors obtained from the results of a number of tests performed at the altitude laboratory with two different carburettors and at various altitudes.

We may obtain an expression for HP_t in terms of HP_o by transposing equation (1), as follows:

$$HP_t = \frac{HP}{F_o} \text{ or } HP_t = HP_o \times \frac{1}{F_o} \qquad (2)$$

in which $\frac{1}{F_o}$ is a factor to correct from 0° Centigrade, to the given temperature, t.

In the tests performed in the altitude laboratory the runs were conducted at four barometric pressures which were adopted as standards for comparing the results of different tests, and also to facilitate computations. In the later tests, series 99 to 111, carried out with the high-compression pistons, the horse-powers were corrected to the mean temperatures corresponding to the observed barometric pressures, consequently it was necessary to establish a set of standard temperatures corresponding to the different standard barometric pressures. The mean values of these four "standard" temperatures obtained from curve in Fig. 2, together with the corresponding approximate altitudes, are as follows:

Barometric pressure in centimetres of Mercury.	Temperatures in Degrees Cent.	Approximate Altitude in feet.
62·1	10·1	5,500
49·8	– 0·1	11,500
37·6	–15·1	19,200
25·6	–36·6	29,600

Values of horse-power for the three compression ratios were obtained from curve in Fig. 1 at the standard barometric pressures, and tabulated in Table IV. These were corrected from 0° C. to the standard temperatures by use of equation (2), giving the values of horse-power corrected to standard temperatures for the three earlier series as tabulated in the last column of Table IV.

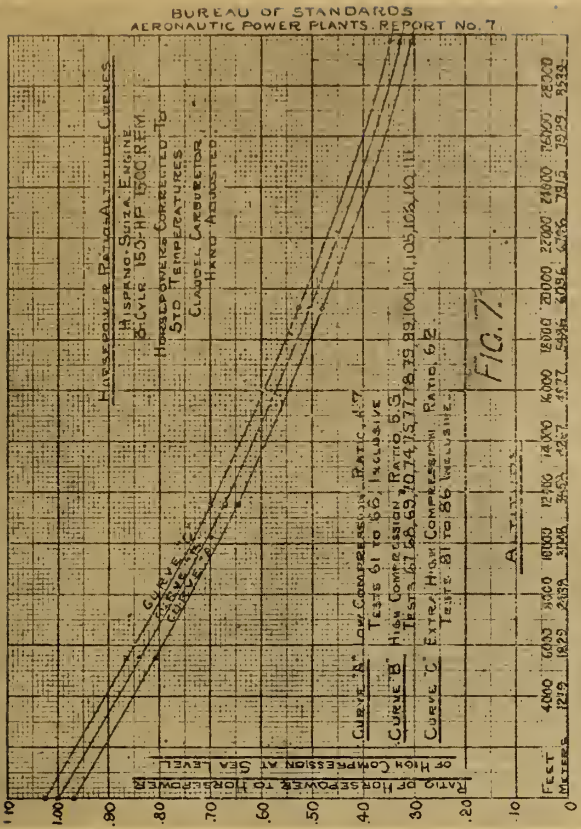


FIG. 7.

The runs in series 99 to 111 were made at various speeds. Table V gives the observed values of speed and horse-power at the different altitudes for this series. These data are averaged and plotted in Fig. 5, and the values of horse-power at 1,500 r.p.m. taken from the resulting curves are tabulated and averaged in Table VI with series 67 to 79, both series

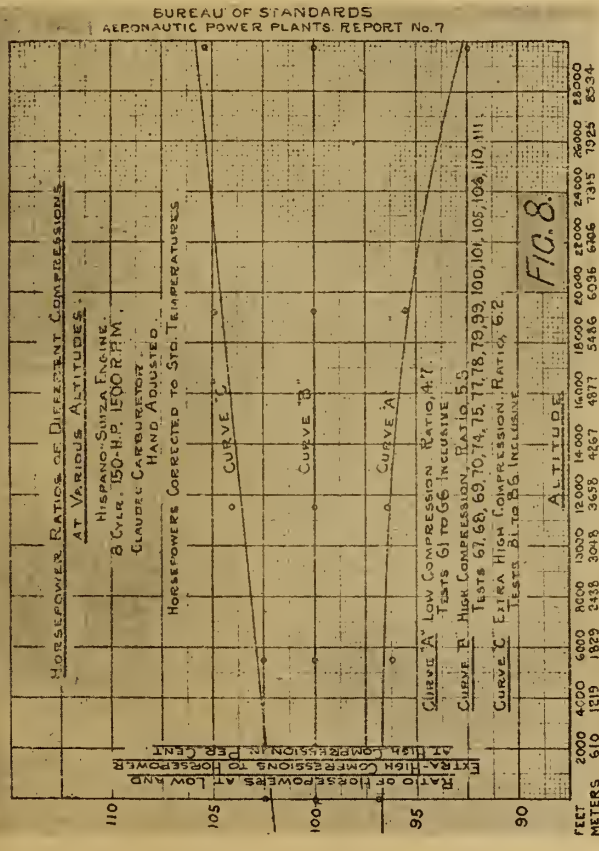


FIG. 8.

TABLE I.—*Average Horse-Powers and Barometric Pressures for Tests on X Fuel—Low Compression Ratio = 4·7*

Horse-powers corrected to 0° C.

Test No.	Bar. Press.	h.p.	Bar. Press.	h.p.	Bar. Press.	h.p.	Bar. Press.	h.p.
61 ..	61·1	135·6	48·0	106·0	—	—	—	—
62 ..	61·5	134·8	48·5	104·6	35·4	71·8	27·7	51·4
63 ..	61·5	133·1	48·5	102·4	35·7	70·0	27·7	52·7
64 ..	60·8	131·8	48·0	102·7	35·4	70·9	27·7	52·7
65 ..	—	—	48·3	103·0	35·4	72·1	27·8	54·0
66 ..	60·7	131·0	48·0	101·0	35·4	70·1	27·7	51·0
Average	61·1	133·3	48·2	103·3	35·5	71·0	27·7	52·4

TABLE II.—*Average Horse-Powers and Barometric Pressures for Tests on X Fuel—High Compression Ratio = 5·3*

Horse-powers corrected to 0° C.

Test No.	Bar. Press.	h.p.	Bar. Press.	h.p.	Bar. Press.	h.p.	Bar. Press.	h.p.
67 ..	62·2	144·0	49·9	111·4	37·7	80·5	25·7	50·3
68 ..	62·1	140·4	49·9	111·2	37·7	79·5	25·7	51·0
69 ..	61·9	141·5	49·6	112·8	37·2	80·5	24·9	51·3
70 ..	62·0	142·1	49·8	112·1	37·6	80·5	25·7	51·2
74 ..	62·2	141·1	50·1	110·2	37·8	80·6	25·7	48·8
75 ..	62·3	138·0	48·8	109·1	37·6	80·4	25·7	50·6
77 ..	62·0	135·8	50·1	115·0	37·7	80·7	25·7	52·2
78 ..	61·9	142·0	49·8	106·5	37·6	79·8	25·6	50·3
79 ..	62·0	138·7	49·9	108·5	37·7	81·5	25·8	49·4
Average	62·1	140·4	49·8	110·8	37·6	80·4	25·6	50·6

TABLE III.—*Average Horse-Powers and Barometric Pressures for Tests on X Fuel—Extra High Compression Ratio = 6·2*

Horse-powers corrected to 0° C.

Test No.	Bar. Press.	h.p.	Bar. Press.	h.p.	Bar. Press.	h.p.	Bar. Press.	h.p.
81 ..	60·6	145·9	49·7	117·6	37·6	85·7	25·7	53·7
82 ..	60·6	142·5	49·7	114·4	37·6	85·4	25·7	53·7
83 ..	60·6	139·4	49·7	115·9	37·6	85·5	25·7	53·0
84 ..	60·6	143·1	50·0	116·7	37·6	85·4	25·7	53·1
85 ..	—	—	49·7	112·9	37·6	82·8	25·7	52·5
86 ..	60·5	138·9	49·6	113·9	37·5	84·1	25·7	53·9
Average	60·6	142·0	49·7	115·2	37·6	84·8	25·7	53·3

TABLE IV.—*Table of Data for Reducing Horse-Powers from 0° C. to Standard Temperatures*

Bar. Press. in Cms. of Hg.	Average Temperature from Curve in Fig. 2, Deg. Cent.	Correction Factor from Curve B in Fig. 3 = $(F_o)_t$.	Factor to correct from 0° C. to Std. T. = $1/(F_o)_t$.	Horse-power from Curves in Fig. 1 = HP_o.		Horse-powers corrected to Std. Temperatures.
				Compression.	h.p.	
				Ratio—		
62·1	10·1	1·019	·981	Low = 4·7	136·0	133·5
				High = 5·3	140·4	137·7
				Ex High = 6·2	145·3	142·5
49·8	− 0·1	1·000	1·000	Low = 4·7	106·9	106·9
				High = 5·3	110·8	110·8
				Ex High = 6·2	115·2	115·2
37·6	−15·1	·972	1·029	Low = 4·7	76·9	79·1
				High = 5·3	80·3	82·6
				Ex High = 6·2	84·4	86·8
25·6	−36·6	·931	1·074	Low = 4·7	46·9	50·4
				High = 5·3	50·3	54·0
				Ex High = 6·2	53·5	57·5

TABLE VA.—*Observed Horse-Powers, R.P.Ms. and Barometric Pressures for X Fuel, Series 99 to 111*

Horse-Powers corrected to Standard Temperatures

Approximate Altitude = 5,500 ft.

Test No.	Bar. Press.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.
99	62·0	1310	119·7	1504	141·9	1710	158·3	1923	168·7	2110	174·2
100	61·9	1325	126·1	1515	147·1	1715	162·7	1935	173·4	2140	181·0
101	62·1	1300	114·2	1518	135·0	1715	154·0	1920	165·1	2155	177·1
105	62·3	1375	124·0	1525	141·7	1725	158·0	1965	173·2	2140	179·3
106	62·1	1365	122·8	1536	140·4	1763	153·4	1925	165·8	2140	174·2
110	61·9	1305	118·9	1480	139·9	1695	159·2	1890	171·4	2120	182·0
111	61·9	1315	116·3	1485	137·2	1700	157·0	1910	171·0	2156	181·1
Av.	62·0	1328	120·3	1509	140·5	1718	157·5	1924	169·8	2137	178·4

Approximate Altitude = 11,500 ft.

Test No.	Bar. Press.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.
99	49·90	1310	96·2	1517	114·0	1715	127·0	1907	134·9	2105	139·5
100	49·80	1315	96·5	1500	113·0	1725	126·7	1930	138·6	2115	143·0
101	49·90	1315	93·9	1505	109·9	1730	118·7	1925	127·9	2107	133·2
105	50·20	1340	95·8	1515	110·8	1715	124·0	1910	134·0	2135	140·5
106	49·80	1370	96·8	1540	111·2	1750	120·7	1945	130·5	2150	135·0
110	49·80	1327	101·2	1540	119·8	1710	130·2	1915	138·7	2120	144·8
111	49·95	1305	92·9	1500	111·0	1737	126·9	1927	137·2	2130	144·5
Av.	49·9	1326	96·2	1517	112·8	1726	124·9	1923	134·5	2123	140·1

TABLE VB.—*Observed Horse-Powers, R.P.Ms. and Barometric Pressures for X Fuel, Series 99 to 111*

Horse-Powers corrected to Standard Temperatures

Approximate Altitude = 19,200 ft.

Test No.	Bar. Press.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.
99	37·6	1300	71·2	1500	84·6	1715	95·2	1920	100·6	2100	103·3
100	37·5	1310	71·7	1500	83·3	1720	95·0	1920	99·5	2135	107·0
101	37·8	1310	69·4	1520	81·0	1725	88·9	1940	95·6	2120	98·5
105	37·7	1355	71·4	1528	82·3	1725	90·6	1923	98·4	2140	105·4
106	37·5	1360	72·8	1515	82·6	1745	91·7	1925	98·6	2140	102·5
110	37·5	1289	74·0	1513	88·3	1718	96·7	1896	99·4	2100	105·7
111	37·6	1310	71·1	1487	82·8	1717	94·2	1910	101·9	2125	105·2
Av.	37·6	1319	71·7	1509	83·6	1724	93·2	1919	99·1	2123	103·9

Approximate Altitude = 29,600 ft.

Test No.	Bar. Press.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.	Speed.	h.p.
99	25·7	1303	47·7	1535	56·6	1730	61·4	1930	62·6	2105	65·1
100	25·5	1330	48·4	1505	55·8	1725	61·8	1930	64·4	2105	64·1
101	26·0	1314	45·1	1512	52·9	1707	58·3	1924	62·4	2120	63·1
105	25·9	1310	47·3	1505	55·8	1705	61·4	1914	65·9	2115	68·8
106	25·7	1370	47·6	1560	54·4	1735	59·6	1885	60·8	2085	60·8
110	25·7	1290	48·2	1510	57·2	1723	63·6	1900	64·8	2120	63·2
111	25·7	1310	51·2	1505	59·1	1710	65·7	1937	69·9	2130	72·0
Av.	25·7	1318	47·9	1519	56·0	1719	61·7	1917	64·4	2112	65·3

TABLE VI.—*Table of Data for Averaging Horse-Powers for High-Compression from Series 67 to 79 and 99 to 111*

Horse-Powers corrected to Standard Temperatures

A—Averages from Table IV.			B—Averages from Tables VA and VB.			C—Averages from A and B.		
	Bar. Press.	h.p.		Bar. Press.	h.p.		Bar. Press.	h.p.
Average of Nine Tests, Series from 67 to 79	62·1	137·7	Average of Seven Tests, Series from 99 to 111	62·0	140·0	Average of 16 Tests, Series from 67 to 79 and 99 to 111	62·05	138·9
	49·8	110·8		49·9	111·0		49·85	110·9
	37·6	82·6		37·6	82·8		37·60	82·7
	25·6	54·0		25·7	55·3		25·65	54·65

being on the high-compression ratio 5·3. The averaged data are plotted in Fig. 6, together with the corresponding data for the other two compressions (4·7 and 6·2) obtained from the last column of Table IV, giving curves of horse-power at 1,500 r.p.m. corrected to standard temperatures *versus* barometric pressure for the three compressions.

From these curves the ratios of the different horse-powers for each compression to the horse-power at sea level for the high (5·3) compression were computed. These ratios were plotted in curve, Fig. 7, against altitudes in feet corresponding to the different barometric pressures. The altitudes were computed from the formula:

$$h = 62900 \log_{10} \frac{76}{p}$$

obtained from the Smithsonian Meteorological Tables for 1907, page 100, in which h is the altitude in feet, and p is the atmospheric pressure in centimetres of mercury.

The curves in Fig. 8 illustrate the variation in horse-power with compression ratio at different altitudes.

The horse-power developed with the 5·3 or "high" compression ratio, at the different altitudes, was taken as 100 per cent., and the other two compression ratios were plotted as percentages of this curve. As will be seen upon examination, the gain in horse-power due to "extra-high" over "high" compression amounts to but 2·8 per cent. at 5,000 ft., while it increases to nearly 5·8 per cent. at 30,000 ft. Likewise the decrease in horse-power due to "low" compression, while only 3·3 per cent. at 5,000 ft., amounts to about 7·3 per cent. at 30,000 ft.

It is evident, therefore, that the value of high compression is more apparent at high than at low altitudes.

It should be pointed out that any comparison of absolute horse-powers for the different compression ratios may be misleading, as the engine conditions, such as fit of piston and rings, condition of valves, etc., were not the same in each case. However, the manner in which the horse-power varies with barometric pressure in each case may be taken as characteristic for the given combination of engine, carburettor, and fuel with a given compression ratio.

In conclusion, it may be stated that practically all the tests conducted in the Altitude Laboratory have a nearly equal bearing on the relation of horse-power to altitude. Any given set of conditions, which affect the operation of the engine, may be held approximately constant during one test, and the variation of horse-power with altitude determined for these conditions. Only a small amount of this information has been collected in this report, as the tests upon which it is based were chosen particularly to show the power-altitude relation at different compression ratios.

Supplementary reports will be issued as additional information becomes available either as the result of experiments already completed or ones to be carried out in the future.

◆ ◆ ◆ ◆

Re-Opening of Recruiting for the R.A.F.

OWING to the large number of men who are due for discharge on the completion of their engagements, recruiting for the R.A.F. has now been re-opened and there are vacancies for skilled mechanics of various trades.

Engagements are for 4, 6 or 8 years with the Colours, with 8, 6 or 4 years respectively with the reserve.

In view of the newly-revised rates of pay of the Force, the openings are distinctly attractive, particularly as men will be working at their own trades and constantly gaining fresh experience which will be of great value to them on their return to civil life, by which time in all probability there will be a greatly increased demand for aircraft workers of all categories.

Skilled aircraft workers who are at present unemployed, of those who are not employed in their own trades, would, therefore, be well advised to consider the possibilities of the careers offered by the Service.

Full details as to pay, etc., may be obtained from 4, Henrietta Street, London, W.C., or from any R.A.F. station.

AIRISMS FROM THE FOUR WINDS

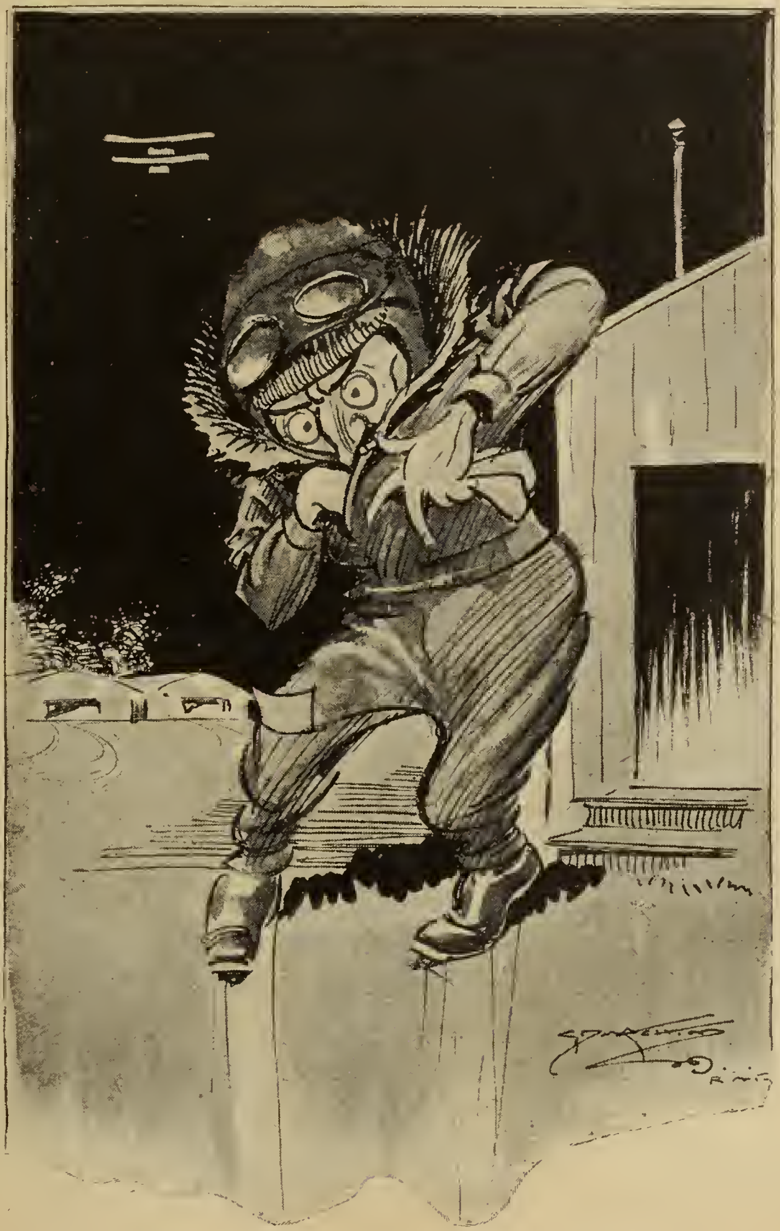
THE strength of a nation's fighting force is its insurance premium against wars. When false economists scream against a strong aircraft fleet and preparedness generally, let them bear in mind one of Lord Jellicoe's most recent utterances in Canada: "Despite the remoteness of future wars, Britain should be prepared, just as any man prepared against fire They appreciated the necessity for economy but, appreciating that, they should not forget the cost of one day of the Great War."

– – –

FROM the story and statistics compiled by the Navy League and published in their official journal, regarding the sinking of submarines in the War, the figures, as given, for the work of seaplanes are somewhat striking. It has hitherto been popularly accepted that quite a big batch of these pests was actually sent to "kingdom come" by aircraft. The actual number credited as destroyed by bombs from seaplanes is five, and by airships one. The five accounted for by seaplanes were despatched between May 20 and September 28, 1917. This is getting down to earth, so far as actual destruction is concerned, although there are instances which appear to have been overlooked in the League's summary, by way of example, the sinking of a submarine off Ostend on August 26, 1915, by bombs from an aeroplane piloted by Comdr. Bigsworth. But where the real strength and value of aircraft came in in our forces countering the Hun submarine menace, was in the "spotting" carried out, enabling many a one to receive the *coup de grâce* by co-operating methods.

– – –

THAT it is necessary and expedient for the Government to close down the National Aircraft Factory at Waddon may well be. But it would appear to be inviting trouble in the long-run for the Croydon Council to suggest that the Government shou'd start manufacturing useful wood and metal goods there. Surely it is due to private enterprise to take on the task in that or some other industrial form. With scarcity of factory buildings, there should be no necessity



MOST ANNOYING !—II. When you've left your cigarette case in your hip pocket and you've got your sidcot on.

to further link up bureaucracy with the future. Or, happy thought, as that criminal, the capitalist, is to be wiped out and done without, could there be a more opportune moment for the advocates of his annihilation proving his uselessness, by starting the factory upon their own. Think it over.

- - -

It was certainly a somewhat drastic method of spoiling an extremist's meeting recently in Cairo, when an aeroplane crashed into a private house, where a demonstration was in course of gathering. It is not surprising to hear that the "demonstrators" scurried in all directions, and that, for the time, at least, all effective demonstration was done in.

- - -

Lord Sydenham is always worthy of respect and attention in the views he expresses. Particularly is this so in the case of matters pertaining to Air policy. In his remarks upon the present burning question of a *real* independent Air Service, he has endeavoured to define the fundamental issue at stake. "Fleets and armies," he writes, "need attached aircraft, which are now essential to their operations. If the Admiralty and War Office proceed to build up separate air services, the essential homogeneity of an Air Force will be destroyed. Its problems will not be dealt with as a whole, and its scientific progress will certainly be arrested. But this is not all. Air force now means something infinitely greater than an arm auxiliary to the other combatant organisations. It is a most powerful independent fighting service, capable in some conditions of deciding a war by its own unaided action, of carrying out vastly important offensive operations without assistance, and, on the other hand, of providing the most effective defence against an enemy's air attacks. The Air Force which we possessed in the later stages of the War could have done more than was accomplished if its offensive power had been turned to the fullest account. It has a psychology of its own, and it will never reach the full measure of achievement unless it develops a distinct air policy and is trained in peace and directed in war by flying men. . . . Opinions will doubtless settle down on sane lines; but any mistake in handling air policy will endanger the future security of the Empire."

- - -

This week there should be *some* enlightenment with Lord Montagu in the Lords and Gen. Seely and Lord Hugh Cecil in the Commons on the war-path upon the subject.

An Order of the Army Council and the Air Council just issued provides that officers and airmen of the Royal Air Force acting with the military forces under or within the Command of the General Officer Commanding-in-Chief the British Army of the Rhine shall in all respects be subject to the Army Act while on active service as if they were officers and airmen attached to the Army.

But surely this has been the position all through? It is the crux of the proper working of the Air Service as a separate unit.

- - -

Is it a case of Cause and Effect that the Ironmongers' Hall in Fenchurch Street, which was partially destroyed in an air raid in July, 1917, has been sold to a firm of coal merchants? At least the raiding may well have served as a plausible excuse for thus passing on the site at the present hugely enhanced value—in paper money—obtainable for any old thing.

- - -

Here in any case we have a definite "cause and effect" example:

Datta Khel, November 19.—The recalcitrant Kazha section of the Madda Khel Waziris had occasion today to realise the inflexibility of the British terms. At eight o'clock no reply had been received to the 24 hours' ultimatum, and within half an hour 17 aeroplanes were flying over Ismail Khel with a full complement of bombs. They unloaded four tons on the recalcitrant tribesmen. The airmen descended to 300 ft., and, according to evidence received, the villages were left mere heaps of dust.

A few chiefs who were detained at Datta Khel were visibly impressed by the sight of the aeroplanes passing over to Ismail Khel. One truculent chief, who spoke boldly and almost insolently to Major-General Skeen yesterday, deeming the threat of aeroplanes idle, was seen wringing his hands as the sound of bombs came over the hills.

The bombing operations against the Waziris have been so successful that further operations will probably be unnecessary, though the column may march through the Wazir country in order to impress the tribesmen.

- - -

It should be noted that, since the despatch of the above message, which was delayed ten days in transmission, the submission of the Waziris has been announced.

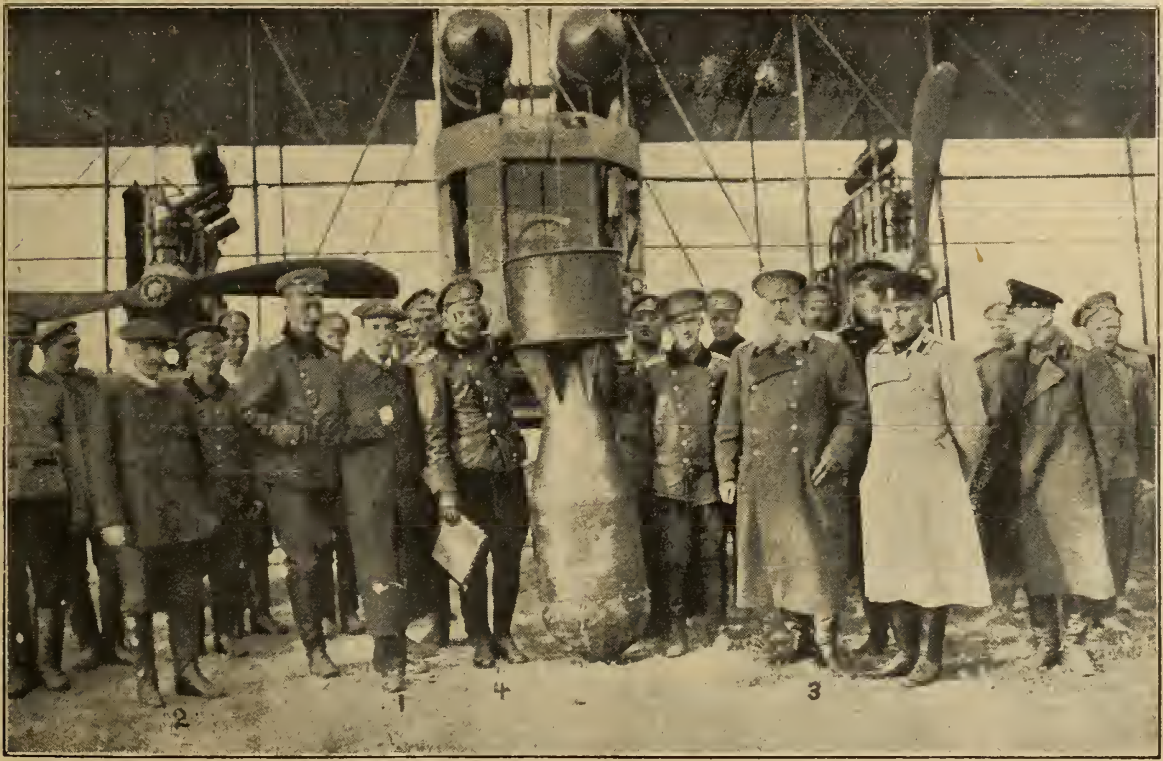
"Flight" Copyright

Homing at Dusk—the last flight of the day, on an Avro waterplane off Brighton

"Flight" Copyright.

Looping the loop, Norwich way, on the big Boulton and Paul machine

In the announcement by the M.O.M., without any reference to the owner, of the sale of Turnhouse, the big aerodrome about two miles from the Forth Bridge, is to be found what looks like an uncommonly ugly example of bureaucracy run mad. No wonder Lord Rosebery, the freeholder, waxes sarcastic in a letter to the *Scotsman*, thus: "I have been furnished with an advertisement, probably from your columns, of the sale of Turnhouse Farm, under the direction of the Ministry of Munitions. I cannot help being surprised at this, because I am under the impression that the farm belongs to me and not to that Ministry. At first sight this might seem to be due to the adoption of Irish methods by our Ministers, but I do not wish to exaggerate, and I do not think this is due to lawlessness, but simply to gross carelessness, arising, I believe, from the fact that the Government during the War have so abridged the rights of individuals



A 1,000-lb. bomb in front of a Sikorsky biplane that its numberless Departments have come to the conclusion that these no longer exist."

* * *

It may be carelessness or deliberate annexation, but Lord Rosebery will be fortunate if he reaps any benefit from the transaction in any case, judging by other cases of "grace" which have been so dis"grace"fully prevalent under bureaucracy. This object-lesson and the case put forward by Mr. Tankerville Chamberlayne of the outrageous treatment in connection with property of his at Southampton should once more focus attention on the absolute necessity for the immediate abolition of the temporary power placed—or misplaced—in the hands of a gang of inefficient swankers.

* * *

Where the astute man of business comes in at the expense of the public war-purse is well exemplified in a suggestion of Mr. Calder at a meeting of the Council of the English Forestry Association, held the other day at the Surveyors' Institution, when the question was discussed of encouraging the use of home-grown timber in view of the large increase in the price of foreign product and its probable effect upon the finance of the Government's housing scheme. The point was how to fill orders, which the President of the Association said were coming along requiring seasoned oak and other timber. Had the Timber Supplies Department drying facilities of which those outside could avail themselves of? he asked. Mr. Calder, in saying the drying could be arranged for, offered the further information that "the drying kilns of the Air Board and the M.O.M. were to be obtained at practically scrap prices." So far good, but now, from the taxpayers' point of view, what we do not quite understand is who was looking after the said taxpayers' interests, having regard to the fact that Mr. Calder is described in the report of the meeting as "Chief of the Disposal Board of the Timber Supplies Department."

* * *

From Sandwich comes a story of a forgotten anti-aircraft station. Golfers in this seaside town, writes a *Times* correspondent, "have been astonished to find an anti-aircraft station stIll in being in spite of the fact that a fortnight has elapsed since the celebration of the first anniversary of the Armistice. The station, which is known as the 45th Anti-aircraft Station, is situated in the Haven, and is connected with another station in Sandwich Bay. The station is in charge of a sergant and one other rank, and every other day a R.A.S.C. lorry visits the spot with rations of fresh meat and vegetables.

"It is true that parts of the guns at the two batteries have been removed, but one gets the impression that with the exception of the fact that rations are regularly delivered, the stations and men have been forgotten by the authorities. The men seem to have no work of importance to do except to look after a few stores."

A Reminiscence of the Flying Meetings at Hendon: The one-stringed violinist under the railway arch

* * *

Wonder if there are many more forgotten depôts about like this one. At the same time, it must be remembered that certain anti-aircraft stations should be kept in activity for all time, if merely as training centres. When the great air-war does arrive, "Anti's" should be as common as milestones, if we haven't all become cave dwellers by that time.

* * *

Upon aerial post issues Mr. F. J. Melville writes in the *Telegraph*: "A number of new aerial post stamps are to hand this week, including the first air-mail stamps from Japan. These are two of the current ordinary postage stamps of that country, the 1½-sen blue and the 3-sen red, on each of which is overprinted a small outline of a biplane. These were issued on October 3 in readiness for the first flights of an experimental air service between Tokyo and Osaka, a distance of about 290 miles by air. The stamps were only to be valid for one month, and the total quantity of the two stamps issued is stated not to exceed 40,000. They were only placed on sale at first and second class post offices in Tokyo and Osaka, but the entire issue was sold out within an hour or two.

"With reference to the mail service, this was to have started on October 4, and prizes were offered in connection with the flights for the quickest successful round trip. But unfortunately the weather on the 4th was not favourable, and on the following day it was worse, so the flight was postponed, and the first 'air mail" was forwarded to the destination by rail. My Tokyo correspondent tells me that it was intended to renew the project about October 20. Although the original flight had to be abandoned, the stamps are likely to be keenly sought after as souvenirs of the introduction of air mails in the Far East. It seems possible that, as all the first edition of these air stamps had been sold out on October 3, a new issue may have been prepared for the re-trial later in the month.

"Two quaint and rather crude air-mail stamps have just been issued in Germany. They are of very modest denominations, 10-pfennig orange and 40-pfennig green, but I have no particulars of the service in connection with which they are used. The stamps are inscribed 'Deutsche Flugpost' (German Flying Post). On the 10-pfennig the design is a winged posthorn and on the 40-pfennig is an aeroplane in flight."

* * *

It's an ill wind that blows nobody a bit of good. And so James Parkin, of Bloemfontein, is one of the few who can claim aeroplane bombing as befriending them. Parkins, it appears, enlisted at Capetown in 1916 and later in France was sentenced to death for desertion on the battlefield. Sentence was commuted to five years' penal servitude, and while an escort taking Parkin to prison was waiting at a railway station in Northern France the station was bombed by a German aeroplane. Two men in charge of Parkin and many others were killed outright, and it was at first thought that he had shared their fate. As a fact, though, he escaped, but the shock had evidently done *him* no moral good, as he promptly set to work and robbed a sleeping soldier at a hostel of Treasury notes and papers, and followed it up by all sorts of other crimes and frauds. These particulars of Parkin's career transpired last week at Westminster Police Court, where he explained how he had mistaken another man's bicycle for his own. Another shock followed in the form of "six months' hard."

* * *

Wells Cathedral is the latest to come into line with the vellum book containing the name, rank and cause of the casualty of every Somerset soldier, sailor and airman who lost his life in the war.

* * *

Somehow football gatherings always carry with them just a "sma' wee" suggestion of the rough element—irrespective of the gentle art itself. The mystery is possibly explained by the following little paragraph of a police court report in the Midlands. It is only right that there should be *some* "place" available where in these days of profiteering and other pastimes man should be able to let off a little excess exhaust steam without incurring, etc., etc. Here's the little par. in question:—

"In a case at Nottingham where a man was charged with using highly objectionable language the magistrate held that a football field was not a public place within the Act and dismissed the summons."

THE ROYAL AIR FORCE

London Gazette, November 21

Technical Branch

Flying Officers to be Flying Officers, Grade (B.), from (S.O.) :—J. L. Denman ; Oct. 18. E. H. Eldridge ; Nov. 7 (substituted for notification in *Gazette* Nov. 18).

Sec. Lieuts. to be Lieuts. :—R. B. Dormer ; April 2, 1918. W. H. Hoile ; Jan. 12 (substituted for notification in *Gazette* July 29).

Pilot Officers to be Flying Officers, without pay and allowances of that rank :—G. N. Coward, P. FitzPatrick ; Oct. 1.

Sec. Lieut. J. C. Howard (Sec. Lieut., Lab. Corps.) relinquishes his commn. on ceasing to be employed ; Jan. 21.

(Then follow the names of 43 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. (Hon. Lieut.) F. M. V. Earle relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; June 25 (substituted for notification in *Gazette* Feb. 28).

Sec. Lieut. W. G. Shipwright relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; Nov. 14.

The initials of Lieut. G. G. Bailey, D.F.C., are as now described, and not G. C., as stated in *Gazette* Oct. 24.

The initials of Sec. Lieut. E. F. Thorpe are as now described and not "E. J.," as stated in *Gazette* of Sept. 12.

The notification in *Gazette* of Sept. 26 concerning A. Clayton is cancelled.

Medical Branch

(Three officers transfd. to Unemployed List.)

Dental Branch

(One officer transfd. to Unemployed List.)

Memorandum

The following Prob. Flight Officers are granted hon. commns. as Sec. Lieuts. :—K. N. Knapp ; Jan. 21. R. S. Hudson ; Jan. 26.

(Then follow the names of three cadets granted hon. commns. as Sec. Lieuts.)

The following Temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed :—R. W. Everett, M.B.E. ; July 31. (Hon. Capt.) F. Fairbrother ; Aug. 31. W. R. H. Arnold, J. H. Ekins, F. W. Jecock, H. R. Knight, A. McIsaac, S. J. Norton, R. A. Pomphrett, A. R. Woods ; Sept. 16.

(One officer transfd. to the Unemployed List.)

London Gazette, November 25

Flight-Lieut. D. F. Massy (T.) is granted a permanent commn. in the rank stated, with effect from Aug. 1.

The notification in *Gazette* Aug. 1 appointing Lieut. R. S. Sorley, D.S.C. (A.) to a permanent commn. is cancelled.

The notification in the *Gazette* of Oct. 28, appointing the following officers to permanent commns. is cancelled :—Sqdn. Ldr. M. E. A. Wright (A.P. (T.)) ; Flying Officer J. L. Findlay, M.C. (A).

Flying Branch

Capt. G. M. Turnbull, A.F.C., is graded for purposes of pay and allowances as Maj. whilst employed as Maj. (A), from May 1 to June 30.

Capt. W. Lambert is graded for purposes of pay and allowances as Maj. whilst employed as Maj. (K.B.), from May 1 to July 9.

Sec. Lieuts. to be Lieuts. :—H. R. Watterson ; May 1, 1918 (since demobilised) ; T. H. Langrishe ; May 10, 1918. W. M. Brewer ; Jan. 7. G. S. Smith ; March 26. R. C. Morris ; June 6 (since demobilised).

The following relinquish their commns. on ceasing to be employed :—Lieut. T. N. Robinson (Lieut., R. Art.) ; Feb. 11. Lieut. J. F. Gillam (Lieut., R.G.A.) ; Aug. 20. Sec. Lieut. (Hon. Capt.) C. J. P. Copner (Capt., S. Wales Bord.) ; Nov. 1. Capt. G. T. Porter (Capt., R.G.A.) ; Sec. Lieut. (Hon. Lieut.) H. A. Deakin (Lieut., S. Staffs. R.) ; Nov. 3. Lieut. F. L. Harding (Lieut., Som. L.I.) ; Nov. 4. Lieut. S. D. Lavelle (Lieut., Manch. R.) ; Nov. 7. Maj. T. K. Elmsley (Lieut.-Comdr. R.N.) ; Nov. 8. Sec. Lieut. (Hon. Lieut.) C. W. F. Busk (Lieut., R.E.) ; Nov. 12.

(Then follow the names of 139 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health caused by wounds, and are permitted to retain their rank :—F. H. Hall ; June 25 (substituted for notification in *Gazette* of Dec. 20, 1918). E. G. Weller ; Nov. 15. C. B. Bateman, J. J. Hickey ; Nov. 19.

The following Sec. Lieuts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank :—E. L. Allanson, C. B. Smith ; Nov. 18. R. I. Jenkinson ; Nov. 19.

The surname of W. F. Grainger is as now described, and not "Granger." as stated in *Gazette* of Oct. 3.

The surname of Sec. Lieut. J. E. Quin is as now described, and not "Quinn," as stated in *Gazette* of Dec. 10, 1918.

The notification in *Gazette* of Feb. 28 concerning Lieut. G. R. Smith (Can. M.G.C.) is cancelled.

The notification in *Gazette* of April 1 concerning Lieut. T. N. Robinson is cancelled.

The notification in *Gazette* of Oct. 28 concerning Lieut. R. Jones is cancelled.

The notification in *Gazette* of Nov. 4 concerning Lieut. E. B. Jones is cancelled.

Administrative Branch

Flying Officer J. M. Dandy to be Flying Officer from (A.) ; Sept. 1 (substituted for notification in *Gazette* of Oct. 3).

Lieut. (Hon. Capt.) A. A. J. Poole to be Lieut. (Hon. Capt.) ("A. and S.") ; Jan. 6 (substituted for notification in *Gazette* of April 4).

Pilot Officer G. E. Pyne to be Flying Officer ; Nov. 10.

The following relinquish their commns. on ceasing to be employed :—Sec. Lieut. E. G. Masson (Lieut., Military Accountant Officer) ; June 12. Lieut. (Hon. Capt.) E. V. Tarrant, D.C.M. (Qrmr. and Capt., Hamp. R.) ; Sept. 25. Sec. Lieut. J. E. Slattery (Sec. Lieut., Lan. Fus.) ; Nov. 8. Sec. Lieut. F. C. Peacock, M.C. (Lieut., R.F.A.) ; Nov. 10. Lieut. A. S. Dark (Lieut., half-pay list) ; Nov. 17.

(Then follow the names of 37 officers who are transfd. to the Unemployed List under various dates.)

The following Capts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank :—A. D. Dawson (Capt., R.F.A., T.F.) ; Nov. 13. G. M. Gordon ; Nov. 19.

Lieut. M. Tarbet relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank ; Nov. 18.

The notification in *Gazette* Nov. 14 concerning Capt. G. A. Revington (Lieut., R.N.) is cancelled.

The notification in *Gazette* July 2, 1918, concerning Sec. Lieut. (Hon. Lieut.) J. W. Harling is cancelled.

The notification in *Gazette* Oct. 21 concerning Lieut. R. W. Dogherty is cancelled.

Technical Branch

Sec. Lieut. H. L. Bown is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (A.) ; May 1.

Sec. Lieuts. to be Lieuts. :—M. A. Doyle ; April 2, 1918 (substituted for notification in *Gazette* March 7) ; H. T. H. Copeland ; March 4 (substituted for notification in *Gazette* July 29).

Sec. Lieut. (Hon. Lieut.) R. O. C. Bush to be Lieut. ; April 2, 1918, without the pay and allowances of that rank prior to Aug. 20, 1918.

Pilot Officer R. West to be Flying Officer, without the pay and allowances of that rank ; Oct. 1.

Sec. Lieut. H. M. Lonsdale to be Sec. Lieut. (Grade B), from (Ad.) ; July 13, 1918.

Capt. H. W. M. Paul, O.B.E., M.C. (Capt., Midd'x R.), relinquishes his commn. on ceasing to be employed ; Nov. 1 (substituted for notification in *Gazette* Nov. 7).

Maj. S. Lambert is temporarily transfd. to Unemployed List ; May 17 to June 3).

(Then follow the names of 43 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank :—H. G. Cooper ; Nov. 14. J. R. Hovenden, L. F. Jones ; Nov. 19.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—J. S. Forde ; Sept. 30 (substituted for notification in *Gazette* Sept. 30). (Hon. Lieut.) C. D. Jackman (Lieut., Norf. R.), contracted on active service ; Nov. 11. J. D. Graham ; Nov. 19.

The surname of Flight-Lieut. (actg. Sqdn. Ldr.) J. Curtis Watson is as now described, and not "J. Curtis," as stated in *Gazette* Nov. 7.

The initial of Sec. Lieut. F. Woombell is as now described, and not "A.," as stated in *Gazette* May 27.

The notification in *Gazette* May 27 concerning Sec. Lieut. H. L. Brown is cancelled.

Medical Branch

Transferred to the Unemployed List.—Capt. M. J. Whelton ; Nov. 5. Capt. A. W. Weston ; Nov. 9.

Dental Branch

Transferred to the Unemployed List.—Lieut. G. O. Roper ; Feb. 19 (substituted for notification in *Gazette* July 1, wherein this officer was shown under Medical Branch) ; Capt. F. R. McCambley ; Oct. 25. Lieut. N. A. Goudge ; Nov. 11.

Memoranda

The following Temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed :—H. J. Foxell, L. J. Hill, A. W. Holden, R. Ross ; Sept. 16. (Hon. Capt.) G. R. Groves ; Oct. 16. D. M. Anderson ; Nov. 8.

The following relinquish their commns. on ceasing to be employed :—Maj. C. S. McNabb (Capt., Cam'n. Highrs.) ; Capt. T. E. Withington, A.F.C. (Capt., Oxf. and Bucks. L.I.) ; Nov. 10.

(Then follow the names of 7 officers who are transfd. to the Unemployed List under various dates.)

The notification in the *Gazette* of July 25 concerning Prob. Flight Officer W. E. W. Holder is cancelled.

The notification in the *Gazette* of Sept. 23 concerning Sec. Lieut. R. D. McEwen Hart is cancelled.

London Gazette, November 28

The following officers have been granted short service commns. in the ranks stated, with effect from Nov. 28 (except where otherwise stated). They will retain their seniority in the substantive rank last held by them prior to the grant of the short service commn, except that officers gazetted to a rank lower than their previous substantive rank will be placed at the head of the list of officers of the rank to which they are now gazetted, and will retain seniority relative to each other in accordance with their previous position on the gradation list.

In the case of officers now gazetted Flying Officer from Pilot Officer, seniority will date from the date of the *Gazette*.

Squadron Leader.—J. W. Cordingley, O.B.E. (S.O.).

Flight Lieutenants.—G. M. Boumphrey (A.), H. H. Clarke (S.O.), E. S. Goodwin, A.F.C. (S.), R. A. W. de H. Haig (A.), L. V. Hirst (A.), A. J. Nightingale (A.), H. L. Nunn, D.S.C., D.F.C. (S.), R. L. Stephenson-Peach, M.B.E. (T.).

Flying Officers (from Flight Lieutenants).—R. S. Sorley, D.S.C. (A.) (with effect from Nov. 27) ; W. V. Simons (S.).

Flying Officers.—D. P. Cameron, M.B.E. (A.), O. W. Clapp (T.), L. A. W. Deane (A.), J. L. Findlay, M.C. (A.), B. Holding (A.), W. R. Rogers (Ad.), E. A. Scales (Ad.).

Observer Officer.—J. S. C. Robinson.

Flying Officers (from Pilot Officers).—A. W. C. Bayes (A.), S. McKeever (A.), G. H. Winckworth (T.).

The notifications appearing in *Gazettes* of the dates indicated below, appointing the following officers to short service commns., are cancelled :—Flight-Lieut. B. E. Catchpole, R.C., D.F.C. (A.), Flying Officer G. A. F. Gibson (T.) ; Sept. 16. Flight-Lieut. E. F. Turner (T.), Flying Officer R. Clowes (A.), Flying Officer A. G. Lamplugh (A.), Flying Officer W. E. Lowrie (T.), Flying Officer J. Owen, D.F.C., M.M. (A.), Flying Officer J. W. Pinder, D.F.C. (A.), Flying Officer A. R. Thompson (T.) ; Oct. 24. Flight-Lieut. B. D. Hobbs, D.S.O., D.S.C. (S.) ; Nov. 11.

The surname of Flying Officer A. C. Townend, A.F.C. (A.), is as now described, not "Townsend," as stated in *Gazette* of Oct. 24.

Sqdn. Ldr. J. C. M. Lowe (T.) is granted a short service commn. with effect from Aug. 1, not Nov. 11, as stated in *Gazette* of the latter date (amended by *Gazette* of Nov. 14).

Flying Officer L. Hamilton, D.F.C. (A.) relinquishes his temp. and short service commn. at his own request ; Nov. 28.

Permanent Commissions

The following promotions are made :—

Group Captains.—Wing Comdr. R. Gordon, C.M.G., D.S.O., Wing Comdr. F. V. Holt, C.M.G., D.S.O. ; Nov. 1.

Wing Commanders.—Sqdn. Ldr. L. A. Strange, D.S.O., M.C., D.F.C., Sqdn. Ldr. A. S. Barratt, C.M.G., M.C., Sqdn. Ldr. J. R. W. Smyth-Pigott, D.S.O., Sqdn. Ldr. L. L. Greig, M.V.O., Sqdn. Ldr. A. H. W. E. Wynn, O.B.E., Sqdn. Ldr. G. P. Grenfell, D.S.O. ; Nov. 1.

Squadron Leaders.—Flight Lieutenant A. A. B. Thompson, M.C., A.F.C. (Ad.) Flight-Lieut. W. Thomas, M.C. (T.), Flight-Lieut. W. G. P. Young, O.B.E

(S.O.), Flight-Lieut. R. G. Parry, D.S.O. (S.O.), Flight-Lieut. H. L. Reilly, D.S.O. (A.), Flight-Lieut. C. C. Darley (A.), Flight-Lieut. G. G. H. Cooke, D.F.C., A.F.C. (A'ship), Flight-Lieut. H. R. H. Prince Albert, K.G. (A.), Flight-Lieut. G. S. M. Insall, V.C. (A.); Nov. 1.

Flight Lieutenants.—Flying Officer F. Fowler, D.S.C., A.F.C. (S.), Flying Officer J. H. Norton, M.C., D.F.C. (A.), Flying Officer W. B. Farrington, D.S.O. (A.), Flying Officer J. F. Lawson, A.F.C. (A.), Flying Officer V. S. E. Lindop (A.), Flying Officer E. J. D. Townesend (S.O.), Flying Officer R. S. Capon (A.), Flying Officer W. H. Longton, D.F.C., A.F.C. (A.), Flying Officer J. S. Goggin (S.O.), Flying Officer F. M. F. West, V.C., M.C. (A.), Flying Officer R. Halley, D.F.C. (A.), Flying Officer C. J. Brockbank, M.B.E. (T.), Flying Officer A. W. Beauchamp-Proctor, V.C., D.S.O., M.C., D.F.C. (A.), Flying Officer A. Rowan (S.O.), Flying Officer W. H. Ellison (T.); Nov. 1.

The following temporary appointments are made at the Air Ministry:—

Staff Officer, 1st Class (Q.).—Maj. A. L. C. Neame; March 19 (substituted for notification in *Gazette* June 3),

Staff Officer, 3rd Class (P.).—Flight-Lieut. W. D. Budgen, O.B.E., from (S.O., 2nd Class); Oct. 30.

The following temporary appointments are made:—Col. (actg. Brig.-Gen.) H. C. T. Dowding, C.M.G., is graded for purposes of pay and allowances as Maj.-Gen. while officiating in command of an area, from April 5 to 25.

Staff Officer, 1st Class.—Lieut.-Col. (Hon. Col.) J. M. Home, C.B.E., is graded for purposes of pay and allowances as Brig.-Gen. (Admin.), from April 5 to 25.

Staff Officer, 2nd Class (Air).—Sqdn. Ldr. C. E. Maude; Nov. 14.

Staff Officer, 3rd Class (T.).—Graded for pay at Air Ministry Rates.—Flight-Lieut. T. W. Elmhirst, A.F.C.; Aug. 1.

Flying Branch

Wing Comdr. G. W. P. Dawes, D.S.O., to be Wing Comdr. (A.), from Group Comdr.; Oct. 18.

Sqdn. Ldr. C. E. Maude to be Sqdn. Ldr. (A. and S.), from (S.O.); Oct. 16.

Flight-Lieut. N. H. Bottomley, A.F.C., to be Flight-Lieut. (A.), from (S.O.); Oct. 18.

Capt. J. C. Croft is graded for purposes of pay and allowances as Capt. while employed as Capt. (A.), from May 1 to Sept. 15.

Lieut. (actg. Capt.) J. C. Cantrill to be Lieut. (actg. Capt.) (A.), from (Ad.); July 26.

Second Lieutenants to be Lieutenants:—J. L. Fletcher, D. Martin; Nov. 30, 1918. C. S. Cope; June 13.

Pilot Officer C. F. Kearns to be Flying Officer; Oct. 1.

The following relinquish their temp. R.A.F. commns on return to Army duty:—Pilot Officer E. M. Matthew (Lieut., R.G.A.); Oct. 13. Flying Officer C. R. H. Firth (Lieut., R.G.A.); Oct. 22. Flying Officer L. H. Forrest (Lieut., Indian Army); Oct. 23. Flying Officer A. G. Grant (Lieut., High. L.I.), Flight-Lieut. L. H. T. Sloan (Capt., Cameron Highrs.; Nov. 7. Flying Officer L. M. S. Essell (Lieut., E. Kent R.); Nov. 8. Flying Officer W. G. B. McKechnie (Lieut., R. Scots Fus.); Nov. 11.

Sqdn. Ldr. the Hon. R. Coke, A.F.C. (Lieut.-Comdr., R.N.), relinquishes his temp. R.A.F. commn. on return to Naval duties; Nov. 8.

Sec. Lieut. E. K. Dashwood relinquishes his commn. on ceasing to be employed; Nov. 4.

(Then follow the names of 105 officers who are transfd. to the Unemployed List under various dates.)

Capt. E. W. Leggatt, M.C. (Lieut., Wilts. R.), resigns his commn., and is permitted to retain his rank; Nov. 29.

The following Lieuts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank:—H. Booth; Nov. 20. D. Barnett, C. K. Mills; Nov. 21.

Lieut. A. Kiteley (Lieut., R.A.) relinquishes his commn. on account of ill-health caused by wounds); Nov. 15.

Lieut. H. T. J. Hynes (Lieut., R.G.A.) resigns his commn.; Nov. 29.

The following Sec. Lieuts. relinquish their commns on account of ill-health caused by wounds, and are permitted to retain their rank:—R. A. Clarke; Oct. 14. G H. Carr; Nov. 15. J. Turnbull; Nov. 20.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—E. O. Korner; Nov. 20. W. H. Cox; Nov. 21. R. Lazzari (contracted on active service); Nov. 22.

Sec. Lieut. K. B. Terry resigns his commn.; Nov. 29.

Sec. Lieut. W. A. Grant is antedated in his appointment as Sec. Lieut (A. and S.) to June 28, 1918.

The surname of Lieut. R. S. Buller is as now described, and not "R. S. Butler," as stated in *Gazette* of Oct. 24.

The notification in *Gazette* of Aug. 29 concerning Sec. Lieut. W. Emery is cancelled (notification in July 4 *Gazette* to stand).

The notification in *Gazette* of Sept. 2 concerning Sec. Lieut. C. F. Williams is cancelled.

The notification in *Gazette* of Oct. 3 concerning Lieut. W. R. Eastman is cancelled (notification in Aug. 5 *Gazette* to stand).

The notification in *Gazette* of Nov. 11 concerning Sec. Lieut. J. F. M. Phillips is cancelled.

The notification in *Gazette* of Nov. 21 concerning Sec. Lieut. E. K. Dashwood is cancelled.

Administrative Branch

Maj. (actg. Lieut.-Col.) R. J. F. Barton, O.B.E., relinquishes the actg. rank of Lieut.-Col. on ceasing to be employed as Lieut.-Col., from (S.O.); March 3 (substituted for notification in *Gazette* of Nov. 7).

Flight-Lieut. G. T. Tait to be Flight-Lieut., from (S.O.); Aug. 8.

Flight-Lieut. A. H. Strading to be Flight-Lieut., from (S.O.); Oct. 20.

The following Lieuts. are graded for purposes of pay and allowances as Capts., whilst employed as Capts.:—A. Webb; May 1 to July 25. (Hon. Capt.) G. H. Hill; June 28 to Sept. 26.

Flying Officer (actg. Flight-Lieut.) J. C. Cantrill relinquishes the actg. rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut., from (A.); Aug. 29.

Pilot Officer F. W. Sinclair to be Flying Officer; Aug. 21.

J. M. Andrews is granted a temp. commn. as Sec. Lieut.; Oct. 25, 1918.

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Flying Officer E. King (Lieut., R. Ir. Regt.); Oct. 6. Flying Officer (Hon. Flight-Lieut.) A. E. Miller, M.C. (Capt. W. Rid. R.); Nov. 15.

(Then follow the names of 20 officers who are transfd. to the Unemployed List under various dates.)

The notification in *Gazette* of Oct. 24 concerning Sec. Lieut. A. H. Black is cancelled.

The notification in *Gazette* of Sept. 26 concerning Flying Officer J. C. Cantrill is cancelled.

The notification in *Gazette* of Nov. 18 concerning Sec. Lieut. C. O. D. Kidd is cancelled.

Technical Branch

Flight-Lieut. (actg. Sqdn. Ldr.) J. C. Watson relinquishes the actg. rank of Sqdn. Ldr. on ceasing to be employed as Sqdn. Ldr., Grade (B.); Oct. 22 (substituted for notification in *Gazette* of Nov. 7).

Lieut. L. F. Peaty is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (A.) (from May 1 to July 25).

Lieut. J. W. Gardener to be Lieut., Grade (A.), from (Ad.), and is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (A.); May 20.

Lieut. S. D. Carpenter to be Lieut., Grade (B.), from (A.); Nov. 18, 1918 (substituted for notification in *Gazette* of Dec. 24, 1918).

Flying Officer J. W. Gardner relinquishes the grading for pay and allowances as Flight-Lieut. on ceasing to be employed as Flight-Lieut., Grade (A.); Oct. 11.

Second Lieutenants to be Lieutenants.—J. K. Shrimpton; Oct. 13, 1918, without the pay and allowances of that rank prior to Dec. 1, 1918 (substituted for notification in *Gazette* of April 11 and May 23); J. B. Donald; Feb. 24. F. Denham; March 13 (substituted for notification in *Gazette* of Sept. 19). E. R. Beckwith; April 2, 1918, without the pay and allowances of that rank prior to March 15. W. J. Maley; June 22.

Pilot Officers to be Flying Officers.:—F. A. Cherry, J. Turner, W. Wheatley; Oct. 1.

Pilot Officers to be Flying Officers without the pay and allowances of that rank:—F. H. Cashmore, S. A. Conway, C. Dollery, T. F. Emms, D. Y. Mattinson; Oct. 1.

Capt. T. Goulhourn relinquishes his commn. on ceasing to be employed; Nov. 6.

(Then follow the names of 40 officers who are transfd. to the Unemployed List under various dates.)

The notification in *Gazette* of Sept. 23 concerning Pilot Officer A. Robinson is cancelled.

The notifications in the *Gazettes* of Aug. 5, Sept. 16, and Oct. 24 concerning Flying Officer J. W. Gardiner are cancelled.

The notification in the *Gazette* of July 15 concerning Lieut. C. H. Knight is cancelled.

Medical Branch

Capt. (Bt.-Maj.) F. C. Cowtan, R.A.M.C., is granted a temp. commn. as Sqdn. Ldr. on seconding to the R.A.F.; Sept. 1.

Flying Officers to be Flight Lieutenants:—S. E. Duff; Aug. 27. A. Parker; Oct. 5. T. D. J. A. Fuller; Oct. 17. E. T. McElligott; Nov. 4. D. C. Farquharson; Nov. 14. J. T. T. Forbes; Nov. 15. J. W. Healy; Nov. 18. M. J. Smyth; Nov. 20.

Capt. C. T. Costello relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Nov. 21.

Dental Branch

Flying Officers to be Flight Lieutenants:—N. A. Goudge; Oct. 8. W. Inman; Oct. 25. L. S. Kettlewell; Oct. 31. W. J. Singleton, J. Smith; Nov. 11. J. Jones, J. Wren; Nov. 15.

Memoranda

(Then follow the names of two cadets granted temp. commns. and five cadets granted hon. commns.).

Capt. T. E. Longridge, O.B.E. (Capt., R.A.S.C.) relinquishes his temp. R.A.F. commn. on return to Army duty; Nov. 6.

The following temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed:—F. Dawson, R. G. Underwood; Sept. 16.

(Then folow the names of four officers who are transfd. to the Unemployed List under various dates.)

Hon. Sec. Lieut. F. Smith relinquishes his hon. commn.; May 1.

Capt. G. H. A. Hawkins (Capt., Manch. R., T.F.) relinquishes his commn. on account of ill-health caused by wounds, and is granted the rank of Maj.; Nov. 17.

* * *

Air Policy in U.S.

THE United States Secretary of War recently announced upon the recommendation of the Joint Army and Navy Board on Aeronautics, that the following policy in regard to the use of aircraft by the American naval and military forces had been approved by him and by the Secretary of the Navy, and was therefore published for the information and guidance of all concerned:—

1. Aircraft operated in conjunction with either military or naval forces shall be military or naval aircraft, respectively, and under the command of the respective military or naval commanders.

2. Both the Army and Navy shall confine the use of their aircraft to activities clearly connected with strictly military or naval functions as such are defined by existing laws and agreements.

3. To prevent duplication, and secure co-ordination, plans of new projects for the construction of aircraft, for experimental stations, for coastal operating stations, or for extensive additions thereto, shall be submitted to the Joint Army and Navy Board on Aeronautics for recommendations.

4. In the interests of economy, heavier-than-air craft shall be used instead of lighter-than-air craft whenever the former can perform satisfactorily the required work.

5. Whenever possible, training and other facilities of either Service shall be made available for, and used by, the other.

6. Each Service before entering the market shall attempt to secure aircraft of the type desired from or through the other Service.

7. As soon as any experimentation is inaugurated, all information pertaining thereto shall be exchanged between the Army and Navy Air Services.

8. All estimates for the Army and Navy programmes shall be presented to the Joint Army and Navy Board on Aeronautics for review and recommendation before submission to Congress.

9. Functions of Aircraft.—(*a*) Army: For offensive and defensive work in the field in conjunction with the various arms of the Service. For general purposes of fire-control and fire-control information in connection with the coast defence. (*b*) Navy: For use from coastal stations for convoy, reconnaissance, and patrol. For use from war vessels, bases, and carriers for reconnaissance and spotting, and for offensive operation against enemy vessels and naval bases.

Personals

Roll of Honour

The War Office announced on November 1 that Lieut. P. C. ELLIS, High. L.I., attd. R.F.C., Sec. Lieut. D. M. PAGE, R.F.C., and Lieut. E. H. P. STREATHER, R.F.C., who were previously reported missing, are now reported killed.

THE War Office announced on November 27 that Sec. Lieut. S. E. Raper, Seaf. Highlanders, attd. R.F.C., who was previously reported missing, is now reported killed.

Married

NORMAN WREFORD BIRKETT, late 6th Batt., The Buffs, and R.A.F., son of Mr. and Mrs. Louis Birkett, of Chislehurst, was married on November 25, at St. Stephen's Church, Ealing, to KATHLEEN WELLS, late W.R.A.F., daughter of Mr. C. W. Wells, of Ealing.

Flight-Lieut. ROBERT JOHN ORTON COMPSTON, D.S.C., D.F.C., R.A.F., was married on November 25, at St. Simon's Church, Chelsea, to NINA MABEL, only child of the late Capt. A. H. BARCLAY and adopted daughter of Lieut.-Col. H. F. Barclay, 34, Lennox Gardens.

Capt. A. H. E. LINDOP, M.C. and Bar, 37th Dogras, Indian Army, attd. R.A.F., elder son of Lieut.-Col. A. H. Lindop, late Royal Dublin Fusiliers, was married on November 29, at Westminster Cathedral, to Miss IVY GERTRUDE LEVASSEUR, elder daughter of Mr. E. Levasseur, of Frinton, Pinner.

Air-Commdr. T. I. WEBB-BOWEN, R.A.F., was married on November 27, at Christ Church, Chelsea, to VIOLET LOUISE HADLEY, elder daughter of Mr. and Mrs. C. A. Hadley, of Johannesburg, S. Africa.

Capt. C. B. WILSON, M.C., late Xth Royal Hussars and R.F.C., and Mrs. HUGH ORR-EWING were married on Saturday, November 22.

To be Married

The engagement is announced between Capt. C. C. CLARK, R.F.A. and R.A.F., youngest son of Mr. Henry Clark and the late Mrs. Clark, of 25, Adelaide Crescent, Brighton, and KATHERINE, eldest daughter of Mr. and Mrs. P. HERBERT COATS, of Corsebar, Paisley.

The engagement is announced between Eng.-Lieut.-Commdr. REY GRIFFITH PARRY, D.S.O., R.N. (acting major, R.A.F.), son of the late W. Griffith Parry, formerly of Grosvenor Lodge, Beckenham, and Belgrano, Buenos Aires, and JOAN BRUNNER BUCKLEY, younger daughter of Maj. T. W. Buckley, R.A.M.C., Clopton Manor, Thrapston, and of Mrs. Buckley, The Ridge House, St. George's Hill, Weybridge.

The wedding of Lieut.-Col. RUSCOMBE SMYTH-PIGOTT, D.S.O., R.A.F., and Lady CLARE FEILDING will take place at Newnham Paddox, Lutterworth, on Tuesday, December 30, at 10.30.

Items

On landing at Portsmouth, on December 1, the PRINCE OF WALES was received by the Prince Albert, the Commander-in-Chief, Portsmouth, the General Officer Commanding, Southern Command, and the Air Officer Commanding, Coastal Area, and by the Hon. Sir Sidney Greville (Comptroller of his Household).

The will of Maj. JAMES THOMAS BYFORD McCUDDEN, V.C., D.S.O. (and Bar), M.C. (and Bar), R.F.C., M.M., of Kingston-on-Thames, killed in France accidentally, has been proved at £266.

The will of Maj. EVELYN NEVILLE LEWIS WHITE, R.A.F., of Tintagel, has been proved at £683.

◆ ◆ ◆ ◆

AVIATION IN PARLIAMENT

Civil Aviation

MAJ. GLYN, in the House of Commons, on November 25, asked the Secretary of State for War whether the Government contemplate assisting the industry engaged in civil aviation by any of the suggested methods contained in Section III of the Air Ministry's Synopsis of Progress of Work in the Department of Civil Aviation (Cmd. 418) ?

Capt. Guest (Joint Parliamentary Secretary to the Treasury): Indirect assistance by the provision of key aerodrome and shed accommodation, the collation and issue of information and the provision of communications is being afforded to civil aviation. The question whether any further action is necessary is under consideration.

Royal Air Force : Airship Service

Lieut.-Comdr. KENWORTHY, on November 26, asked the Under-Secretary of State for the Air Ministry how many large rigid airships are now in commission ; how many large rigid airships are under construction ; how many large airship sheds are in use ; and how many have full staffs and crews in attendance for handling airships ; and what is the estimated total cost next year of the Airship Service, rigid and non-rigid, for the Royal Navy ?

Mr. Churchill : The reply to the hon. and gallant gentleman's first question is that there is one large rigid airship (R 34) in commission for the Navy, and that two (R 32 and R 33) are being maintained temporarily, pending a decision as to the most advantageous method of disposing of them.

The reply to the second question is that the construction of R 38 is proceeding under an arrangement for her sale, when completed, to the Government of the United States of America. A certain amount of work is being done on three other ships, pending the issue of negotiations for their use for commercial purposes.

The reply to the third question is that the large airship sheds in use are five in number, at Pulham, East Fortune and Howden. It is intended to retain permanently for service purposes the airship station at Howden with two large sheds. The reply to the fourth question is that none of the airship stations have full staffs and crews.

The reply to the fifth question is that the Estimates for the Airship Service are included in the general Estimates for the Royal Air Force, and that these latter being still under consideration no figure can be given. Even when the Royal Air Force Estimates are passed, it is not intended to show separate estimates for the airship side of the Air Force, because the personnel of the different branches will, to some extent, be interchangeable within the Service.

R.A.F. and Government Policy

MAJ.-GEN. SEELY (by Private Notice) asked the Prime Minister whether the Air Policy of the Government in respect to the Air Ministry is the same as it was on November 14, 1917, when the present Lord Privy Seal stated that the whole of the Air Service must be independent of either the Admiralty or Army Council ; why the Secretary of State for War is now President, both of the Army Council and the Air Council, and whether the Air Council is now ndependent of, or dependent on the president of the Army Council ?

The Prime Minister : I regret that my right hon. friend did not see his way to put notice of this question down on the Paper. Nothing has arisen in the course of the last two days which was not in existence before, and, therefore, notice might have been given. I will, however, do my best to answer, as far as I can, in the short time at my disposal.

It has already been stated that there is no change whatever in the Air Policy of the Government, which remains the same as it was when my right hon. friend accepted the position from which, to my regret, he has recently retired.

Maj.-Gen. Seely : May I ask the Prime Minister how he can say that there is no change in the policy of the Government as announced by the Lord Privy Seal when he said that the Air Ministry must be independent of the Admiralty and the Army Council ; further, will he give an opportunity to this House to express its opinion on a change of policy from a decision which was so strongly endorsed by his own colleagues ?

The Prime Minister : The Army Council has no control whatever over the Air Force—none. It is perfectly independent of the Army Council.

Lord H. Cecil : Not of the President of the Army Council.

The Prime Minister : That is the Secretary of State for War, who holds both positions. That has been done many times in the history of this country, and it is thought desirable in this case. With regard to the latter part of my right hon. friend's question, I have already said, in answer to my noble friend, that if there is a general desire on the part of the House for a discussion of the subject, the Government will find time—[Hon. Members : "No, no!"] —but I would point out that the pressure of business is very great, and we do not wish to allocate time unless there is a general desire on the part of hon. members.

Lord H. Cecil : Will the Prime Minister consider whether a few hours or half a day would not be quite sufficient for this purpose ; has not recent experience shown that there is often half a day at the disposal of the Government, if they cannot promise a whole day, and could we not have a friendly arrangement that half a day should be assigned, without any inconvenience to the Government, to give the Government an opportunity of explaining to the House the rather metaphysical obscurities which have arisen ?

Aircraft Supplies

LIEUT.-COL. SIR F. HALL on December 1 asked the President of the Board of Trade if he has had his attention drawn to the great efforts which are being made by American trading interests, with the United States Government's co-operation, to develop the South American markets for aircraft supplies and aircraft transport undertakings ; and if he will state what is being done by the British Government in the same direction with a view to stimulating this important industry in this country ?

Sir A. Geddes : The answer to the first part of the question is in the affirmative ; as regards the second part of the question, several important British aircraft firms already have their representatives in a number of the South American Republics, and His Majesty's diplomatic and commercial representatives in those countries are assisting, and will continue to assist, them as far as lies in their power. British firms in this country are being kept in touch with developments, information concerning which is unlikely to reach them through their local representatives.

Anti-Aircraft Station, Putney Heath

MR. LORDEN asked the Secretary of State for War why the anti-aircraft station at Putney Heath on and adjoining the Metropolitan Water Board's reservoir is still continued, seeing that the urgent need has ceased to exist for over twelve months, in view of the danger to the health of the metropolis caused by the very dirty and unsatisfactory state of the station ?

Mr. Forster : It is proposed to maintain these headquarters, though not necessarily on the present site, as part of the permanent scheme of anti aircraft training. Until a new permanent site has been acquired no other accommodation is available for the personnel, stores and equipment.

Russia—General Denikin

LIEUT.-COL. MALONE asked the Secretary of State for War if he will state the number of aeroplanes supplied to General Denikin, K.C.B.; the number of officers and men, late of the Royal Air Force, now serving with his forces; and the date on which it is proposed that this force should return to England?

Capt. Guest : The answer to the first part is that 277 aeroplanes have been sent to the forces serving with Gen. Denikin. In regard to the second part, it is assumed that the hon. and gallant member desires to know the number of officers and men still on the strength of the Royal Force serving with Gen. Denikin's armies. There are at present 101 Royal Air Force Officers and 300 airmen serving with these armies. The reply to the third part is that these troops, all of whom volunteered for this service, are to be maintained up to March 31, 1920, but the actual date of their withdrawal has not yet been settled.

"AVIATION AND WORLD TRANSPORT"

This was the subject chosen by Lord Montagu of Beaulieu for a most instructive address before the members of the British Women's Patriotic League on Monday last.

Lord Sydenham, who presided, said our future safety depended on how we handled the problem of the air. If we were to trust to the League of Nations and neglect the air we should be courting disaster. In any future war aviation would be the dominant factor.

After summarising the wonderful progress made in aviation by this country in recent years, particularly during the War, Lord Montagu remarked that since the Armistice all kinds of new "records" had been set up. He had been believed to be perfectly mad when, in a lecture he delivered in India, he had said that it would be possible to fly from London to Delhi. That feat had since been accomplished, and he saw no reason why flights should not be made from Delhi to Australia if suitable landing-places, supply bases, etc., were provided.

He pointed out that at the outbreak of war we had only 270 aeroplanes, and the War Office had confessed that only about 40 were fit to fly, but the news conveyed by the latter did more than anything else to save the original Expeditionary Force from being encircled. At the end of the War the number of aeroplanes of all types had grown to over 20,000, while the personnel of the Air Force was bigger than that of the Navy. There were at that time over 30,000 young pilots willing to undertake more risks than could be undertaken in any other form of service.

Turning to the subject of progress in aviation since the Armistice, Lord Montagu pointed out that the London-Paris air services had been in operation now for five months, and 95 per cent. of the journeys begun had been finished at an average speed of 105 miles an hour. That was a very wonderful performance, and eclipsed all the records of the early days of railways or motor-cars. The great danger to the British Empire lay in the length of its lines of communication. We were by sea 6,000 miles from India, 5,000 miles from the Cape, and 2,000 miles from Canada. It was vital to us in time of war that all those sister nations of ours should be linked up with the central head of the Empire in this country. Every hour that we could shorten the lines of communication we strengthened our position, and if we could go to India in three days instead of three weeks we added to our strength. Aviation was going to be a great source of strength, but only if we realised that it was very vital to the Empire, and not a matter to be put under any other Department.

Dealing with the conveyance of mails by aeroplane, people often thought that the use of aeroplanes for mail-carrying was going to interfere with the postal arrangements. He did not believe that. The interference would be with the telegraphic arrangements. He did not know whether any of them had tried to send a telegram to Paris, but a person was very lucky if he got a telegram delivered there in six hours. When he was in India he sent a telegram which took ten days to reach England. Aviation was going to hit the cable company. Telegrams from India were sent at the rate of 12 annas (or 1*s.*) per word, and the time occupied was five or six days. By aeroplane a message of 5,000 words, written on paper weighing one ounce, could be carried for 5*s.* for those distances. Even if extra cables were laid, and the company were able to transmit messages in 24 hours, they could still get a letter through by aeroplane in three days. Then there was the conveyance of newspapers. They would be able to have the English newspapers in India three or four days after they were printed. It was possible that they would have to pay 1*s.* for *The Times* instead of 3*d.*, but people would be delighted to pay that for a good newspaper. When he was in India he would have been delighted to have paid anything to keep in touch with what was going on at home.

Lord Montagu gave it as his opinion that the mail between this country and India was more likely to be carried by airship than by aeroplane. Fifty per cent. of the total lift of a big airship was available for a useful load. During the War British airships flew 2,500,000 miles, chiefly engaged in protecting convoys and in scouting over the North Sea. That was a wonderful performance, and the ratio of loss and breakdown was very small indeed.

Lord Montagu then referred to the resignation of General Seely and the probable future of the Air Service. He said he was not going to say for a moment that his own opinions were right, but he did say that the question whether the Air Service in future should be independent or under the War Office or the Admiralty, either separately or jointly, was a question of the greatest importance to this country. It was generally admitted that the independence of the Air Service grew out of the fact that it was found impossible to work it under another Government Department. What had induced the Government now to alter that opinion he did not know and he regretted it. He wanted to point out that unless we retained the nucleus of an independent organisation it would go very hard with us on the outbreak of the next war. While we wished to see a strong League of Nations, our real security was a strong right arm. Let us pray for peace, but there was no good in being dependent on another nation's good will. Whatever our treaty might be with Germany, we all knew that we could not prevent her from building up a large air fleet. She might do it for commerce or for internal communications. Every weight-carrying aeroplane could carry bombs. He asked them to think what would happen if Germany suddenly sent over 10,000 aeroplanes, practically without any declaration of war. London would be a heap of ashes; most of our shipping might be sunk. It was a far too serious matter for us to play with. We must have a Minister separately responsible to this country and the House of Commons for its efficiency.

He did not care whether we spent £100,000 or £10,000,000; it must have an independent existence. The general attitude of the War Office and the Admiralty had been deplorable. They had been much more concerned in scoring off each other than in winning the War.

We could not operate the Fleet without aeroplanes. A fleet with eyes could avoid or accept battle when it chose. A fleet without aeroplanes was a blind fleet. As to the Army, he asked them to inquire what any gunnery officer could have done without the aeroplane. The Navy and the Army were much more dependent on the Air Force than the Air Force was on the Navy and Army.

◆ ◆ ◆ ◆

British Aircraft Competitions, 1920

Owing to the representations made by British aircraft manufacturers the Air Ministry has decided to alter the date of the commencement of the Small Type Aeroplane Competition to June 1, 1920. Entries for this competition will, therefore, not close until February 1, 1920. The dates already announced in connection with the other two competitions will remain the same.

Both of the aeroplane competitions will take place at the Aeroplane Experimental Station, at Martlesham Heath, near Woodbridge, Suffolk.

The Seaplane (Amphibian) Competition will take place at Felixstowe, with the exception of the tests for landing upon and rising off the ground for this class, which will be held at Martlesham.

A New Airco Passenger Machine

Profiting by the practical experience gained on the London–Paris route, the Aircraft Manufacturing Co., Ltd., are engaged upon the construction of a new aeroplane—the Airco 18—designed for use in the service of the various European airways. This machine will carry eight passengers in a luxuriously appointed cabin; while it will be possible, quite easily and rapidly, to remove the seats from the cabin and find accommodation for about a ton of mails. The motor used will be a 450 h.p. Napier Lion, and it is anticipated that when fully loaded the machine will fly at a speed of 114 miles an hour.

Wireless Telephones on London-Paris Air Route

In connection with the daily flying of the Airco mail-carrying aeroplanes between London and Paris, an improved wireless telephone installation is to be placed on the roof of the seven-storey building in Westminster which is now the headquarters of Aircraft Transport and Travel. By this means it will be possible to receive messages from pilots while they are actually in flight between London and Paris.

In the head offices of the company in London will be installed a special map of the continental routes, with small model aeroplanes attached to it; and the position of these aeroplanes can be changed by the wireless operator on the roof, according to the messages he receives.

MODEL AEROPLANES

By F. J. CAMM

NOTE.—*All communications should be addressed to the Model Editor.*

Retrospective

In setting out to renew the model pages of this journal, there are three things which it will be advisable to bring to the reader's notice in order to refresh his memory; firstly, the progress of those interesting years prior to the continental argument, secondly the work which was done during the War, and lastly the prospect of the subject in the future.

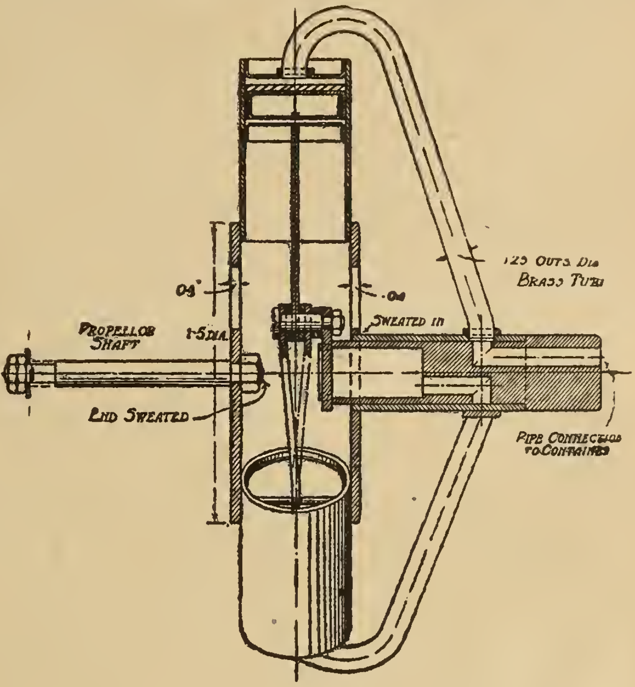
Prior to the War about 60 model clubs existed in this country. Most of them were content to strive for distance or duration, and an examination of their reports as published in these pages leads one to the conclusion that no concerted effort in any particular direction formed part of their curriculum. Not more than three of them undertook the construction of gliders, and many of them enjoyed an ephemeral existence only to fizzle out after the initial glamour of inauguration had worn off. The records created in those days by Slatter, Louch, Houlberg, etc., still stand officially, although the writer has succeeded unofficially in beating Slatter's record of 2 mins. 49 secs by a performance of 3 mins. 19 secs. The Kite and Model Aeroplane Association, with the indefatigable Secretary—W. H. Akehurst—did much to encourage model aeroplaning in those days by the many prizes it offered. With the return to civil life of many of its most active protagonists, there is every indication of a resuscitation of model aeroplaning from the semi-torpor occasioned by the War. Will the K.M.A.A. be reformed to represent its interests as it formerly did? Since the Association is an adjunct to the Royal Aero Club, surely it is within the ægis of the latter society's business to see into this matter. I understand there is difficulty in obtaining a secretary, and, should this be so, I am prepared to act in an honorary capacity *pro tem.*

The moribund War-period did not witness a great amount of endeavour, owing to the demands of the Army, and it is, therefore, easy to bridge the interim to the present time. From the correspondence I receive, there are indications of the reformation of the clubs, and a fillip is needed in the way of a competition; anent this I shall have more to say next week. To the clubs I would say: 1. Do not encourage the flying stick element too much; and 2. Charge an entrance-fee commensurate with a programme of promising proportions. Moreover, it is essential to keep records of results achieved, and we shall be pleased to publish any item of merit submitted to us.

Model ornithopters and helicopters have not received much attention, and I certainly think this subject should be taken up by the clubs. As in the past, so now the latter may depend upon our support. I appreciate that it is necessary, if this feature is to be a success, to be in touch with the whole movement, and I would ask all those readers interested in models to acquaint me with their work, or to write me upon any matters as to which they are in quandary. Such querists may be certain of a reply to the fullest extent of my capacity and knowledge of the subject.

Compressed Air

There are many indications that compressed air as a motive power for model aeroplanes bids fair to equal in popularity the elastic motor which has practically held the field since its introduction by Penaud about 1870. Although compressed-air models have created performances almost as good as those obtained with rubber motors (71 secs. appears to be the highest record for compressed air to date), elastic has yet to be beaten with regard to the power-to-weight ratio. There are, however, certain models that it would be impracticable to propel by elastic—particularly large machines, where the quantity of elastic would be so great that (even if geared) the length of flight would be too short for any information to be garnered from it. Such models *can* be driven by compressed air; but there is a disadvantage common to both forms of power, viz., the power is not constant. With the rubber motor as the turns on the elastic skein in torsion grow less, the power proportionately decreases. So with compressed air the pressure in the container grows less, with the result that the model has a tendency to helicopter at first, and when the initial thrust has dropped it appears to be under-elevated. Unlike elastic, however, this tendency can be eradicated to a certain extent by means of a reducing valve. Contrary to the prognostication of others, I have obtained better results with rotary compressed-air engines than with stationary, and I show a side elevation of the engine with which I have experimented, and embodying the Camm sleeve-valve. I have found that a three-cylindered engine of $\frac{7}{16}$-in. bore is sufficient to efficiently propel a 30-oz. model. A piston-type reducing valve was used, drawings of which will be given subsequently. It was found best to so arrange the inlet parts in the sleeve and shaft that inlet commenced 45° of crank after reaching top dead centre. It would be interesting to hear the experiences of others in this matter.



With regard to power-driven hydroplanes, the floats could conveniently be made of sheet copper or brass and so form the container for the engine. With regard to other forms of power the steam (flashboiler) type has given by far the best results. Stanger and Meyer have both produced successful petrol motors, the only drawback being that the smallest petrol motor necessitates the construction of too large a machine to be conveniently transported.

The Classes of Models and Their Uses

Model aeroplanes may be divided into three classes. I refer, of course, to machines provided with motors as distinct from gliders, and all models belong to one or other of these. First, we have the scale model, which reproduces in miniature, with a degree of exactness depending upon the possibilities of the scale, a full-size machine either actually built or in contemplation.

The uses of such models depend upon the object with which they have been constructed. When they are reproductions of existing machines they are intended for exhibition purposes or for demonstrating in technical classes the functions of the various parts. When scale models are built which have been copied from no existing prototype, the object of the builder is usually either to embody some new invention into the design, to test some method of construction mechanically, or with the object of interesting financiers in a new type and explaining new theories more graphically than could be done without such model.

Models of the second class are those which, although making some pretence to resemble a full-size machine, are also intended for actual flight. These are more often than not the most useless of models, for they do neither the one thing nor the other well. If their motor arrangements are so changed as to render them capable of flight they do not as a rule fly well or for any great distance, whilst the more closely they resemble the prototype the more inferior are their flying qualities. These remarks apply more particularly to models of existing machines, and to models which, in all their general structural forms, are designed on full-size lines.

The use of such models is merely that of pleasing the eye. They are more ornamental than useful, since they teach nothing relating to the laws governing dynamic flight, which could not be learned in a better manner from a more simply and scientifically constructed machine. At the same time, the flying scale model is, or appears to be, the most popular, although most amateurs who build it care more for its fairly correct appearance than they do for its flying abilities.

The third class is the long-distance flyer or racing machine, which has been described as the "freak" type. Freak it more often is judging by the generally accepted standard of proportion in large machines. There are some long-distance flyers which approximate very closely to the lines of possible full-size aeroplanes, but, nevertheless, they are designed for flight, and flight only.

Generally speaking, the monoplane type has been more in evidence than the biplane, and although there are doubtless some authorities in the model world who will disagree with me, I think that it is this type which will survive. It has been well demonstrated that whatever the biplane model can do the monoplane can do equally well, and oftentimes better. The fact that large surfaces are unnecessary on the racing model renders at least one of the main planes of the biplane superfluous; indeed, I have known machines fitted with two planes to fly better when one of them with its stanchions and braces has been removed, thus showing that the head-resistance of the extra plane with its supports and the impaired sweep of both was detrimental to the lift of the whole when driven forward in flight.

Suppose we have a machine weighing 6ozs., and surface it at the rate of 20 sq. ins. to the ounce for the main plane, we should have an area of 120 sq. ins. Now, it would be absurd to place this into biplane form, since in a monoplane surface it represents a plane of, say, 24 ins. by 5 only. The effect of such a low surface-to-weight rating is a considerable reduction in propeller slip with a consequent increase in the amount of forward movement of the machine at each revolution of the propellers, resulting in a greater flight distance.

It may be argued that the flight distance of a biplane with double this amount of surface would be increased to equal that of our supposititious monoplane simply by increasing the power and diameter and pitch of propellers, but the reply to this would be that if this is possible with the biplane the same expedient could be adopted with the monoplane with a yet further improvement in the length of flight; always bearing in mind, of course, that by increasing the power and the size of the propellers we increase the weight, and consequently alter the weight-to-surface rating. I think it quite possible that we shall come, in the near future, to still smaller surfaces, perhaps to 10 or even 8 ins. to the ounce, which latter figure is, after all, slightly less than 1 lb. to the square foot (9 ins. to the ounce is 1 lb. to 1 sq. ft. exactly).

The only difficulty which I foresee is that of obtaining sufficient lateral stability owing to the shortness of the span, but this can be met in machines with the well-known triangular framework by doing away with the central portion of the plane and placing what would virtually be two planes, one out on each side of the framework. Or if the frame is of the single centre stem type, by placing the plane a little above the frame. The fact of the centre of the thrust line of the propellers being below the plane would make little or no difference with such a small surface as would be used, since the head resistance of motors and frame would probably exceed the head resistance and drift of the plane.

(*To be continued.*)

"The Design of Model Aeroplanes"

For years those who have made a hobby of making and flying model aeroplanes have wished for a text-book to help them in their work, and now Mr. F. J. Camm has stepped into the breach. He has tackled the subject from the theoretical as well as the practical standpoint, and bearing in mind the many years he has given to the building and flying of models, his book may well become in time the standard one on the subject.

The opening chapter is given up to explaining how an aeroplane flies and in the next two or three chapters Mr. Camm goes into the question of design, and also explains some methods of construction. Thereafter he describes various types of models, and by the aid of the very clear drawings it should be possible for any reader to construct any one which his fancy may lead him to select. Then follow useful chapters on the theory, design and making of airscrews, the construction of compressed air motors, the flying of models, the running of a model aero club, the building and flying of a full-size glider, etc.

In a foreword, Mr. F. Handley Page points out that model aeroplanes are not toys, but scientific instruments, and it is, therefore, possible to combine an interesting sport with the fascinating study of the science of aeronautics. After pointing out the important part which aircraft must play in the commercial and national interests of all nations, Mr. Page says that no more certain way of acquainting oneself with the alpha and omega of aeronautics exists than the making and flying of model aeroplanes. And to attain that object one could hardly have a better guide than Mr. Camm's book, which forms an admirable Christmas present. It is published by Messrs. Benn Brothers at the price of 7*s.* 6*d.*; it can be obtained from Flight offices for 7*s.* 10*d.* post free.

Model Aeroplane Supplies

Whether they wish to obtain materials and fittings in order to build their own models, or to obtain a complete model, ready to fly, those who visit the showroom of Messrs. A. E. Jones, Ltd., at 52, High Street, New Oxford Street (facing Tottenham Court Road), will hardly fail to find exactly what they require. As befits the firm which was one of the pioneers in this business, the stock of materials and fittings is most comprehensive and complete, while the range of flying models extends to well over a score. They include monoplanes and biplanes, and in the useful catalogue issued by the company full details are given of each. The catalogue also gives complete information regarding materials, is very thoroughly illustrated, and copies will be sent to any reader applying to the address given above. The model aeroplane department of Messrs. A. E. Jones, Ltd., is now in the capable hands of Mr. William Moss, who is well-known in the aircraft industry.

An Aero Club for Queensland

Preliminary steps were recently taken to form a Queensland Aero Club. Mr. J. J. Knight was elected provisional chairman, and Capt. E. H. Rydon secretary and treasurer. An inaugural dinner was held on November 5.

Double Fatality in Holland

A Rumpler machine caught fire while flying near Soesterberg on November 24, and the two occupants, Lieut. M. C. van Dyk and Lieut. C. Land, were both killed, the machine falling from a height of 1,200 ft. This is the fourth fatal accident with German machines in Holland since May.

Seaplane *v.* U-Boat

Before Sir Henry Duke, President of the Prize Court, the story of a fight between a British seaplane and a German submarine was revealed on November 25. Capt. C. E. S. Lusk, of the R.A.F., senior surviving officer of the crew of seaplane 8695, said that on September 22, 1917, the machine was operating under the direction of the Admiralty, and was under the command of Capt. (then Flight-Lieut.) N. A. Magar.

An enemy submarine was observed in the North Sea and attacked by bombs.

One of the bombs hit the submarine direct, and took effect. The submarine heeled over and sank, and at once, in the disturbance on the surface, were observed air bubbles, an escape of oil, and a large quantity of wreckage.

There were no survivors of the submarine, which was U.B. 72, but her crew had been ascertained to be 32, and prize bounty at the rate of £5 per head of the craft destroyed, totalling £160, was awarded. Capt. Magar was killed in action on April 25, 1918.

SIDE-WINDS

Those who take a pride in the appearance of their aeroplanes or motor cars will be interested in the "Duco" rubber sponge for washing down purposes which Messrs. Brown Brothers, of Great Eastern Street, E.C., have placed upon the market. It is claimed that "Duco" rubber sponges will outlast two or three natural sponges, and will dry off the moisture equally well as, if not better than, a natural sponge. They are British-made and more absorbent than the rubber sponges of foreign manufacture, being made of practically pure rubber. If "Duco" rubber sponges cost three times as much as a natural sponge, they would be cheaper in the end, besides their being easier to use. As a matter of fact, they are made in three sizes, viz., small oval, 2*s.* 6*d.*; medium oval, 3*s.* 9*d.*; and large round, 7*s.* 6*d.*

– – –

Among the visitors to the Motor Show we were glad to observe Mr. Percy Richardson, until his recent resignation managing director of Sheffield Simplex Motor Works, Ltd., and one of the first owners of an aeroplane in this country. Mr. Richardson is just recovering from a long illness which has kept him from business for several months, and has now left for America in the hope that a sea voyage may complete his convalescence. We trust he may return quite restored to his old form.

– – –

Another invalid who has just made his welcome reappearance is Mr. Ridley Prentice, who is well-known in connection with the G.A.C., Emaillite, and other prominent firms in the aircraft world. He has had a serious and prolonged illness, and is fortunate to have recovered. His numerous friends will be very glad to see him about once more.

– – –

The statement issued by the Air Ministry on the first six months of civil flying is a remarkable and convincing testimony to the safety of flight. This is the less surprising when one remembers that a large proportion of the civilian passengers took the air in aeroplanes of the type used by the R.A.F. for training pilot cadets, namely the Avro, a machine designed mainly with an eye to safety. Of the 52,000 passengers carried, at least 30,000 made flights in machines belonging to Messrs. A. V. Roe and Co., Ltd., while many of the other air transport companies use Avros for pleasure flying. Next year, of course, an earlier start will be made, and far more extensive operations may be expected. It will not be long before the majority of the people of the United Kingdom will have enjoyed the experience of being up in the air.

– – –

Weather permitting, the Avro air fleet will visit Bournemouth on Saturday, 6th, and Sunday, 7th, insts. A carnival, or if one may use the expression, an air regatta will be held there on both afternoons, commencing each day at 2 p.m. There will be a sham fight, trick flying, and Miss Nellie Gibson will make her parachute descent. The Avro Baby will take part in the performance, and the latest pattern limousine will be there to show the last word in comfort and luxury. The arrangements are in the hands of Mr. E. J. Hucks.

– – –

A useful accessory to the busy man's desk is thoughtfully provided at an opportune moment by Messrs. C. A. Vandervell and Co. in the shape of a note-block with a few thumb-indexed pages for noting telephone numbers, and not forgetting a pencil which *will* write. Many thanks.

– – –

Motorists and motor cyclists throughout Scotland and Ireland will be interested to learn that Messrs. S. Smith and Sons (M.A.), Ltd., the world-famous motor accessory manufacturers, whose head offices are at 179-185, Great Portland Street, London, W. 1, have opened depots and appointed special representatives for both countries. The Scottish depôt is situated at 141, Bath Street, Glasgow, and will be in charge of Mr. F. Marshall Milligan. The Irish depôt will be controlled by Mr. R. P. Whiteside.

– – –

At both these depots, adequate supplies of the whole of Messrs. Smith's manufactures, which include speedometers, carburettors, starting and lighting systems, electrical and mechanical horns, double-acting jacks, tool-kits, mascots, etc., will be carried, and also stocks of the various lines for which Messrs. S. Smith and Sons (M.A.), Ltd., are sole agents, including M.L. magnetos, K.L.G. plugs, E.U.K. easy starters, Radamax plug-testers, etc.

– – –

The Witton Engineering and Storey Metals Co., Ltd., notify us that they have moved their works from Newtown Row to very much larger and more commodious premises at Wilders Drive, Warwick Road, Greet, Birmingham, where they hope to be able to increase their output of petrol taps, compression taps, hand pumps, cycle pumps and other similar accessories to the motor, electrical, gas and cycle trades.

– – –

A very artistic pack of playing-cards enclosed in a pocket leather case is to hand from Messrs. W. B. Dick and Co., Ltd., 90, Fenchurch Street, whose name is so familiarly associated with Ilo oil. When you handle this pack it certainly makes you so optimistic as to persuade yourself that you can win every time. Any engineer or firm who would like to possess one of these packs should apply immediately to the address given above, as the demand is sure to be heavy.

– – –

From one of our friends in the North we hear of an opening for a chief technical assistant, male or female, which will fall vacant at the end of the year. Applicants for the post should have a thorough knowledge of the mathematics necessary for aerodynamic and stress calculations, and should preferably have held a similar position before. We shall be glad to pass on any applications if they are marked "Technical Assistant," c/o Editor, Flight.

An Allied kite balloon "snapped" from a German biplane just before the latter attacked it.

COMPANY MATTERS

New Pegamoid, Ltd.

THE report for the year ended September 30, 1919, states that the profit amounts to £11,888, which, with the balance of £5,422 brought forward, makes a total of £17,310, out of which an interim dividend at the rate of 10 per cent. per annum has been paid, leaving a balance available of £15,771. The directors propose to appropriate this as follows:—In payment of a dividend at the rate of 10 per cent. per annum for the half-year ended September 30, 1919, making (with the interim dividend already paid) 10 per cent. for the year, £2,500; in placing to reserve £6,000; in placing to contingency account (including excess profits duty and income tax) £5,000, leaving a balance to be carried forward of £2,271. The directors announce an addition to the board in the person of Mr. J. Walter Bunting, one of the directors of Chamberlins, Ltd., of Norwich.

NEW COMPANIES REGISTERED

DOVER AIRCRAFT VENTURES, LTD.—Capital £1,000, in 750 ordinary shares of £1 each and 5,000 deferred shares of 1*s.* each. Objects, to establish and work lines and services of aerial conveyance, carriers of passengers, goods, etc. Solicitor, E. E. Chitty, 19, Castle Street, Dover.

ESSEX AIRCRAFT AND MOTORS, LTD., 90, North Road, Southend-on-Sea.—Capital £5,000, in £1 shares.

KNIGHTS MOTOR AND ENGINEERING CO., LTD., 24, Sherlock Street, Birmingham.—Capital £7,000, in £1 shares. First directors: R. C. P. Knights, V. I. Olliver and C. O. Brettell.

MODERN MOTION, LTD., 93, Old Christchurch Road, Bournemouth.—Capital £1,000, in 800 preferred shares of £1 each and 800 ordinary shares of 5*s.* each. Dealers in motors, aircraft and their accessories, etc. First directors: G. H. Bettinson and Capt. H. Kirhy.

NORTHERN AIRCRAFT TRANSPORT AND TRAVEL CO., LTD., Empire Motor Garage, The Green, Sunderland.—Capital £5,000, in £1 shares. Permanent directors: C. A. Crichton, Flight-Lieut. R. Thornton, F. Woods, F. Fowler, J. Emerson, R. W. Graham. A. Sember and W. Thomas.

JOHN SCOTT AND BRADSHAW, LTD., 9, Boundary Street, Liverpool.—Capital £1,000, in £1 shares. Aeronautical, automobile, and general engineers, etc. First directors: A. Scott, G. W. Bradshaw, Jnr., G. W. Bradshaw, Senr., D. Holliday.

PUBLICATIONS RECEIVED

Manual of Meteorology. Part IV. By Sir Napier Shaw, Sc.D., F.R.S. Cambridge University Press, Fetter Lane, E.C. 4. Price 12*s.* 6*d.* net.

The Heart of a Car is the Engine. W. H. Dorman and Co., Ltd., Stafford.

The Press on Dormans of Stafford. W. H. Dorman and Co., Ltd., Stafford.

British Magnetos. London: The British Ignition Apparatus Association, 8, Bream's Buildings, E.C. 4.

British Airships: Past, Present and Future. By George Whale. London: John Lane, The Bodley Head. Price 7*s.* 6*d.* net.

Report No. 48: *Carburetting Conditions Characteristic of Aircraft Engines.* Washington, U.S.A.: The National Advisory Committee for Aeronautics.

Report No. 45: *Effect of Compression Ratio, Pressure, Temperature and Humidity on Power.*

Report No. 53: *Properties and Preparation of Ceramic Insulators for Spark Plugs.*

Report No. 56: *Heat Energy of Various Ignition Sparks.* Washington, D.C., U.S.A. The National Advisory Committee for Aeronautics.

Report No. 42. *A New Process for the Production of Aircraft Engine Fuels.*

Report No. 59. *General Analysis of Airplane Radiator Problems.* The National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

The Design of Model Aeroplanes. By F. J. Camm. London: Benn Brothers, Ltd., 8, Bouverie Street, E.C. 4. Price 7*s.* 6*d.*

Crossley and the Royal Air Force. Crossley Motors, Ltd., Gorton, Manchester.

Meteorology for All. By D. W. Horner. London: Witherby and Co., 326, High Holborn. Price 6*s.* net.

All About Flying. By Gertrude Bacon. London: Methuen and Co., Ltd. Price 3*s.* net.

The Royal Aero Club Year Book: 1917-18-19. The Royal Aero Club of the United Kingdom, 3, Clifford Street, W. 1.

Motor-Cycling and Lubrication. C. C. Wakefield and Co., Ltd., Wakefield House, 30-32, Cheapside, E.C. 2.

"*Hydra*" *Tool Steels.* Hall and Pickles, Ltd., 64, Port Street, Manchester.

Report No. 49: *Metering Characteristics of Carburettors.*

Report No. 60: *General Discussion of Test Methods for Radiators.* The National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

Catalogues

The B.L.I.C. Magneto. The British Lighting and Ignition Co., Ltd., Cheston Road, Aston, Birmingham.

Palmer Tyres. The Palmer Tyre, Ltd., 119-123, Shaftesbury Avenue, W.C. 2.

The Sopwith Aviation and Engineering Co., Ltd.

IN the case of the Sopwith Aviation and Engineering Co., Ltd., a petition to confirm alteration of the objects of the company, Mr. Justice Astbury sanctioned the alteration on Tuesday. Mr. Micklem, K.C., said that the company was founded in 1913 by the well-known airman, and as the demand for aeroplanes had now fallen off, it was desired to obtain powers to make motor-bicycles and motor vehicles, and to act as coach and carriage builders, and manufacturers of all kinds of furniture.

◆ ◆ ◆ ◆

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1916

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 4, 1919

16,952. FAIREY AVIATION CO. and C. R. FAIREY. Controlling-devices for aeroplanes. (134,556.)

APPLIED FOR IN 1918

The numbers in brackets are those underw hich the Specifications will be printed and abridged, etc.

Published December 4, 1919

12,297. J. HIGGINBOTTOM. Air screws. (134,569.)
12,667. G. GARTMANN. Periscopes for use on aircraft. (134,571.)
17,965. R. F. POWER. Control of aeroplanes. (134,602.)
18,064. F. SAGE AND CO. and N. A. T. N. FEARY. Aircraft fabrics. (134,611.)
18,108. G. E. MORTLEY. Aeronautical dynamos. (134,614.)
18,333. E. R. CALTHROP. Safety devices for aviators. (134,625.)
19,087. H. C. WATTS. Propeller blades. (134,642.)
19,195. N. P. HINTON and RADIO COMMUNICATION CO. Wireless direction finding. (134,644.)
19,448. BLACKBURN AEROPLANE AND MOTOR CO., H. BOOTH and G. BEAUMONT. Ribs, spars, etc., for aircraft. (134,652.)
20,113. M. A. SPENCER. Parachute cases. (134,668.)
20,689. J. S. WHEELWRIGHT. Apparatus for determining speed and course of aircraft. (134,674.)
21,623. and 21,624. A. E. AND H. O. SHORT and E. H. MITCHELL. Balloons or airships of rigid type. (134,684 and 134,685.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published November 27, 1919

1,168. BOULTON AND PAUL and J. D. NORTH. Aircraft construction. (134,441.)
1,956. F. H. PAGE and HANDLEY PAGE, LTD. Release gear for bomb dropping, etc. (134,446.)
9,790. R. S. STEPHEN. Aerial, etc., compasses. (134,483.)

Published December 4, 1919

10,194. W. MURRAY. Propeller shaping machine. (134,762.)
12,597. A. TEBALDI. Aeroplanes. (128,547.)
21,078. R. ESNAULT-PELTERIE. Starting devices for I.C. engines. (131,901.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xxxv, xxxvi, xxxvii and xxxviii).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT
The Aircraft Engineer and Airships
36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates:*—

UNITED KINGDOM	*s.*	*d.*	ABROAD*	*s.*	*d.*
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 572 (No. 50, Vol. XI.) DECEMBER 11, 1919 [Weekly. Price 6d. Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:
United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**
These rates are subject to any alteration found necessary under abnormal conditions

European subscriptions must be remitted in British currency.

CONTENTS

Editorial Comment PAGE
The Air Force and Imperial Strategy .. 1575
The Weakness of the Case .. 1576
The Douglas-Pennant Enquiry .. 1576
Flight—and the Men: H. P. Folland, A.F.R.Ae.S., Chief Engineer and Designer, Nieuport and General Aircraft Co., Ltd. .. 1577
The Australian Flight .. 1580
The Blackburn "Milestones" .. 1581
Imperial Air Routes .. 1588
The Imber Self-Sealing Petrol Tank .. 1591
Airisms from the Four Winds .. 1593
Aeroplane Undercarriages. By J. D. North .. 1596
The Royal Air Force .. 1600
In Parliament .. 1601
Models .. 1602
Side-Winds .. 1604
Imports and Exports .. 1604

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Dec. 19 to... Jan. 4, 1920.	Paris Aero Show.
1920	
April 18 to May 2	Seaplane Competition at Monaco
June 1 ...	Air Ministry Competition (Small Type Aeroplanes), Martlesham Heath
July, 1920	S.B.A.C. International Aero Exhibition at Olympia
Aug. 1 ...	Air Ministry Competition (Seaplanes) Felixstowe
Sept. 1 ...	Air Ministry Competition (Large Type Aeroplanes), Martlesham Heath

NOTICE.—Owing to Christmas Day and Boxing Day falling on Thursday and Friday, it is necessary that all copy, Editorial and Advertisement, for the issue of December 25 should reach FLIGHT Offices not later than the morning of December 19.

EDITORIAL COMMENT

The Air Force and Imperial Strategy

GENERAL SEELY'S letter to *The Times*, upon which we commented last week, has been productive of several other letters to the same journal, all setting forth different points of view of the relation of air power to sea and land power. General Guy Dawnay writes a very closely-reasoned communication, in which he seems to advocate a return to the old system of two separate Air Services, attached respectively to the Navy and the Army. Nor does he do this in the usual dogmatic manner of the crusted old Service officer who, as a rule, seems to argue from the point of view that what existed in the time of the Crimean War must of necessity be good now, and that the customs and organisation of the Services should be as unalterable as the laws of the Medes and Persians. On the contrary, he presents the case as he sees it, and were it not for the obvious failure to see quite far enough, he would be almost convincing.

He lays it down that in considering the question there are two vital points to be taken into consideration: the absolute necessity for co-ordination and a common doctrine in essentials; and the equally vital necessity for providing the Navy and Army with efficient organs of their own. On the first point, he proceeds, three things at least may be said. Only by the fullest possible co-ordination will it be possible to fit the Air Force into its proper place in the military (which includes the naval and aerial) machine. Further, to each arm its own tactics; but it is a main essential that air forces working with the Navy or Army should be thoroughly familiar with, should have most detailed knowledge and understanding of, military and naval tactics respectively. Moreover, as strategy is all one, there must be no risk of an independent Air Service devising divergent or unrelated theories in the region of strategy, or even in the borderland of "grand tactics." These desiderata cannot be ensured without either a combined Ministry of Defence or a Joint General Staff; nor without a most comprehensive scheme of attachment of Air Force *personnel* for thorough training with the older Services.

We agree with all of this, but it is here we think, with all submission, that General Dawnay fails in vision. We would answer the argument by taking the proposition that strategy is all one, and saying that there must be no risk of an independent sea or land service devising "unrelated theories," inasmuch as it is admitted by every authority that air power must in the next great war exert a decisive effect on the course of campaigns. Unquestionably, however the whole subject is regarded, the case is most amply made out for either a Ministry of Defence or a Joint General Staff. Of the two, we should prefer the latter, as being very much less cumbrous and less likely to be subject to delays in decision. In the matter of the attachment of Air Force *personnel* for training with the older Services, there can be no question but that the idea is thoroughly sound, but we should carry the matter farther, and lay it down as fundamentally sound that there should be an all-round exchange of *personnel* in order that each of the three great Services might thoroughly and properly understand the powers and the limitations of each other, and thus be in full possession of the details of the rôle and duties which each is competent to carry out in combined operations or in the realms of grand strategy. The whole thing seems to hinge on the fact that all war is a question of related effort, and it is only afterwards that the historian is able to dissect the parts played by each Service and by each arm of the several Services. At the present moment it is difficult for officers brought up in the old school to thoroughly realise that air power has become as potent a factor as sea or land power and that it in reality requires a new and separate train of thought.

◆ ◆ ◆

The Weakness of the Case

General Dawnay goes on to speak of the provision for the Navy and Army of "efficient organs of their own." He thinks that the outlook for the Army—he declines to speak for the Navy—is at least dubious. He makes the point that as cavalry used to be called the eyes of an army, aircraft may now be so called. But if aircraft are the eyes of the Army, the Army has no eyes of its own. Yet in modern war eyes of its own are more than ever necessary; it is no longer mainly a matter of strategic or tactical reconnaissance, for modern artillery requires eyes of distant vision incessantly. It seems to us the answer is that the British armies in France and in the more distant theatres of the late War were never so well or efficiently served in the matter of "eyes" as they were after the creation of the Air Force as a separate Service. To say that because the Air Force is the Air Force and not a unit of the Army the latter is without eyes of its own is most certainly an error of vision. Is there any reason to think that the Air Force will be any less capable of acting as the eyes of the Army in a future war than it was in 1918? Obviously, the answer in in the negative and it weakens the case which General Dawnay tries to make out but he should fall into so manifest a misjudgment of probabilities.

He next expresses grave doubt whether in ten years' time the young Air Force officers will know enough about warfare on sea and land to undertake efficiently reconnaissance for the Army or Navy. Nor does he seem to think that in that time they will know enough about artillery on sea or land to co-operate to the fullest advantage with that arm. He thinks that ten years' complete independence without some exceedingly strong co-ordinating factor might easily produce a dangerous loss of efficiency in co-operation. He says: "No one who saw the working of the Dardanelles Expedition from within can disguise from himself that, in spite of the most loyal, admirable, and unbroken harmony between the Navy and Army in that instance, considerable obstacles are placed in the way of perfect co-operation between two Services when mutual understanding of the tactical views and requirements of each is not complete throughout, when the staff systems of the two are utterly different, and when the heads of either may report independently to independent Ministries at home."

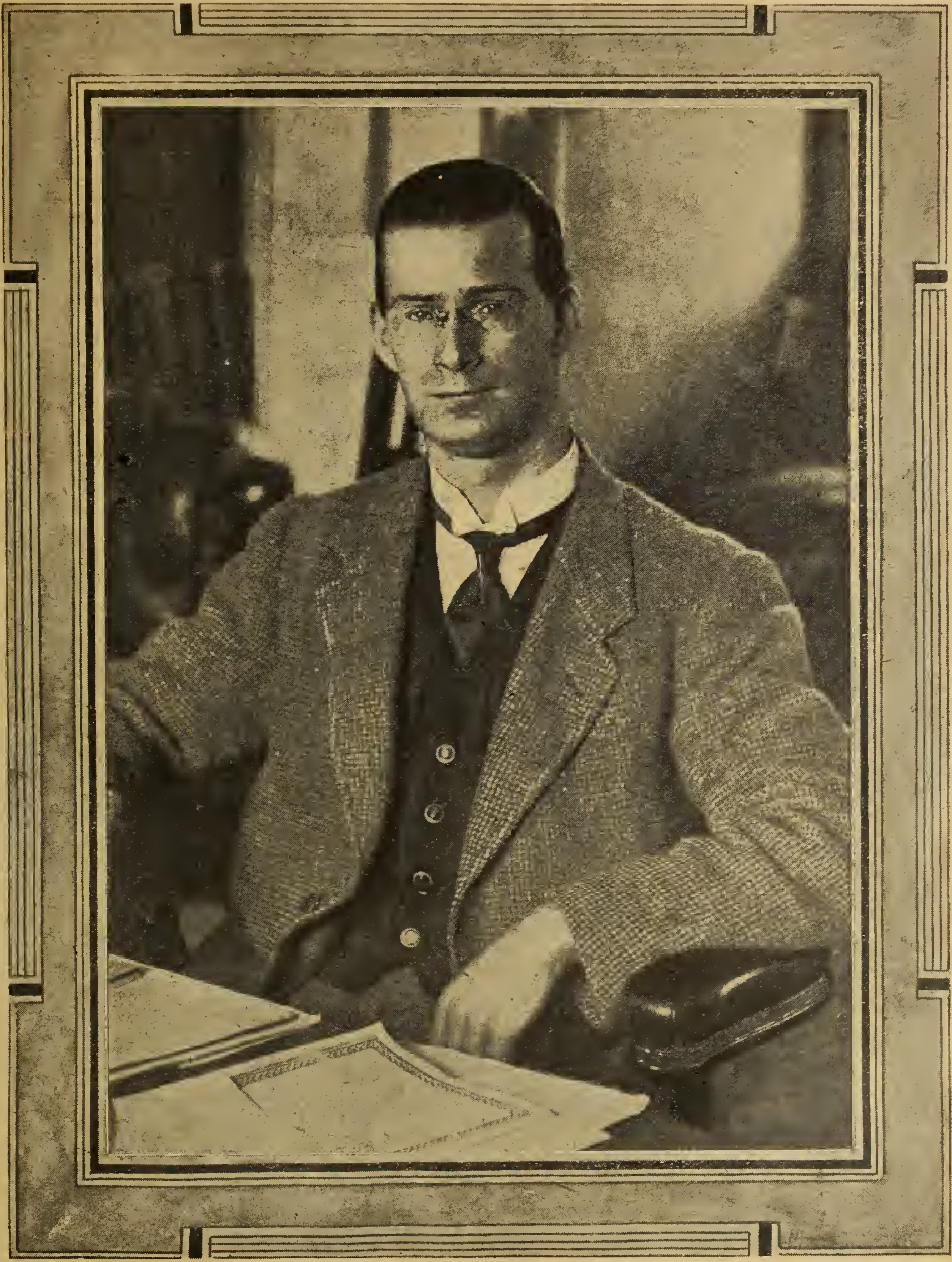
It is possible to agree to all this and yet to fail to see in it any case for again fusing the Air Service with the older Services, any more than there is for the fusion of the Army and Navy in order to arrive at that perfect mutual understanding without which there cannot be efficient co-operation in war. What does seem to emerge is that the case is fully proved for the constitution of a Great General Staff which should make war its sole study. Not war by land. Not war by sea. Nor war in the air. But war as one single subject and in all its relations. It should as one of its first tasks properly visualise the functions, as well as the limitations, of all the Services and strive to arrive at a comprehensive and far-reaching system of real co-operation between them. It should bring into line the staff methods of all three so that never again will it be possible to see in war promising operations hampered and brought to nothing because of a want of essential understanding between Services due to nothing but difference in method. The trouble has been in the past that each Service has to a very great extent lived in a water-tight compartment of its own. The soldier has not troubled to study sea war and its relation to war on land, nor has the sailor concerned himself particularly with the strategy of land war. Above all, they have both cultivated the habit of regarding war as a matter of sea and land alone. They have yet to realise that a new power has arisen in an element which has until quite recently been completely disregarded. They have now to readjust the focus of thought and they are not finding it easy to do so.

◆ ◆ ◆

The Douglas-Pennant Enquiry

The Select Committee of the House of Lords, appointed to enquire into the charges brought by Miss Douglas-Pennant in connection with the administration of the W.R.A.F., has at last made its report. As was obvious from following the evidence, the Committee finds that none of the charges has been justified and the Report is from beginning to end a scathing censure of Miss Douglas-Pennant, whom the Committee accuses of listening to scandal and bringing loose charges against a number of people who were perfectly guiltless of wrong-doing. The story of an intrigue to get rid of Miss Douglas-Pennant, the Committee scouts as being unworthy of credence and finds that everyone connected with her supersession in the command of the W.R.A.F. acted in the most perfect good faith. And so ends one of the most unsavoury episodes of the War. No good can come of the discussion now of any single aspect of the case and the best thing to be done is to bury the whole thing

Flight—And the Men



"Flight" Copyright.

H. P. FOLLAND, A.F.R.Ae.S., Chief Engineer and Designer, Messrs. The Nieuport and General Aircraft Co., Ltd.

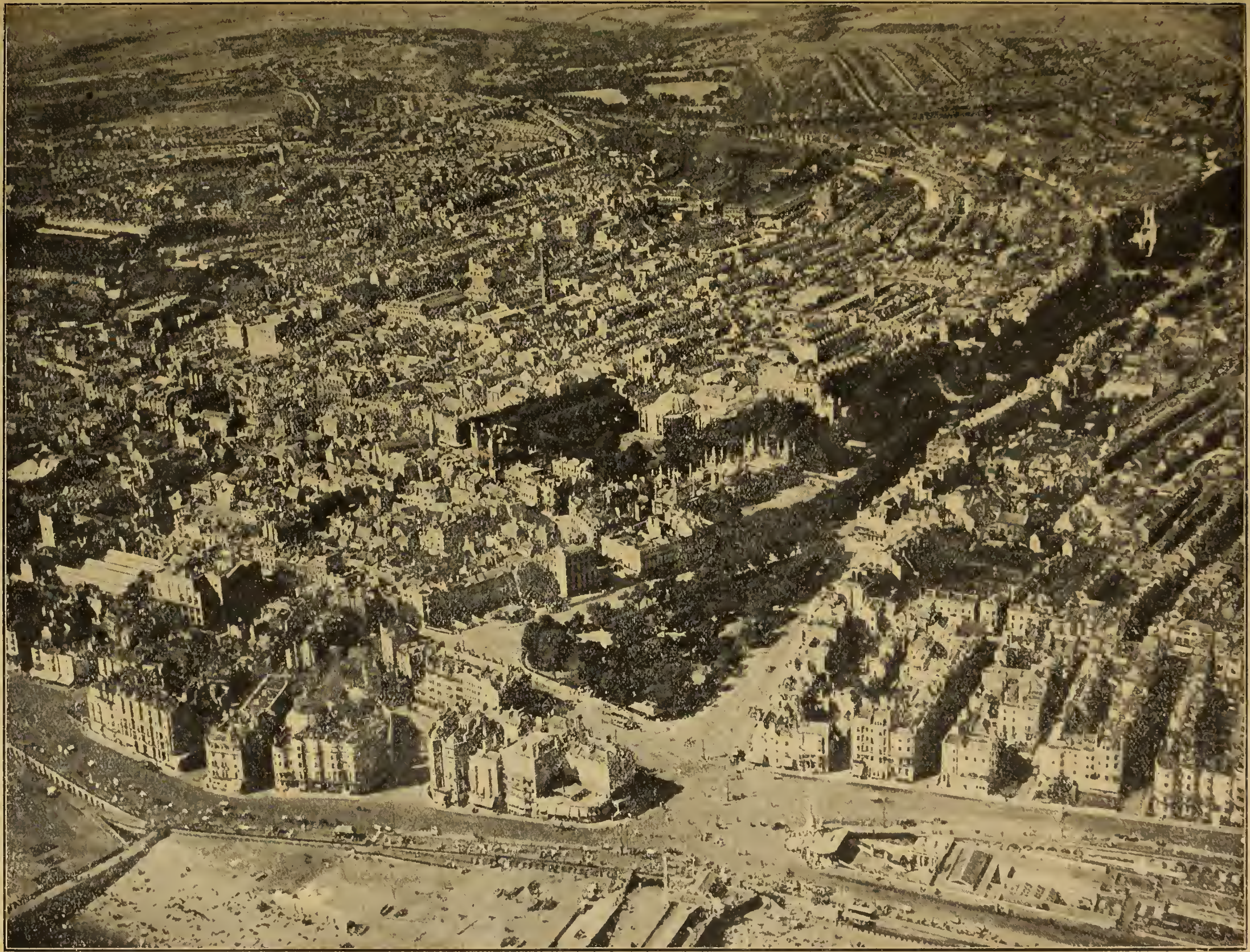
in oblivion, if that be possible. So much mud has been thrown that it is impossible none of it should stick and we fear that more than one party to the case will have cause for remembrance and regret for many years to come.

The Committee deplores that the enquiry was ever granted. It "sincerely trusts that this enquiry will not form a precedent for an enquiry being ever granted hereafter under similar circumstances. . . . It is necessary that those who are employed in the public service shall be removable from the service if the Minister, in the honest exercise of his discretion, thinks they ought to be removed. In such a matter the wounded pride of the officer removed must be allowed no place." That is all very well in its way and had there been no circumstances such as gave the idea to Miss Douglas-Pennant that there was an intrigue against her there need not, and would not, have been an enquiry at all. For this the Committee think Lord Weir was to blame. The Report itself says that "supersession *brevi manu* on August 28, when a month had been given on August 17, was an unfortunate error on the part of Lord Weir. No wonder the lady was startled. . . . The Committee think it clear the change of front was due solely to Sir Auckland Geddes' letter of August 19 (a letter in which Sir Auckland said the arrangements for the W.R.A.F. were thoroughly bad, and unless put right the women's recruiting movement would be jeopardised). Lord Weir was vacillating. He does not seem to have known his own mind in the matter until he was brought up short by the plain intimation from Sir Auckland Geddes, then Minister of National Service, that the existing state of things must not continue. . . . . The circumstances, the Committee think, might well account for a feeling of indignation and resentment in Miss Pennant, which resulted in her pressing for an enquiry when under other circumstances she would not perhaps have done so."

Therein no doubt lay the chief mischief. This journal was among those which insisted that an enquiry was the right of anyone placed as Miss Pennant was situated at the time, and in spite of all the deplorable innuendo and the loose statements which have been made before and during the enquiry, we still think that such an enquiry was inevitable in all the circumstances. We do not propose to review the whole of the painful circumstances again. There is no need, nor would the task be one to our taste in any case, although in totally other directions we have had occasion to point out flagrant cases of abuse which upon enquiry have been rectified. But we do think it transpires that the error of a vacillating Minister placed Miss Pennant in such a position that she was almost compelled to press for the enquiry, which we doubt not she regrets she ever asked for now that the Committee's Report has been made. That lady must accept all the blame and odium that must attach to her for the manner in which she, without going over-deeply into the alleged position, made the grossest charges against individuals who have been entirely acquitted by the Committee, but it is the simplest justice to her to point out that the manner of her dismissal was such as to lay her under a stigma which she believed she could only clear by means of public enquiry. Not only will she have learnt a severe lesson from the result, but it is to be hoped that Lord Weir or any other Minister who may find himself in the dilemma in which he was in August, 1917, will appreciate the infinite harm that can be worked by the failure of the head of a great public Service to know his own mind for more than a week at a time.

* * *

THE AUSTRALIAN FLIGHT: On the left, the start from Hounslow of the Martinsyde 'plane on December 4. "Goodbye-ee!" At top: Mr. Nesbit of the Martinsyde firm wishes good luck to Capt. C. E. Howell on his journey. On the right: The Martinsyde 'plane gets away at 9.35 a.m.



"Flight" Copyright.

A view of Brighton as seen from an Avro seaplane

THE FLIGHT TO AUSTRALIA

Just as this issue of Flight goes to Press comes the expected news of the safe arrival at Port Darwin in Australia on Wednesday last of the Vickers-Vimy-Rolls, piloted by Captain Ross-Smith—and the winning of the £10,000 prize offered by the Australian Government. As a matter of fact the time limit for the flight, 720 consecutive hours, allowing for the difference in time, expired on the morning of to-morrow (Friday), so the Vickers is well inside the period set. Owing to the delay in the transmission of long-distance messages we were only able to record in our last issue the arrival of the machine at Allahabad and its departure for Calcutta on November 28. Continuing his steady progress, Capt. Ross-Smith arrived at Akyab at 2 p.m. on November 29, and at Rangoon (Burma) at midday on the 30th, three-quarters of an hour before Poulet, on his twin-engined Rhone-Caudron, arrived. The latter had flown from Calcutta to Akyab on November 28. The two pilots arranged to fly in company to Bangkok, but Poulet was first away on December 1, and so was enabled to reach the destination first; Captain Ross-Smith, however, landed at 1 p.m. The greatest assistance was given to the aviators by Prince Pitsanoluke and the Siamese Aviation Corps.

On December 2, the Vickers-Vimy-Rolls left Bangkok at 7 a.m., and arrived at Singora at 1 p.m., being escorted during the first 50 miles by four Siamese machines. After the first two hours' flying, the machine had to negotiate a heavy monsoon, but got through safely, although it was found impossible to make the petrol last out until Singapore could be reached. Poulet, who left Bangkok two hours later, was also caught in the storm, and was blown back to Rangoon, 350 miles behind his starting point.

In landing, the tail-skid of the Vickers-Vimy-Rolls was broken, but this was repaired next day. During the night the weather was squally, and Captain Ross-Smith and his crew had an exciting time holding down the machine.

Petrol arrived during the evening of December 3, but it was then raining too hard to put it into the tanks. However the next day—being the pilot's birthday—it was determined to make an effort to reach Singapore and this flight was made through the rain. He arrived at Kalidjatti, near Bandoeng, West Java, at 4 p.m., on December 6. A brief message stated that Captain Ross-Smith was passing through Biwa (Island of Soembawa) on the night of December 8, and that he was expected to be in Australia on Wednesday.

In order to minimise the risk to competitors while flying over the sea from the Island of Timor to Port Darwin, the Australian Defence Department had arranged for the Royal Australian Navy, when warned by competitors, to maintain a patrol between these points.

The Other Competitors

There are now three other machines on the way to Australia. On December 4, Captain C. E. Howell, D.S.O., M.C., D.S.C., accompanied by Mr. Henry Fraser, left Hounslow at 9.34 a.m. on his Martinsyde, fitted with 275 h.p. Royce engine. Previous to starting he receiving the following:—

From Prince Albert: "May you have good fortune in your sporting journey."

From Mr. Winston Churchill: "I wish you the best of fortune in your sporting attempt."

From Maj.-Gen. Sir F. H. Sykes, Controller-General of Civial Aviation: "Every best wish to you in your venture."

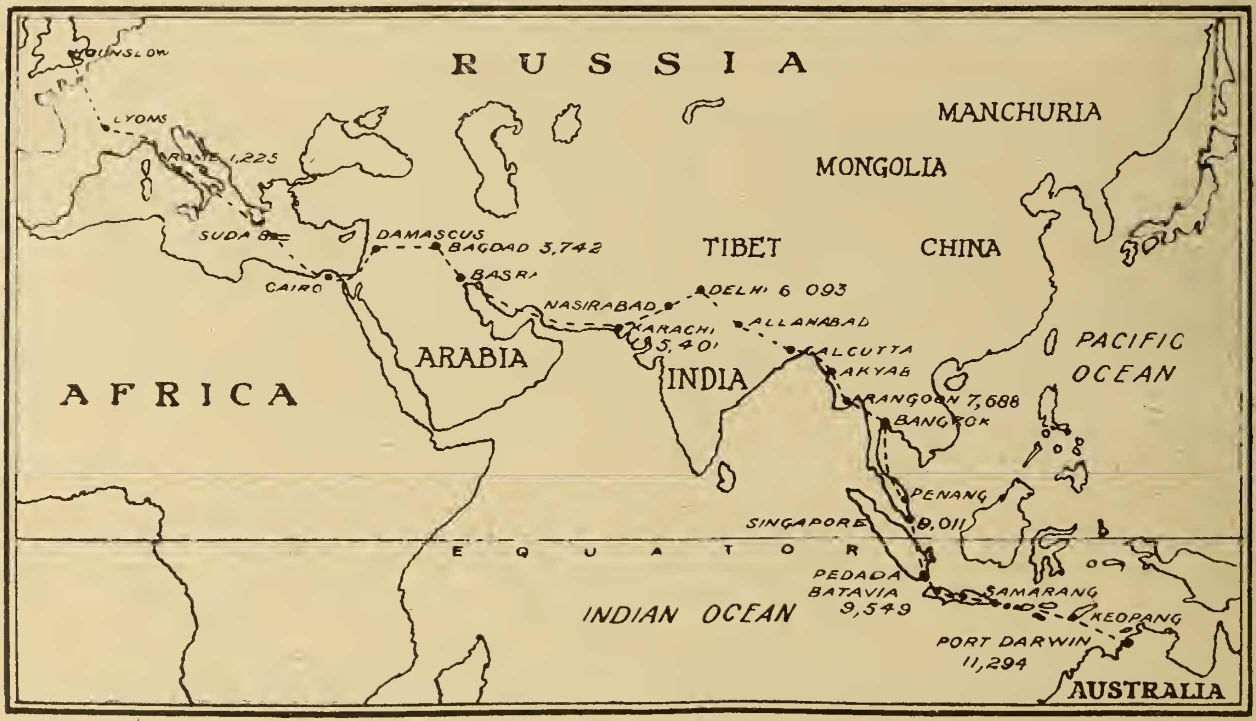
The machine arrived safely at Lyons, and on December 5 reached Pisa at 4 p.m. Padua was reached on December 6, and then bad weather entailed a day's delay, but the machine went on to Taranto on December 8.

The Blackburn Kangaroo, which started from Hounslow on November 21, and was reported at Rome on November 29, was at Taranto at 2 p.m., on December 3, and arrived at Suda Bay. She left on December 8 for Egypt, but when 40 miles from land an oil pipe on the port engine broke, necessitating a return to Suda Bay. The flight was successfully accomplished on the starboard engine alone, and a safe landing effected. The machine itself was undamaged.

This flight followed on a successful flight of 627 miles from Taranto to Suda Bay on a land machine.

The prize was won by Capt. Ross-Smith when he landed at Port Darwin, but the Australian authorities have organised an overland route to Melbourne, with 11 stages in the 2,396 miles. The suggested stages and distances from Port Darwin in the journey are: Katherine, (170 m.), Newcastle Waters (405 m.), Anthony Lagoon (530 m.), Avon Downs 730 m.), all in the north territory; Cloncurry (915 m.), Longreach (1,230 m.), Charleville (1,473 m.), in Queensland; Bourke 1,728 m.), Narromine 1,936 m.), Cootamundra (2,111 m.), in New South Wales, Melbourne (2,396 m.), Victoria.

The crew of the Vickers-Vimy-Rolls consists of Capt. Ross Smith, M.C., D.F.C., pilot, Lieut. K. M. Smith, assistant-pilot, Sergt. W. H. Shiers, A.F.M., and Sergt. J. M. Bennett, M.S.M., A.F.M. The machine, of which a description, with photographs and scale-drawings, appeared in Flight of Nov. 6 last, is fitted with two 350 h.p. Rolls-Royce engines.



Sketch Map of the England–Australia Flight

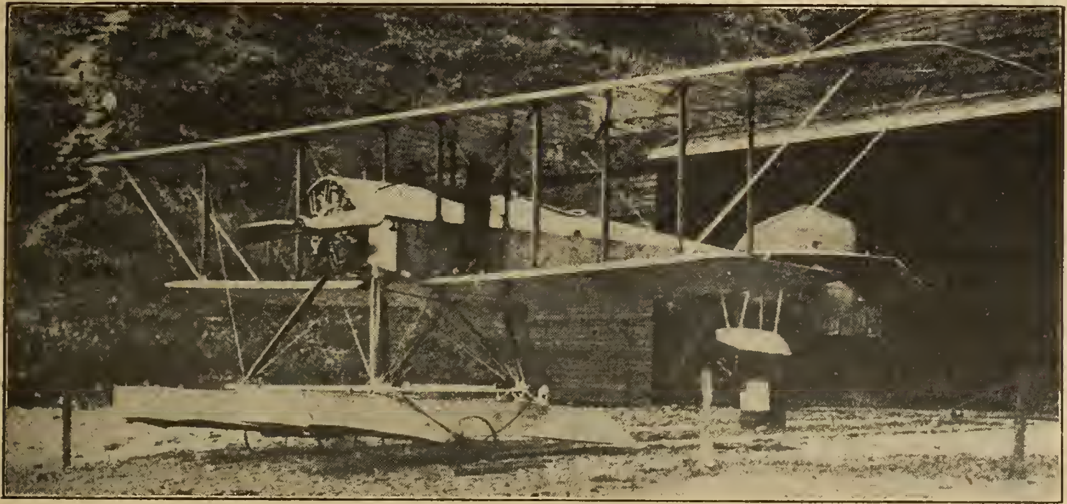
"MILESTONES"

THE BLACKBURN MACHINES. *

Like one or two other firms that date back to the beginning of aviation in this country, the Blackburn Aeroplane and Motor Co., Ltd., of Leeds, as the firm is now styled, commenced their career as constructors of aeroplanes of the monoplane type. These machines had, at first, some resemblance to the famous French Antoinette monoplanes, with their tapered, square-ended wings set at a large dihedral angle, and with triangular-shaped rudders above and below the level of the elevators. They differed considerably from the Antoinette machines in many respects, however, not only in the matter of power plant, which was in those early days either Gnomes or Isaacson radials, whereas the Antoinette had Antoinette water-cooled engines, but also in the wing bracing. The characteristic feature of the Antoinette monoplanes was, it may be remembered, the king post type of bracing. The Blackburn monoplanes had the usual monoplane bracing, and also its undercarriage was of totally different design, being of what was known in those days as the Farman type—that is to say, a wheel and skid combination. The body was of triangular section throughout, braced by wood members instead of wires. Perhaps the most original detail of those early machines was the controls, which were in the form of a wheel mounted on a horizontal longitudinal shaft, which was secured at its forward end by a universal joint. Rotation of the wheel operated the wing warping, an up-and-down motion actuated the elevators, while the rudder was worked by shifting the wheel bodily in a sideways direction. The feet thus took no part whatever in the control of the machine.

As time went on and aeroplane controls commenced to become more standardised, this unique form of controls was discarded in favour of one of more orthodox design. Also, the machines generally were "cleaned up," improving not only the appearance of the machine but also its aerodynamic qualities. At the Olympia Aero Show of 1914 was exhibited the most modern version of the Blackburn monoplane, which was thought a great deal of in those days, and in which the Antoinette influence was rapidly disappearing, the only feature in common being the comparatively large size (for monoplanes) of both machines.

During the same year, 1914, the first Blackburn biplane made its appearance. This machine was a seaplane designed for the *Daily Mail* "Circuit of Britain," which was postponed owing to the outbreak of War. In a general way it resembled the Blackburn monoplanes, but instead of the triangular section body which had characterised the monoplanes, the seaplane had a rectangular section *fuselage*. As the race was called off, the biplane-seaplane, which was to have been piloted by Mr. Sydney Pickles, did not have an opportunity of showing its capabilities in peaceful competition, but quite early in the War she was modified to carry a machine gun, and hence became known as



The Blackburn Type "L" seaplane, 130 h.p. Salmson engine

The "Type L" Seaplane. (September, 1914)

This machine was fitted with a Salmson Canton-Unné engine of the water-cooled radial type, the radiators being mounted on the sides of the *fuselage*. Considering the power loading (over 19 lbs./h.p.), the performance was quite good, and the flight range (445 miles) was rather out of the usual for those days.

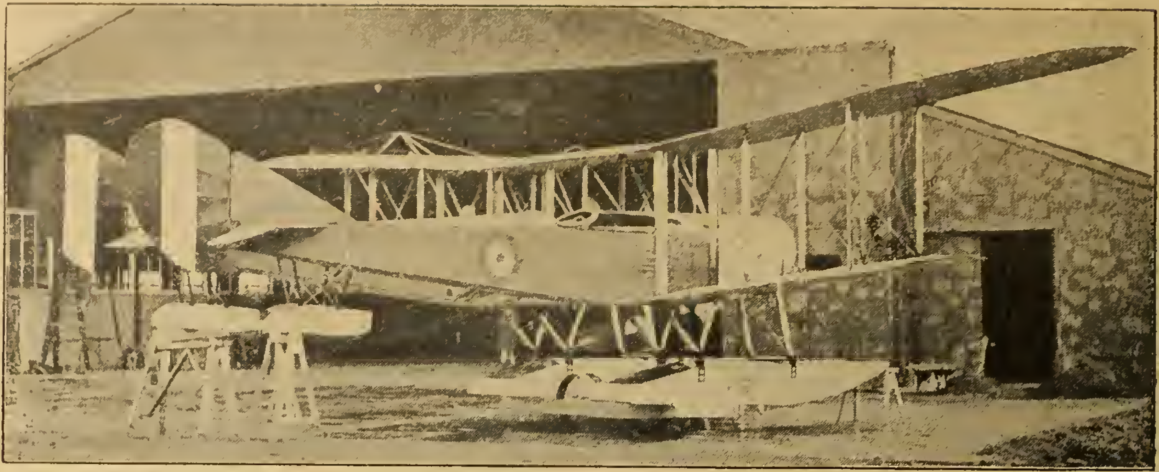
The next machine to be designed and tested was of very unusual design, and was produced as a result of instructions from the Admiralty to design a twin-engined machine for dropping darts. In those days the dart was considered quite a weapon, and certainly the number that could have been carried on a large twin-engine machine should have been sufficient to cause unpleasant punctures in the Hun.

The "Type T.B." Seaplane. (August, 1915)

as this machine was called, represented a very drastic departure from usual practice. Instead of having a central *fuselage*, and the engines placed in *nacelles* on the wings, the T.B. had two *fuselages*, each with

---

* *Previous instalments in this series appeared as follows: Airco (de H.), January 9, 1919; Bristol, January 23, 1919; Sopwith, February 6, 1919; Avro, March 20, 1919; Armstrong-Whitworth, April 3, 1919; Vickers, June 12, 1919. All the scale diagrams of this series are to a uniform scale, and are thus immediately comparable as regards relative size.*



The Blackburn Type "T.B." seaplane, two 110 h.p. Clerget engines

its engine and pilot. The *fuselages* were connected at their forward end by the main biplane structure and at the rear by the tail. As the machine was of the seaplane type, each *fuselage* had under its forward end a plain non-stepped float and a smaller tail float under its stern. In spite of the twin *fuselage* arrangement, which is not usually conducive to beauty of outline, the T.B. was, as will be seen from the accompanying illustrations, by no means an ugly machine, and her performance was very good, both as regards speed and climb. In fact, we understand that as regards the latter she established a record for altitude.

The first experimental machine was fitted with two 100 h.p. Gnome monosoupape engines, but these were replaced, in the production machines, by two 110 h.p. Clergets.

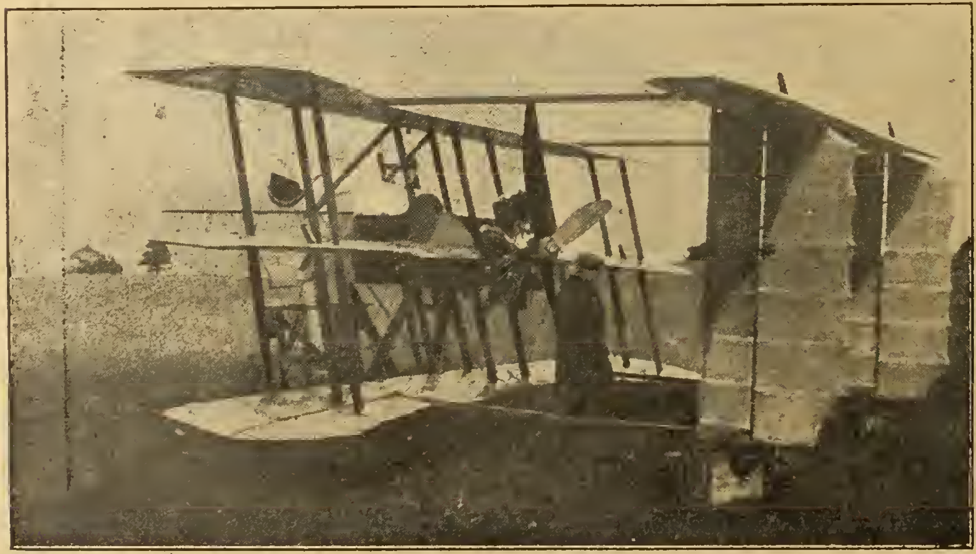
The Triplane Scout. (December, 1915)

In appearance one of the most extraordinary aeroplanes ever built was a little Blackburn triplane produced in 1915. At that time the synchronised machine gun had not been generally adopted, and consequently there was a demand for machines in which the pilot was free to fire in a forward direction. The D.H.2, for instance, was a reply to this demand, and the Blackburn triplane was designed with a similar purpose in view. The machine was provided with a machine gun firing forward through the nose of the *nacelle*, and consequently gave the pilot a very free field. In a rearward direction also the view was quite good, the middle plane being on a level only slightly lower than that of the pilot's eyes.

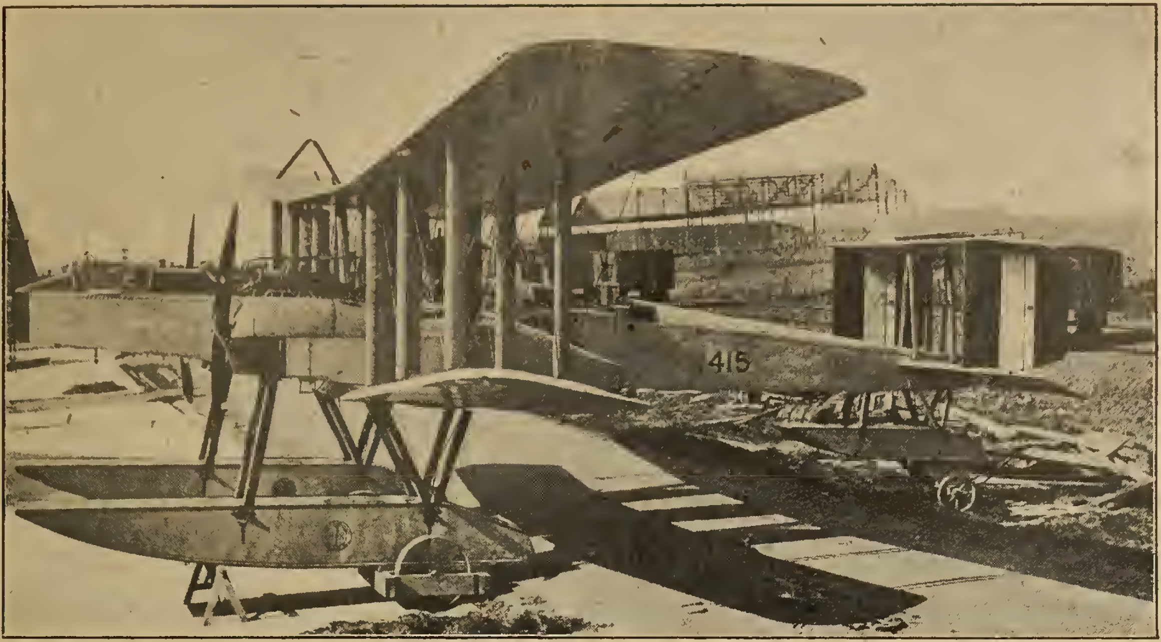
The engine fitted was a rotary 100 h.p. Gnome or 110 h.p. Clerget, both being tried. Considering that the machine was a pusher, which type is not usually as fast as the tractor type of machine of the same power, the performance of the Blackburn was quite good, the maximum speed being 115 m.p.h. With the invention of the synchronising gear for machine guns the *raison d'être* for the pusher type disappeared and the construction was discontinued.

The "G.P." Seaplane, or "Kangaroo" Seaplane.
(July, 1916)

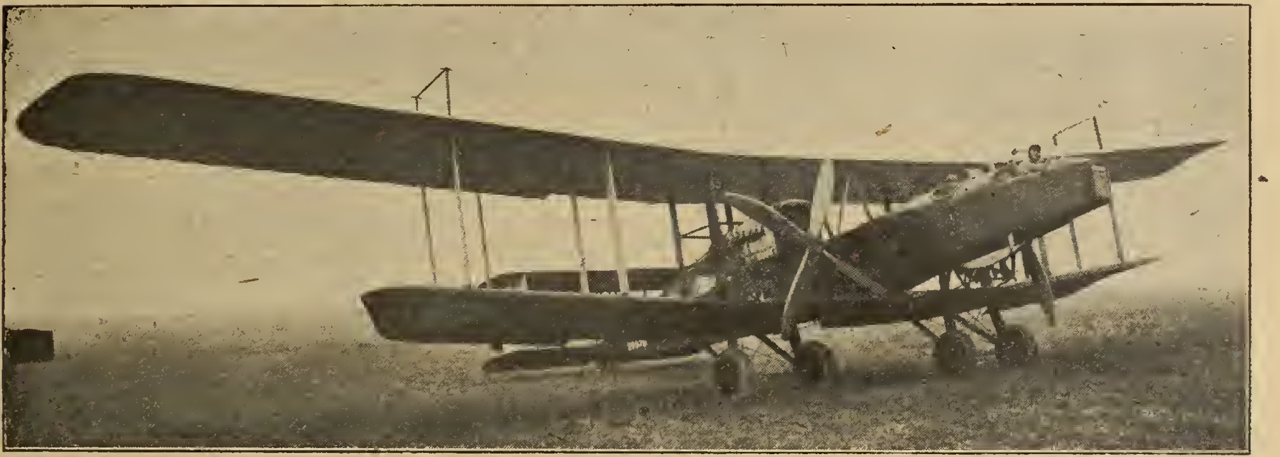
Probably the best known of all the Blackburn machines is the "Kangaroo" land machine, and it is not generally known that the prototype of this machine was a seaplane. This is, however, the case, the machine which led to the production later of the famous "Kangaroo" being a seaplane with two engines placed on the wings, and otherwise being, generally speaking, similar to the land machine that was to follow. This machine was known as the "G.P." (general purpose) seaplane, and the



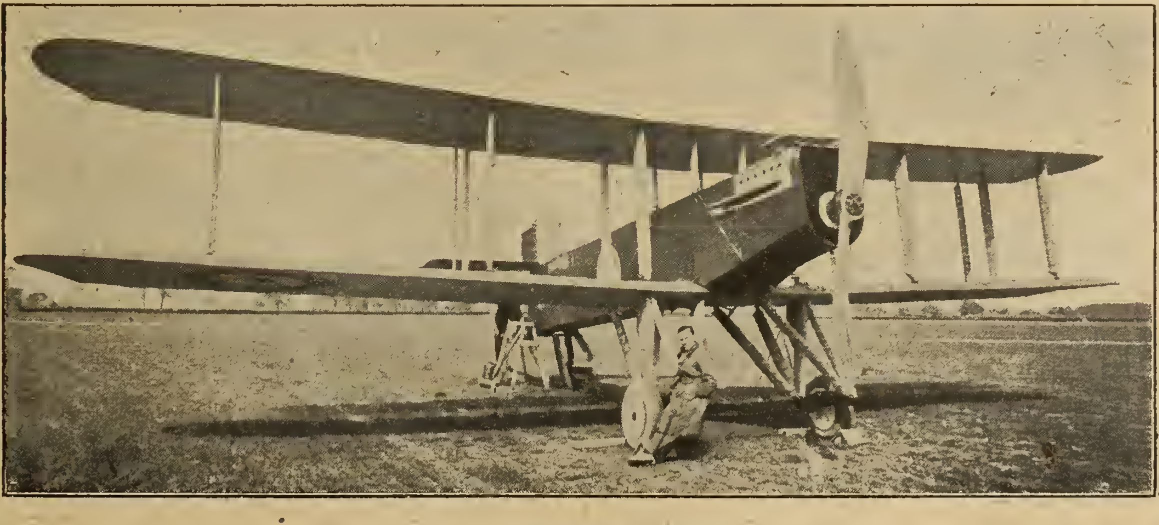
The Blackburn triplane scout, 100 h.p. Gnome Monosoupape



The Blackburn "G.P." seaplane, two Rolls-Royce engines



The Blackburn "Kangaroo," two Rolls-Royce engines



The Blackburn "Blackburd," Rolls-Royce engine first made its appearance in July, 1916. The experimental machine was fitted with two Sunbeam engines of 160 h.p. each. The second experimental machine had two Rolls-Royce engines of 190 h.p. each, and finally the production machines were fitted with two Rolls-Royce Falcon engines of 250 h.p. each. There was a plain, non-stepped float underneath each engine, and a single tail float under the stern of the *fuselage*. The crew consisted of three men, the pilot being placed about halfway between the leading edge of the planes and the nose of the *fuselage*. In front of him was a gunner armed with a machine gun on a gun ring, and farther aft in the body was another gunner whose duty it was to defend the machine against attacks from behind. In addition to the guns and their ammunition, the G.P. seaplane was designed to carry bombs, or even a torpedo, so that it was well armed for either offensive or defensive purposes.

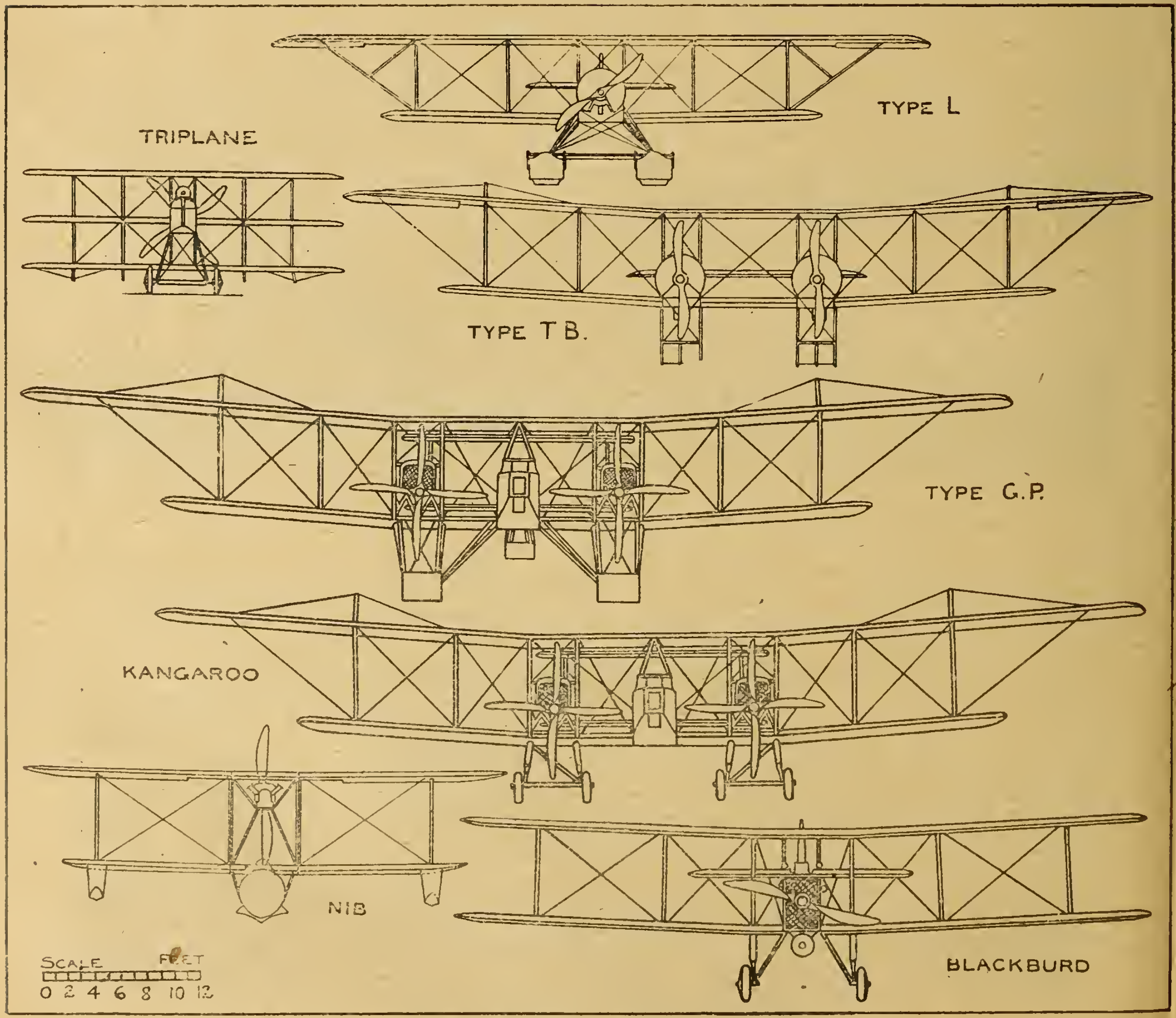
The "Kangaroo" Bombing Aeroplane.

As a direct result of the successful trials of the G.P. seaplane, the Blackburn firm received instructions to convert her into a land machine. By replacing the float undercarriage with two Vees under each engine this was very easily done. In her new form the "Kangaroo" was suitable for night bombing raids, and also, in spite of being now a land machine, for anti-submarine patrol, in which latter capacity she did very valuable work, accounting, we believe, for more than one Hun submarine. The standard "Kangaroo" carries a crew of three, a front gunner who has control of the bomb gear, a pilot, and a rear gunner who also acts as wireless operator. The engines fitted are Rolls-Royce Falcons.

Since the Armistice the "Kangaroo" has done excellent work as a passenger carrier, notably at the E.L.T.A. Exhibition at Amsterdam, while another machine of the same type is now on its way to Australia in connection with the Australian Government's prize of £10,000. As will be seen from the accompanying table, the performance of the "Kangaroo" is very good for the power loading (17 lbs./h.p.).

The "Nib" Flying Boat

The next machine to be laid down was a seaplane of the flying boat type, known as the "Nib." Owing to certain changes in Service requirements this



Front elevations of the Blackburn machines

Table of Dimensions of Blackburn Machines

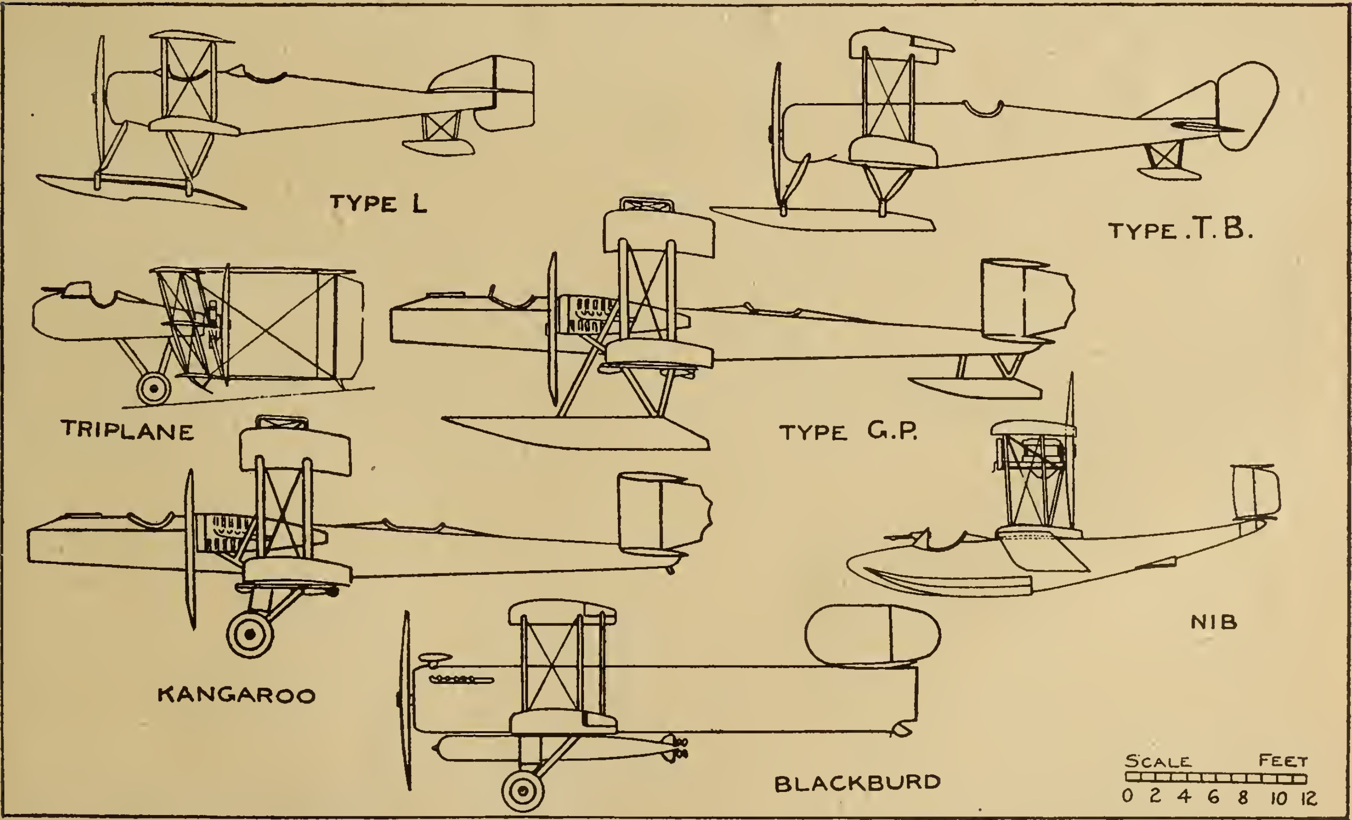
Type of machine.	Length o.a.	Wing span.		Wing chord.		Wing area.*			Incidence.		Gap.	Stagger.	Sweepback.	Dihedral.		*Aileron* area.	Area (sq. ft.).			Area (sq. ft.).		
		Top.	Bot.	Top.	Bot.	Top.	Bot.	Total.	Top.	Bot.				Top.	Bot.		Tail-plane.	Elevators.	Total.	Fin.	Rudder.	Total.
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	square feet.			°	°	ft. in.	ft. in.	°	°	°	sq. ft.						
Type L. ..	32 6	49 6	33 6	5 9	5 9	294½	186½	481	4	4	6 0	Nil.	Nil.	Nil.	2	42	37¼	24	61¼	5¾	13¼	19
Type T.B.	36 6	60 6	45 0	5 6	5 6	341	244	585	4	4	6 6	Nil.	Nil.	4	4	35¼	37	27¼	64¼	15¼	36	51¼
Triplane ..	21 5$\frac{5}{16}$	Top, Inter. and Bot. 24′ 0″ each.		3′ 5″ each.		Top Inter. Bot	79·108 67·116 74·806	221·03	Top, inter. & Bot. 2° each.		3 6	9″	Nil.	Nil.	Nil.	39·2	29·7	25·1	54·8	15·2	23·9	39·1
Type G.P.	46 0	74 10¼	53 3	7 3	7 3	536	344	880	5	5	7 3	Nil.	Nil.	5	5	166·5	80	63·5	143·5	25	22·5	47·5
Kangaroo	46 0	74 10¼	53 3	7 3	7 3	536	344	880	5	5	7 3	Nil.	Nil.	5	5	166·5	80	63·5	143·5	25	22·5	47·5
Nib ..	28 3½	34 10	29 4	5 6	5 6	170	144	314	3	3	6 9	3°	Nil.	3	3	83	30¼	21½	51¾	11	9	20
Blackburd	34 10	52 0	52 6	7 0	7 0	345½	349½	695	¾	¾	7 0	—1°	Nil.	2·05	2·05	77½	61	27	88	19½	5	24½

* Including *ailerons*

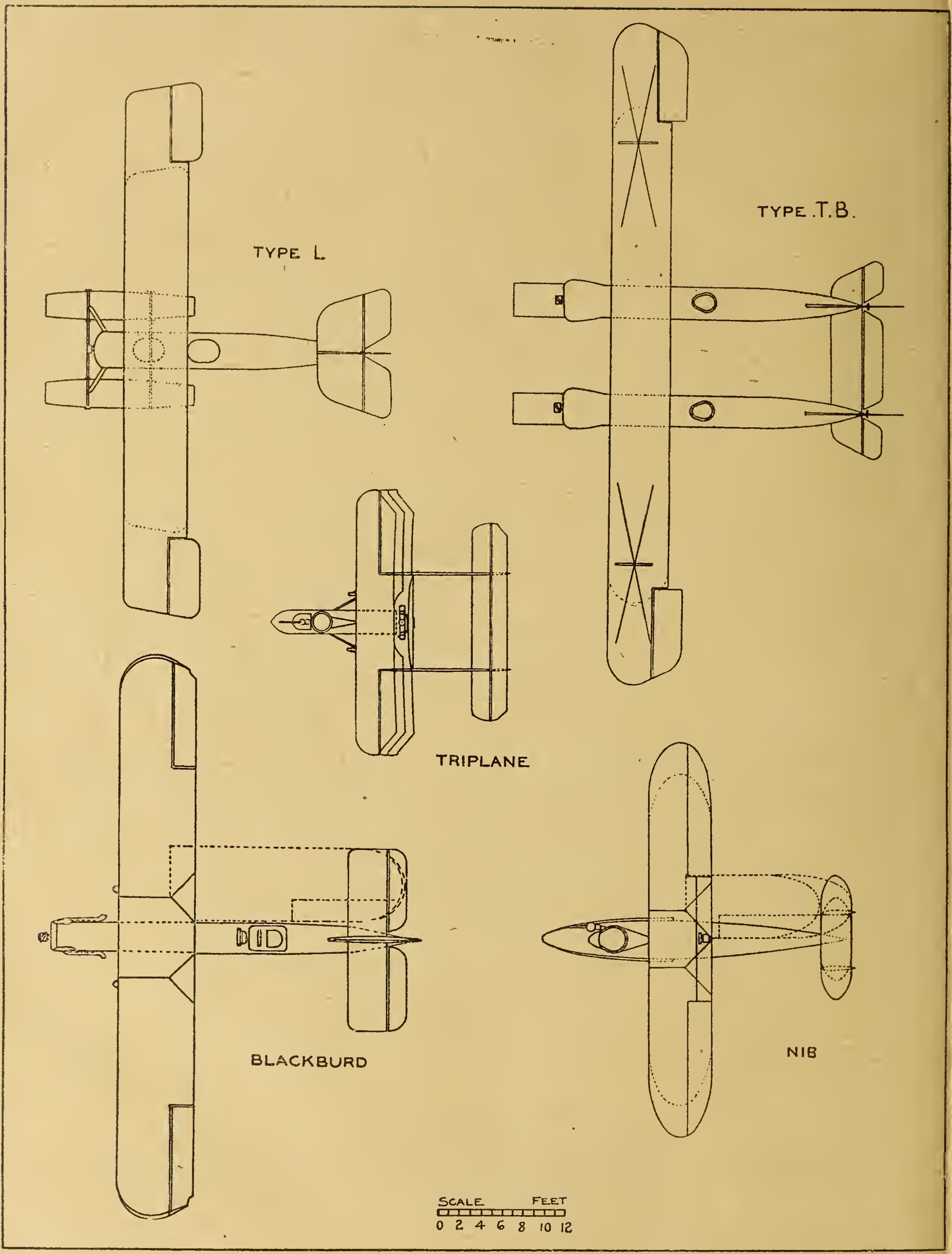
Table of Weights, etc., and Performances of Blackburn Machines.

Type of Machine.	Engine.		Weight of Machine.		Fuel capacity (hours).	Range (in miles).	Speed (m.p.h.).			Climb (in mins.) to			Ceiling.	Landing speed.	Load/sq. ft.	Load/h.p.	Military load.
	Type.	H.P.	Empty (lbs.).	Loaded (lbs.).			Ground level.	10,000.	15,000.	5,000.	10,000.	20,000.	ft.	m.p.h.	lbs.	lbs.	lbs.
Type L. ..	C.-U.	130	1,717	2,475	5½	445	81	64	—	34	—	—	11,000	42	5·15	19·04	—
Type T.B.	M.G. C.	100 110	2,310	3,500	4	344	86	—	—	12	—	—	—	44	6·0	15·9	70
Triplane ..	M.G. C.	100 110	1,011	1,500	3	345	115	—	—	—	—	—	—	45	6·79	13·64	50
Type G.P.	2 R.-R.	190 each	5,690	8,490	6	582	97	77	—	10	30	—	11,000	52	9·64	22·3	630
Kangaroo	2 Falcon R.-R.	250 each	4,970	8,500	6	612	102	82	—	9¼	24	—	13,200	52	9·67	17·0	1,220
Nib ..	H.-S.	200	1,721	2,390	3	342	114	108	—	7	18	—	16,000	45	7·60	11·95	1,152
Blackburd	R.-R. Eagle VIII	350	3,053	5,700	5	475	95	85	—	11¼	33¼	—	13,000	53	8·33	16·20	1,721

C.U. = Canton-Unné. M.G. = Mono Gnome. C. = Clerget. R.-R. = Rolls-Royce.
H.-S. = Hispano-Suiza.



Side elevations of the Blackburn machines

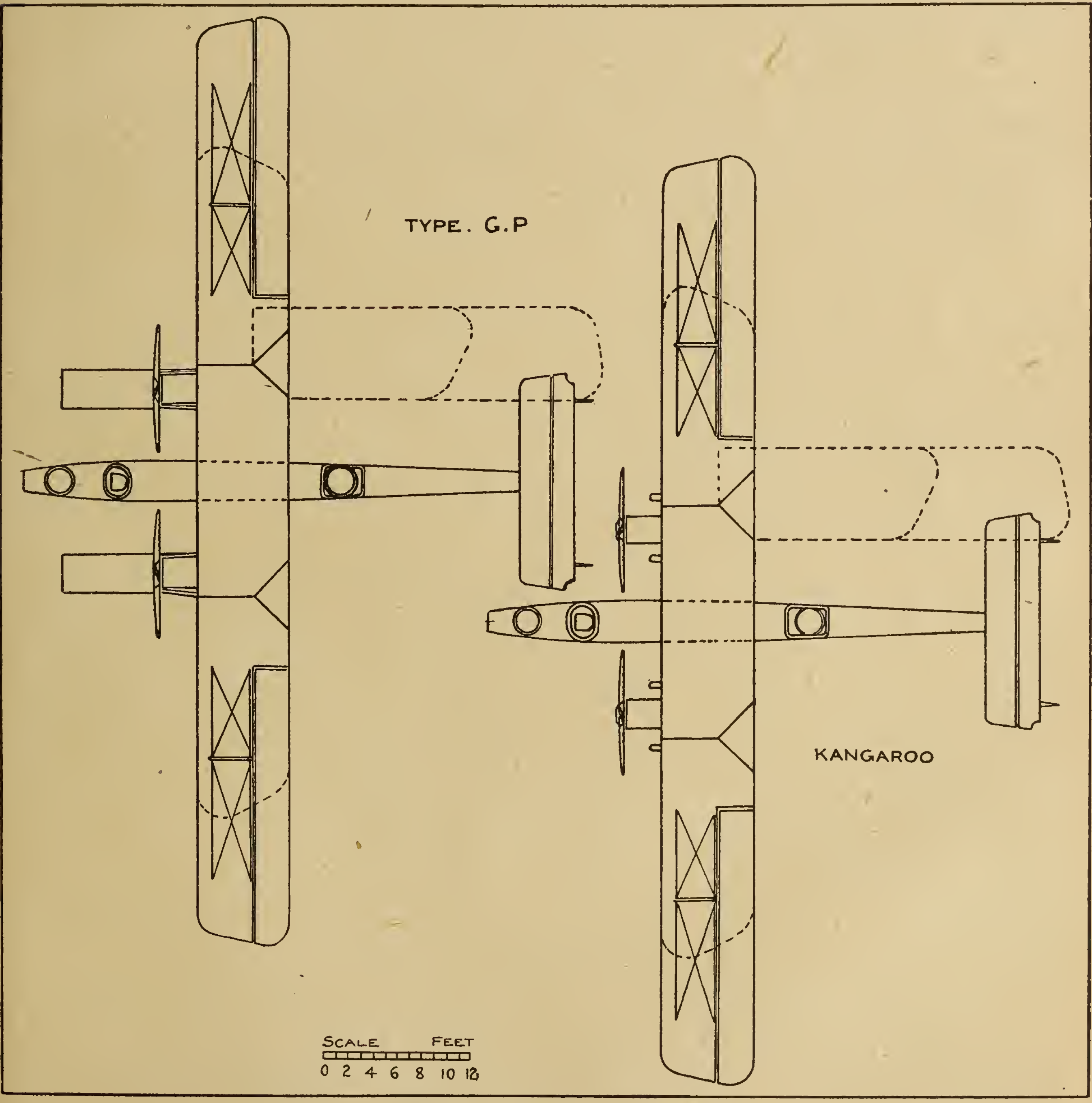


Plan views of Blackburn machines

machine was not actually completed, although we understand that both design and construction were nearly finished. It will therefore be understood that the figures of performance, etc., are estimated ones. The "Nib" was intended to act as escort to our large bombing flying boats.

The "Blackburd" Torpedo 'Plane.

This machine, it will be seen, is of rather unusual appearnance, resulting from the special requirements for which she was designed. As the title indicates, the chief function of the "Blackburd" is that of dropping torpedoes, and, consequently, the lifting capacity of the machine has to be considerable, as the torpedo weighs over half a ton. Also, she is designed for use from a "mother" ship, and hence is of small dimensions when folded. The use from a ship entails starting from the deck and alighting on the deck or on the sea as circumstances dictate. To this end the "Blackburd" has a special undercarriage, the wheels of which can be dropped after rising, leaving clear two long skids which can be used for landing on the deck after the torpedo has been discharged. If, on the other hand, it becomes necessary to alight on the sea, the skids do not, we understand, have the same "tripping effect" as do wheels, and there is therefore less danger of the machine turning over on her nose. When in the water the machine is kept afloat by inflating air bags in the *fuselage*, which gives the necessary flotation to support the machine until she is "collected" by her mother ship.



Plan views of Blackburn machines

IMPERIAL AIR ROUTES

The following report of the Advisory Committee on Civil Aviation to the Right Hon. Winston S. Churchill, M.P., Secretary of State for Air, on Imperial Air Routes, was issued as a White Paper on Wednesday. Although the report comes somewhat late in the day, it is an informative document, and if all Government Committees exhibited the same assiduity in seeking information and lucidity in reporting, we think there would be a decided change in public opinion as to the usefulness of such bodies :—

The Committee have given very careful consideration to the question, "How best to organise Imperial Air Routes,' which was the question specifically referred to them for consideration and advice when they were appointed. The Committee understand the designation "Imperial Air Routes" to mean routes which will enable the new transport element, namely, the air, to be made use of in speeding up communication between the various portions of the British Empire. This Report throughout deals only with heavier-than-air machines. The Committee propose to submit a further report dealing with the subject of the possible use of lighter-than-air craft in the development of Imperial Air Routes.

They have considered Canada, Newfoundland, South Africa, India, Australia and New Zealand as the main outlying portions of the British Empire (and to these they would add Egypt) to which they should direct their attention, and have thought it best to confine themselves to the question of the establishment of main trunk lines connecting these portions of the Empire with the United Kingdom by air. Such trunk lines would no doubt in course of time be supplemented, if not preceded, by local lines connecting up the various Dominions and Colonies internally, and with other Dominions and Colonies, but this portion of the problem is one which the Committee do not conceive themselves to be called upon to deal except on specific reference by the Secretary of State.

They offer the following observations on the problem of main trunk lines. At the outset they wish to make it very clear that they have in their investigation kept always in view the present financial position of the country. That position obviously dictates the restriction of proposals to what is necessary to meet the essential needs of the present situation.

Under existing conditions it is not practicable at the moment to recommend any large appropriation of public funds by way of investment in what is now an entirely novel business. The Committee, however, are of opinion that, taking a long view, any investment such as they suggest will at least bring the necessary experience to help to establish flying ultimately on a paying basis.

The Committee realise to the full the unique character of the problem, which is, whether any, and if so what, steps can and should be taken now to develop civil transport over these routes in an element wherein the controlling and limiting factors are as yet very imperfectly understood. There is little guidance to be found in experience, but as compensation there are no precedents or vested interests to hamper an attempt to solve the problem.

The Committee have started from the basis that the problem is one which is capable of solution, that there is a future for the development of the air as a new means of civil transport and communication, in spite of the present handicaps from a technical, operational and financial point of view. They feel it necessary to endeavour to strike a mean between the view of those who, in contemplating the development of air transport, lose sight of the difficulties and dangers whcih at present beset it, and advocate too ambitious schemes, and those others who, while freely admitting the progress of aviation on the service side during the War and the great influences which that progress exercised on the position, are yet very doubtful whether the War development went so far as to establish even the practicability in the immediate future of making use of the air element for everyday commercial purposes.

The Committee have been impressed by the unanimity of the opinion of those who have identified themselves with development in civil aviation as to the fact that the problems involved in each section of an Imperial Route vary greatly and thereby render the formulation of a general Government policy exceptionally difficult at present.

The Committee accordingly find themselves without enough data or experience to justify them in recommending any rigid policy involving the immediate planning and initiation of any complete scheme of Imperial routes at present. They have come to the conclusion that in the meantime the correct policy is to initiate immediate action to obtain experience, and that such experience should be obtained on that part of the whole field of Imperial routes which offers the best chance of success, leaving the initiation of action elsewhere for further consideration when fuller experience has been obtained.

They have no hesitation in deciding that the proper place for initial action is the route from this country to India, and ultimately thence to Australia. In the second place stands the route from this country to South Africa, which on the section from this country to Egypt would be the same as the first route. They consider it would be wise in the first instance to deal with the problem in reference to one section of the route from this country to India, viz., the section between Egypt and Karachi, leaving to the Indian Government the initiation and encouragement of the internal air routes in India. They are convinced that this section is the sphere in which experience can be most readily and usefully obtained, as the conditions of aerial navigation on this section are judged to be more favourable than elsewhere. Assuming that an air route is to be established between these points, the first question which arises is the broad question of principle as to the agency by which that work can best be undertaken.

The point has been made that at this moment the readiest way of testing the air possibilities of the route for civil purposes would simply be to give to the Royal Air Force squadrons stationed on or near the route the task of carrying mails, passengers, etc, in so far as their Service duties allow them to do so, or, in the alternative, to increase the formations for strictly Service purposes by additional formations to meet the civil requirements. The Committee have considered this method, and have decided against it. There are weighty Service objections against the use of the Royal Air Force for civil purposes, under either of the two alternatives above mentioned, and the Committee cannot avoid the conclusion that under neither alternative would the conditions be such as to enable any real judgment to be formed or experience gained as to the possibilities of civil aviation. They must also give weight to the consideration that private enterprise would be entitled to raise strong objection to State monopoly or direct State competition on what the Committee themselves find to be the best sphere for trying out the possibilities of the new form of transport. There is also the very important consideration that in the view of the Royal Committee the development of aircraft for Civil and Service purposes must before long result in their differentiation into distinct types, and that consequently assistance in the development of commercial aviation cannot be permanently expected from the Service side otherwise than in the spheres referred to below, such as common use of aerodromes, wireless, and meteorological facilities, etc.

Assuming, then, that direct action by the Royal Air Force is set aside, the Committee have had to consider what other arrangements are feasible. They are met at the outset by the difficulty that without State aid in one form or another, they see no prospect, more especially in present financial conditions, of any private enterprise embarking capital in a venture of this description, where, as they have already observed, experience is lacking and many unknown factors will come in. The Committee have accordingly come to the conclusion that State aid in one form or another will be essential. They consider that there is a case for such State aid, holding that the moderate expenditure which in present financial conditions is all that should be contemplated is justified as an investment in an undertaking with very great ultimate possibilities. The Committee have considered three possible methods of organising the undertaking :—

1. Operation by the State itself.
2. The constitution of a Chartered Company combining State and private capital.
3. Private enterprise, State aided.

The Committee are against 1, operation by the State itself. They consider that in a new enterprise of this description, the work of initiation and development is work which the State cannot perform in such a way as to enable the possibilities to be properly tried out.

The Committee have had before them various suggestions for 2, the formation of a chartered company combining State and private enterprise. This proposal presents certain attractive features. It is argued that it would enable the organisation to be so formed as to contain representatives of different interests concerned, such as aircraft constructors, shipping companies, and the various departments of State, including the Post Office. It is argued that it would secure a single and uniform development of policy, the co-ordination of all effort, the standardisation of material, the avoidance of any objection on the ground of monopoly, and more or less definite support to the existing aircraft contractors by preferential treatment in the supply of material. The Committee appreciate these arguments, but have come to the conclusion that they cannot recommend this form of organisation for the following reasons :—The enterprise under consideration is of all enterprises one in which it is essential that the direction should be free from stereotyped methods and open to new ideas and suggestions, even those which would normally be regarded as imaginative. The concentration of all British aerial effort into a single organisation would have a narrowing tendency likely to jeopardise success. There is serious risk that a chartered company would tend to develop a system of bureaucratic control, open to the same objections as direct control by the State.

The Committee consider that too much weight can easily be attached at the present to the arguments for standardisation.

They have, therefore, come to the conclusion that the third method is the sound one—*i.e.*, the use of private enterprise with some measure of State aid behind it. They would point out that it is in this way that the development of British trade and industry has been attained in the past, and that it best secures the initiative and drive which are vital in the undertaking now under review. At a later stage of the general development it may well be that other methods may be usefully employed, but at this stage the Committee hold that the case is one for the application of the traditional British method of private initiative and private enterprise, with just such assistance from the State as is requisite for the securing of success.

They have considered closely the problem of the form which this State assistance should take. There are certain facilities required for air navigation which are clearly best provided by the State, such as meteorological and wireless information and the like. These the State should in any case provide, but the Committee think that it must go further and undertake the provision of what may be called Air Ports—*i.e.*, the terminal and intermediate aerodromes and emergency landing grounds. The provision of these by private capital would lay an initial burden on the enterprise, which would be likely to be fatal to its inception. Further, if, as the Committee anticipate, the enterprise develops and establishes itself, it is on expenditure on Air Ports that the State might expect to obtain a return in the shape of charges for use. Moreover, the Committee are of opinion that, when aerial transport over Imperial Air Routes is an assured success, it will be of the greatest importance that the Air Ports should be owned and controlled by the State. The Committee regard this as an important factor in preventing operating firms from building up "good-will" of a serious character against the Government. State ownership will give a very full degree of control by the State over commercial flying and will prevent the very dangerous possibility of monopolistic control if the aerodromes were privately owned and merged into a trust. The Committee generally attach the utmost importance to the principle of State ownership and control of Air Ports, and they think the matter of sufficient importance to justify it being brought to the notice of all Governments of the Empire.

In the case of the Egypt-India Air Route, the Committee understand that it has been decided for purely Service purposes to establish and maintain aerodromes and landing grounds for the transit of machines to India, and that proposals to this end have been approved by the War Cabinet. Consequent upon this decision, it appears to them that the approval and execution of this scheme, while meeting Service needs, will also be a starting point for the civil development of the air route from Egypt to India ; they are advised that the civil air route, at all events at the outset, will best follow the route laid down for Service machines. They strongly urge, therefore, that the Service proposals for joining India and Egypt by air should be put into effect as soon as possible.

They are advised that when this is done it will be possible to pass one civil machine per week each way between Egypt and India. It may well be that, as civil aviation develops, further facilities will be required, which facilities would naturally mean further expenditure on the routes for purely civil purposes. The Committee, while recognising that additional expenditure beyond that incurred on the establishment of this route for Service purposes is inevitable, as the facilities are increased, to meet civil requirements, find it difficult to estimate closely at the moment either the total amount so required or the periods when the additional expenditure will be necessary. But clearly the need for additional expenditure must be taken into account now.

It is then necessary to consider what concrete action should be taken to give private enterprise its opportunity of getting on to the route. The element in which the air has the advantage over other means of transport is speed. The Committee are advised, for example, that the time occupied in transit from Egypt to India by sea, namely, nine days at a moderate computation, could be reduced by not less than three-and-a-half days if the transit were made by air, and in the future might be still further reduced.

Accordingly, it would seem that the first step is to ascertain on what terms arrangements can be made for the carriage of mails by air—the carriage of express goods and of passengers being relied on as ancillary to the carriage of mails. The Committee recommend that the Post Office, in consultation with the Air Ministry, should forthwith draw up a form of tender for an air mail contract between Egypt and Karachi and/or Bombay. It would be put up to limited competition between firms of such standing as to make it reasonably certain that they could perform the services tendered for. This contract should provide for alternative tenders for services of varying frequency per week, and would be fitted in with the standing ocean mail contract. In calling for tenders it would be made clear what facilities the State would provide in the way of meteorological, wireless, and other information, and in the way of aerodromes and landing grounds. At the outset these facilities may have to be restricted to those provided under the purely Service scheme above mentioned, particulars of which, if approved, would be made known to tenderers, and which would cover the transit of one machine per week each way.

Tenderers would be requested to quote for more frequent services on the basis that the State would, in presence of the tenders, consider that further facilities as above could properly be provided.

It appears to the Committee that the above method of procedure is the only way of arriving at a judgment on experience of what the cost and income of an air route on this section is likely to be. In the light of this experience, the whole problem would be further considered, and a more general policy for further development prepared.

The Controller-General of Civil Aviation has, during the course of the meetings, informed the Committee as to what is being done for civil aviation in other countries, and the Committee understand that he is forwarding to the Secretary of State a statement of this information, from which it will be seen that in certain cases subsidies and other forms of assistance are given which are not included in the recommendations of this report. The Committee suggest as a possible additional form of assistance that a certain quantity of the aircraft engines and material which have been declared surplus by the Royal Air Force could be placed at the disposal of the Civil Aviation Department for distribution free in this country and the Colonies.

The Committee understand that in India and Egypt local regulations prevent any pioneer work whatever in civil aviation being carried out. The policy underlying these regulations is not a matter for the Committee. From the point of view of civil aviation, which is their concern, they consider it very desirable that all prohibitory bans on civil aviation, so far as those parts of the British Empire which are under the direct control of the Imperial Government are concerned, should be removed at once, and that representations be made to the Dominions and India in favour of the immediate acceptance of a similar policy.

The conclusions of the Committee may be summed up as follows :—

(1) That the air route from Egypt to India should be developed.

(2) That the development should be by private enterprise backed by State assistance, and that the State assistance should take the form of providing meteorological and wireless services and of air ports, including the provision of the sheds required for running purposes.

(3) That the Service proposals for these air ports should be carried through as soon as possible.

(4) That the necessity for additional expenditure on the development of these ports for purely civil purposes in order to meet the increase in frequency of the services should not be overlooked, though only experience can show what such expenditure may be.

(5) That the G.P.O., in consultation with the Air Ministry, should draw up a form of tender for an air mail contract between Egypt and India to be put up for competition.

(6) That a certain quantity of the aircraft engines and material which have been declared surplus by the Royal Air Force could be placed at the disposal of the Civil Aviation

Department for distribution free in this country and the Colonies.

(7) That the prohibitory bans on civil aviation in Egypt and India should be removed.

These modest recommendations are made on the assumption that the State intend to maintain flying supremacy by supporting the Service side at a level that will ensure the safety of the position.

The report is signed by Lord Weir of Eastwood (late Secretary of State for the Royal Air Force) (*Chairman*); Lord Inchcape of Strathnaver, G.C.M.G., K.C.S.I., K.C.I.E., Sir James Stevenson, Bart. (Member of the Army Council and of the Air Council) (*Vice-Chairman*), Col. J. T. C. Moore-Brabazon, M.C., M.P., Mr. Charles I. de Rougemont (Chairman of Lloyds), Mr. H. White-Smith, C.B.E. (Chairman of the Society of British Aircraft Constructors), Mr. L. Bairstow, C.B.E., F.R.S., Air-Marshal Sir Hugh M. Trenchard, Bart., K.C.B., D.S.O. (Chief of the Air Staff), Maj.-Gen. Sir Frederick H. Sykes, G.B.E., K.C.B., C.M.G. (Controller-General of Civil Aviation), Sir W. Arthur Robinson, K.C.B., C.B.E. (Secretary of the Air Ministry), Mr. F. G. L. Bertram, O.B.E. (Air Ministry) (*Secretary*).

◆ ◆ ◆ ◆

Honours

THE War Office announced on November 26 that the President of the French Republic had awarded the Croix de Guerre to L. R. P. Harvey, M.C., 5th Lancers, attd. R.A.F., for distinguished services rendered during the War.

R.A.F. Decorations

IN the *London Gazette* of December 5 were published several warrants dealing with the ribbons for the Distinguished Flying Cross, the Air Force Cross, the Distinguished Flying Medal and the Air Force Medal, the creation of which decorations was announced in a supplement to the *London Gazette* dated June 3, 1918. The first warrant, dated June 3, 1918, prescribes the designs for the ribbons, with horizontal stripes, but the second warrant specifies the diagonal arrangement subsequently adopted. It sets forth that the Distinguished Flying Cross is to be worn on the left breast pendant from a ribbon 1¼ ins. in width, in colour violet and white "in alternate diagonal stripes of ⅛ in. in width, running at an angle of 45 deg. from left to right." The ribbon for the Air Force Cross is similar, except that the colours are red and white, while the ribbons for the D.F.M. (violet and white) and the A.F.M. (red and white) are arranged in the same way, but the stripes are only half the width of those for the Crosses. A further Royal Warrant makes civilians eligible for the A.F.C. and the A.F.M., which are awarded for "acts of valour, courage, or devotion to duty performed whilst flying though not in active operations against the enemy." These two distinctions may under the revised regulation be awarded to "individuals not belonging to Our Air Force (whether Naval, Military or Civil), who render distinguished services to aviation in actual flying." The designs for the D.F.C. and the A.F.C. were illustrated in FLIGHT of August 28.

Aerodromes and Landing-Grounds

LINTHORPE aerodrome, West Acklam, Linthorpe, near Middlesbrough, has been licensed as suitable only for Avro 504K and other similar types of aeroplanes. Luce Bay aerodrome, Stranraer, formerly a service station, has been passed over to the Disposal Board.

Air Work on Indian Frontier

IT was reported from India on November 25 that a few sub-sections of Mahsuds had come in asking for peace as a result of the daily air raids which have been carried out since November 13; but they were informed that until there was a general agreement among the tribe to submit to our terms and a representative *jirgah* makes surrender no such overtures could be entertained. On November 27 seven tons of bombs were dropped and 8,000 rounds of small arm ammunition fired. On November 28 three and a half tons of bombs were dropped and 5,200 round fired. Good results were obtained.

Aerial Mails in India

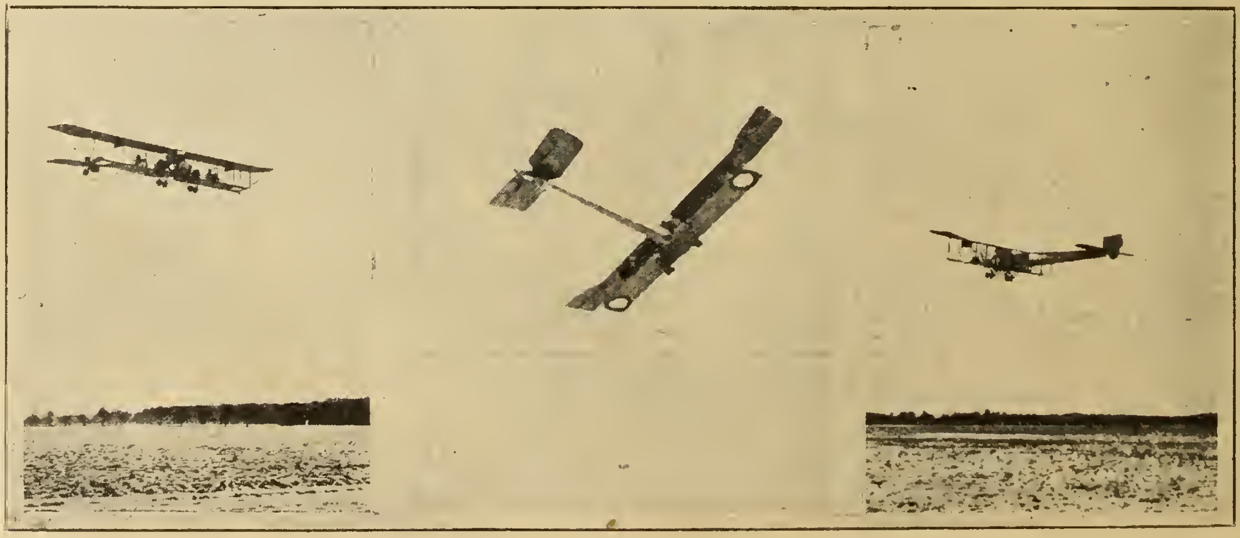
AN aerial mail service is to be inaugurated between Bombay and Karachi on January 1, by means of which residents of Karachi will be enabled to post home letters at least 24 hours after the dispatch of the mail steamer from Karachi and yet catch the steamer at Bombay.

The Monaco Seaplane Meeting

THE International Sporting Club of Monaco is now busily engaged in organising the seaplane competition which is to be held at Monaco from April 18 to May 2, 1920, a week separating these events from the motor-boat meeting. The main event will be over three stages: 1. Monaco–Corsica (alighting on the sea at Bastia or Ajaccio)—Bizerta, 750 kiloms.; 2. Bizerta–Tunis–Sousse–Bizerta, 500 kiloms.; 3. Bizerta–Monaco direct, 750 kiloms. The winner will be the competitor which covers the course in three days and makes the best time over the last stage, the competitors being placed—firstly, according to the number of days taken for the three stages, and secondly, by the speed on the last stage. The prizes will be 100,000, 30,000, 12,000 and 8,000 francs. The machines must carry a useful load of 400 kilogs., except in the case of those fitted with a separate motor for the wireless installation, in which case an allowance of 30 kilogs. is made; all machines must be fitted with wireless equipment, and must be capable of climbing 2,000 m. in 45 mins The body, engine and floats of the machine must be of the nationality represented. The main idea underlying the contest is that it represents a mail service, and at each stop the pilot will have to hand over a sack of sand weighing 1 kilog., and receive a similar sack in exchange. The start will be given at 6 a.m. on April 18, and the controls will be open between 6 a.m. and 6 p.m. each day.

The other events include an altitude competition, in which the prize is 10,000 francs, and a speed contest, on April 25, over the 125 kilom. course, Monaco–Cannes–Monaco–Mentone, for which the prize is 5,000 francs.

Entries close on February 29, and full details of the regulations can be obtained from the International Sporting Club, 10, Rue Auber, Paris.

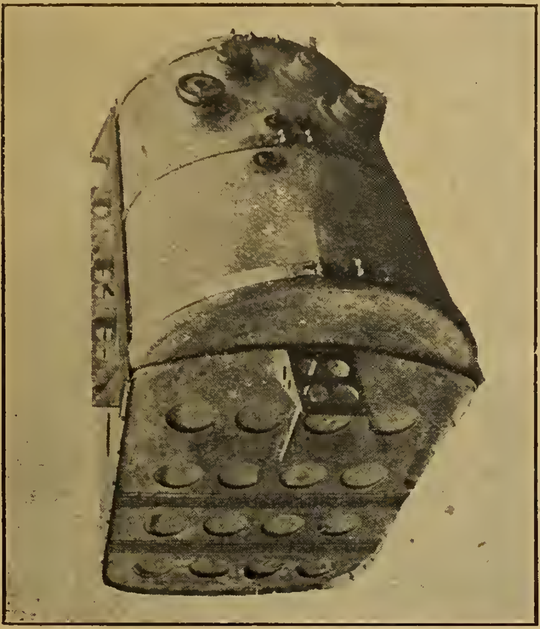


Three views of a four-engined Sikorsky biplane in flight

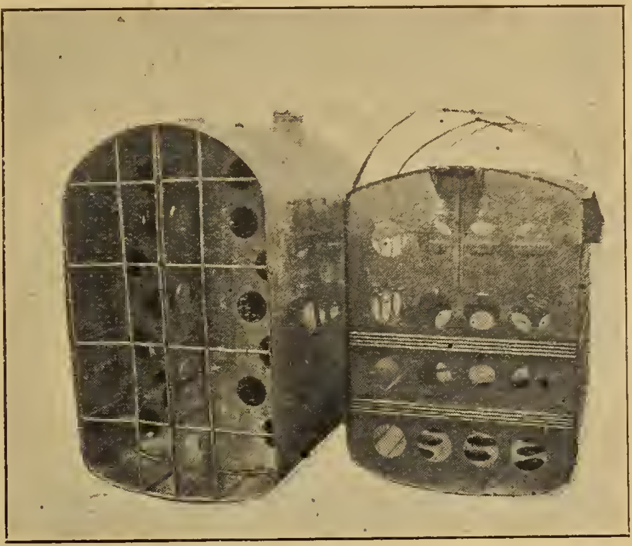
THE IMBER SELF-SEALING PETROL TANK

One of the outstanding inventions of the War, but one of which the general public has heard little, was the Imber self-sealing tank, which has now to be fitted to all Service aircraft. It is asserted that approximately 75 per cent. of the fatalities, which occurred previous to the invention of this tank by Mr. J. Imber, were directly attributable to the fact that the fuel tanks had been pierced and the leaking petrol had become a source of danger.

Many thoughtful persons had given their attention to the problem, but they were baffled by the fact that in many cases when an ordinary bullet passes through a tank it will tear a hole six or eight inches in diameter in the side of the tank opposite to that in which it enters. A large proportion of the devices proposed failed either because they were too heavy or some important detail of the structure was not properly disposed.



An Imber tank, in its cradle, as fitted on Airco (De H.) 9a machines



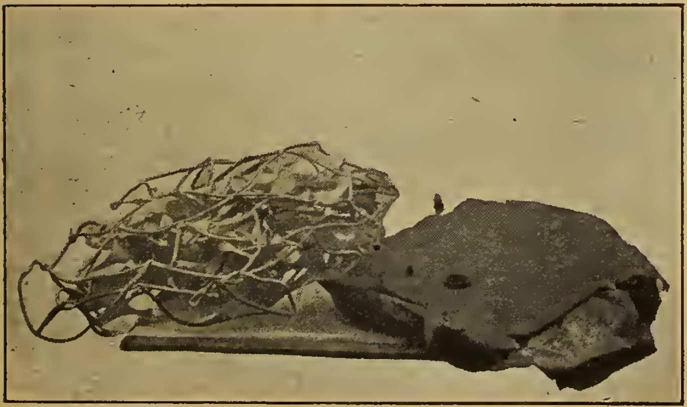
On the left, the interior of an Imber tank, and, on the right, the cradle as used on Airco 9a machines

It may be pointed out that a bullet entering the fuel tank makes an aperture as large as itself, but in emerging a relatively large hole is torn in the metal. On investigating this Mr. Imber came to the conclusion that the larger hole was due to the great pressure of fuel against the far side of the tank. Upon entering the tank the progress of the bullet is somewhat arrested by the liquid, but in its travel through the tank the pressure of the liquid increases both in area and force from the point of entering to a distance of approximately 2 ft. 6 ins. Thus, when a bullet travels through a tank of large diameter, its momentum is checked before it goes entirely through, while, on the other hand, in a tank of ordinary size, it is found that up to a certain point the further one side wall is from the other, the larger will be the hole torn upon the exit of the bullet.

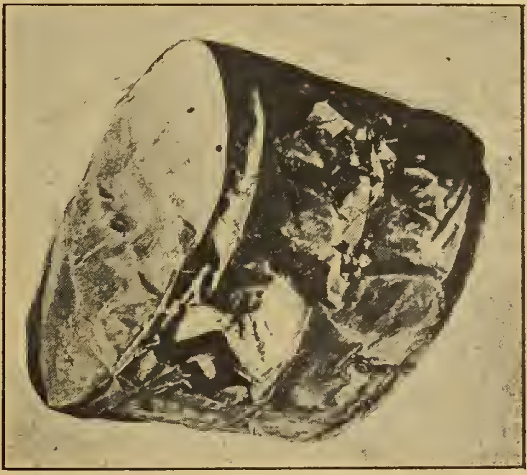
It was readily seen that the pressure generated in the tank would either have to be confined or released. Many inventors sought to confine the pressure, but results showed that when the bullet made its exit the pressure sought exit through the aperture made by the bullet, and in its effort to escape a large rupture is made in the tank.

Having acquired a knowledge of the action taking place in a petrol tank when it was pierced, Mr. Imber sought a means of perfecting a tank that would not only prevent leaking when pierced, but which would also prevent the escape of the liquid in the event of a bad crash.

In the Imber tank the pressure is allowed to escape by providing the tank with a resilient outer rubber covering, so that when the pressure exceeds a certain point the tank yields and the rubber stretches out from the side of the tank under pressure. Naturally, the highest point on the stretched



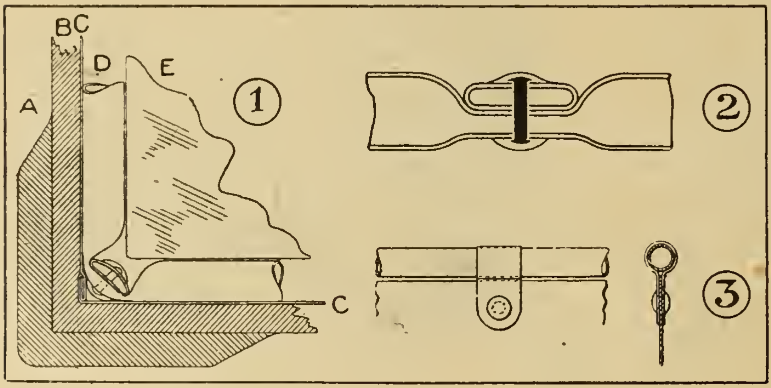
A 27-gallon Imber tank after being dropped from a height of 400 ft. from a Handley Page machine. On the left the framework, and, on the right, the covering. After this experience the rubber casing still held the petrol intact



Another Imber tank stripped of its cover after 18 shots had been fired right through it. Despite this treatment, the tank did not leak rubber covering is that through which the bullet makes exit, and the rubber being stretched makes this point also the thinnest portion of the covering, so that when the bullet leaves and the pressure is relieved the rubber goes back to its former shape, completely closing up and sealing the bullet-hole.

When the Imber tank first appeared some experimenters with ordinary rubber-covered tanks suggested the use of angular section braces for framework and diaphragm or baffle-plate supports. Failures resulted, due to the fact that when the metal brace was bent outward against the covering, it required an equal amount of pressure from the outside covering to force the frame back in place, and allow the rubber covering to assume its normal position. The aluminium tubing employed in the Imber tank, after being bent outward, is easily brought back into place with a great deal less pressure than that required to bend it outward in the first place. The elasticity of the rubber covering is sufficient to force the bent tubular members back in place so that the bullet-hole is closed, but in cases where other inventors used angle frames the rubber covering was torn by the unyielding metal.

The Imber tank is composed of three parts, which are shown in section in the sketch: The inside tubular aluminium framework to which sheet aluminium baffle-plates are attached. The framework is adapted to fit within and conform to the shape of the shell. The second part of the tank consists of a metal shell into which the baffle-plate frame is inserted. The third part of the tank consists of an outside rubber covering which surrounds the entire shell. The resilient or elastic covering returns to its seating against the framework in such a brief space of time that it is impossible for the contents to ignite in the event of the projectile being of an incendiary nature.



Some details of the Imber tank: 1. Section of a corner: A, Rubber reinforcing; B, rubber covering; C, Outer shell or casing; D, Framework members; E, Baffle plate. 2. Method of crossing the tubular members of the framework and of securing them with rivets. 3. The method of clipping the baffle plate to the inner framework of the tank

The tank is installed in the aeroplane by means of a cradle, in such a way that no rivets, bolts, etc., are used to secure it to the machine.

The general arrangement of the internal cradle or framework and baffle-plate is shown in one of our photographs. Of course, the principle is applicable to tanks of any shape or any size.

The framework is built up of aluminium tubing about $\frac{5}{16}$ in. in diameter, and 22 gauge in thickness. The diameter and gauge of material varies according to the size of the tank. Where the tube crosses one another they are held together by rivets as shown in Fig. 2, or they may be welded together. Baffle-plates are secured to the framework by means of aluminium clips as shown in Fig. 3. The entire framework, together with the baffle-plates, is constructed so that no rivets or other means are used to hold it in place in the shell. It is imperative that the inner cradle be not fixed in any way to the metal shell.

The function of the framework is to form a backing against which the rubber covering may seat itself to form a self-sealing covering.

The shell or casing is made of tinned steel. Other materials, including copper, were found to be inferior in some respects to the material finally adopted. Tanks with a capacity of more than 38 gallons are made of 28 gauge tinned steel. Joints are formed as indicated in Fig. 1. The joint is sweated, welded or otherwise formed without the necessity for the employment of rivets or other members passing through the metal.

The outer covering is of specially prepared rubber, which is put over the entire surface of the tank. The rubber is approximately ¼ in. in thickness. Edges of the tank are reinforced with an additional rubber strip ¼ in. thick, vulcanised to the covering rubber. The entire tank is then vulcanised for about 75 minutes under a steam pressure of about 40 lbs. per sq. in.

In order to provide for the greater security of the tank against leakage, all fittings are provided with double seatings, so that in the event of one joint giving away there will still be a second joint to prevent leakage.

In one convenient form of fitting the desired effect is obtained by having a flange internally threaded bush sweated upon the inside of the casing and surrounding the aperture for the fitting. Into this is screwed a second bush or sleeve carrying the fitting which makes the first-mentioned member a joint by means of fibre or packing. This second bush or sleeve projects beyond the rubber covering of the tank, and is surrounded by a metal washer which is forced into close contact with the exterior of such covering by means of a flange upon such sleeve so as to form a second joint or seating for the fitting. The inner bush is so constructed and arranged that it is practically flush with the inner surface of the metal shell.

No part of the fitting is allowed to project into the tank in a manner which would prevent the aluminium framework from being slipped into the tank.

Minor shocks are, of course, taken care of by the rubber covering, but when a hard blow is struck the internal construction gives. While the framework is strong enough to give adequate bracing to the tank under ordinary usages, it is purposely made collapsible upon the application of a blow likely to cause a puncture. In the case of a landing in which a smash occurs, the rubber covering retains the petrol, no matter how badly the tank may have been battered. While the framework of an aircraft may crumple and strike forcefully against the tank or the tank strike the ground, the result will merely be a distortion of the shape of the tank, thereby minimising the danger of fire from the inflammable liquid that otherwise would have been sprayed about the wreckage.

◆ ◆ ◆ ◆

Brazilian Air Mail

Some details of the mail-carrying contract for Brazil secured by the Handley Page Co. have been sent by *The Times* correspondent at Rio de Janeiro.

The chief route along which the mails are to be carried is the international route, Pernambuco to Buenos Ayres, a distance of 2,500 miles, which will be covered in three and a-half days, compared with nine or ten days by the ordinary mail boat services. There will be a weekly service between these two points. The other air-mail routes covered by the contract include Rio to Sao Paulo and Sao Paulo to Santos.

The Handley Page Co. are sending out to Brazil 24 machines, which, besides carrying the mails, will inaugurate passenger and freight services. The machines are of the two-engine type, with a carrying capacity of 2,500 lbs.

Dutch Experiences with German Machines

Apparently the Dutch Government are finding their purchases of German aeroplanes anything but satisfactory. Anyway, an order has been issued by the commandant of the Dutch Aviation Department forbidding further flights in Rumpler aeroplanes, as there have been four fatal accidents with these German machines in the last few weeks.

AIRISMS FROM THE FOUR WINDS

As an indication of the same old ethics prevailing in Hun diplomatic quarters and methods a telegram from Bucharest to the Paris *Journal* is instructive. From this it appears that Roumanian troops have captured a large aeroplane which had to land at Hotin, in Bessarabia, owing to engine trouble. The crew of the machine consisted of two German officers and three mechanics, who had with them 360,000,000 roubles for the Bolshevik troops in Ukraine, a printing machine to print bank-notes, and several thousands of jewels of all kinds. The aeroplane, it is stated, had been making a regular service between Germany and the Bolsheviks, and that the documents found on the machine leave no doubt as to the insincerity of Germany towards the Entente. Incidentally it's not a bad tribute to the usefulness of aeroplanes under emergency, even if the occasion happen to be an illicit one.

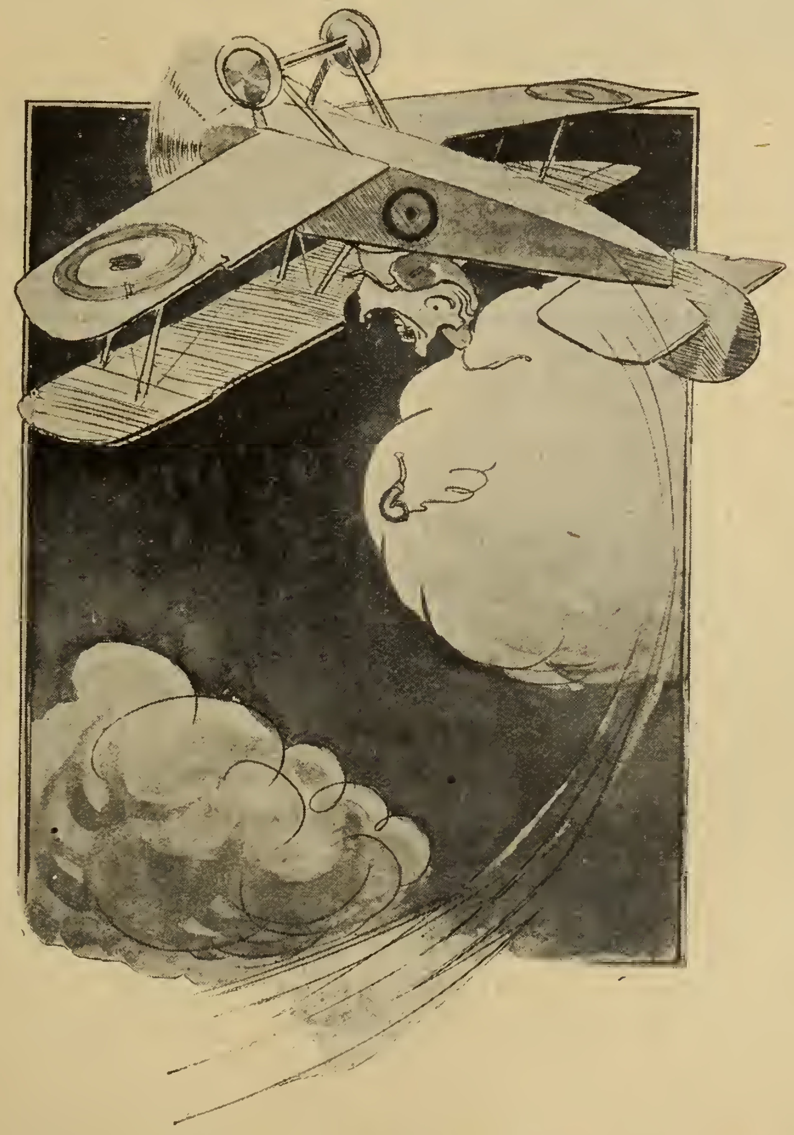
- - -

A rather round-about way of securing an aerial "souvenir" is disclosed in the *Yorkshire Observer*. A letter, our contemporary states, which went across the Atlantic in H.M. Airship R 34, the first lighter-than-air craft to cross from England to America, has just been delivered to Alderman R. Jackson (Deputy-Mayor of Todmorden). The letter was sent as a souvenir by a Todmorden officer in the Royal Air Force, with instructions for it to be posted in America. For some reason or other the letter was dropped in Nova Scotia on July 5, and after being sent to different parts of the country, it was forwarded to England on November 12. A charge of 3*d*. was made on delivery to Alderman Jackson.

And cheap at the price, we should think. But what was the original idea to be sought for anyway. We fancy there must be a missing link somewhere.

- - -

Many stories of the ex-Kaiser's personal dread of air-raids have been current both during the War and subsequently. But none of these approach the reality, if the tales as told by M. Domelier in a book "Au G.Q.G. Allemand," just published (Paris, La Renaissance du Livre), are to be accepted as literally as the text sets out. In all things William apparently was fastidious almost to foppishness, although he lived very simply, most of his idiosyncrasies being begotten of his colossal vanity. "Everything with him," M. Domelier writes, "was for show. He knew of Napoleon's simplicity in the field, and himself slept on a camp bedstead lacquered white, but instead of erecting it in a tent, placed it in a



MOST ANNOYING!—III. When you drop your pipe in the middle of a loop!

Portrait of Mr. Claude Johnson, first secretary of the Royal Automobile Club, 1897-1903, which has been presented to the Royal Automobile Club. Mr. Johnson was the organiser of the 1,000 miles motor trial of 1900, etc., first honorary secretary of the Royal Aero Club, and has been managing director of Rolls-Royce, Ltd., since its foundation. The portrait is by Mr. Ambrose McEvoy, the well-known artist.

sumptuous villa, which he had thoroughly protected against air raids by a solid armouring of concrete."

His terror of air raids was entertaining to the people, and the French airmen gave him a very lively time. In April, 1915, they dropped a bomb only 200 ft. from his villa and four more within 300 ft. After this he changed his sleeping place constantly. A year later the French population heard the humming of the aeroplanes and saw "imposing colonels, fat majors, terrified field-greys, and excited policemen rushing in the scantiest costume" for shelter. The servants and soldiers of the Kaiser's train, which was kept at Charleville, bolted for a dug-out just as a bomb fell on it, and were killed to a man; "the chief engineer, a personal friend of the Emperor, the head guard, the cooks and the other attendants met death in the panic flight of terror."

* * *

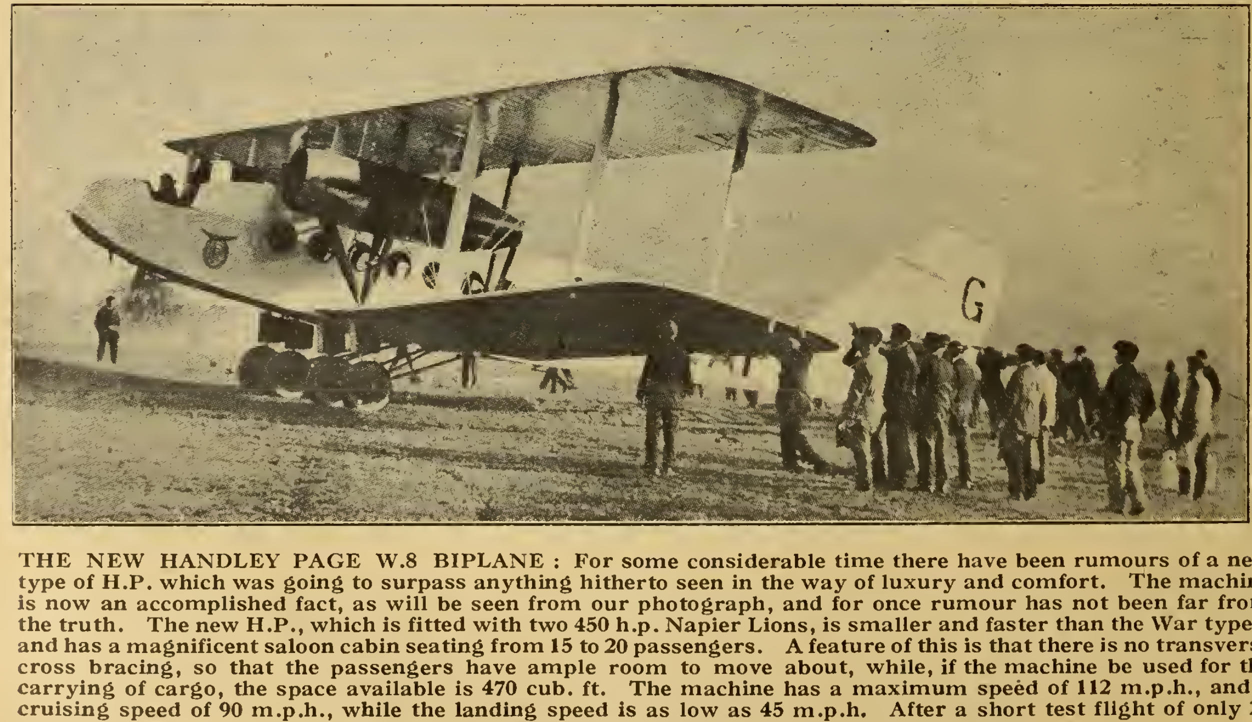
AFTER this William II left his villa and retired to a house at a distance where his quarters were protected by very strong steel netting, held up by piston-supports which would yield to a blow, with a very strong steel grating underneath. Even this did not satisfy him. He had a shelter of concrete 3 ft. thick constructed over his bed on huge steel supports; and in the garden a great concreted dug-out was prepared, which was lighted with electricity and capable of holding 30 persons. Numerous batteries were established to protect him, and when he went about he was followed by an anti-aircraft gun on a motor.

* * *

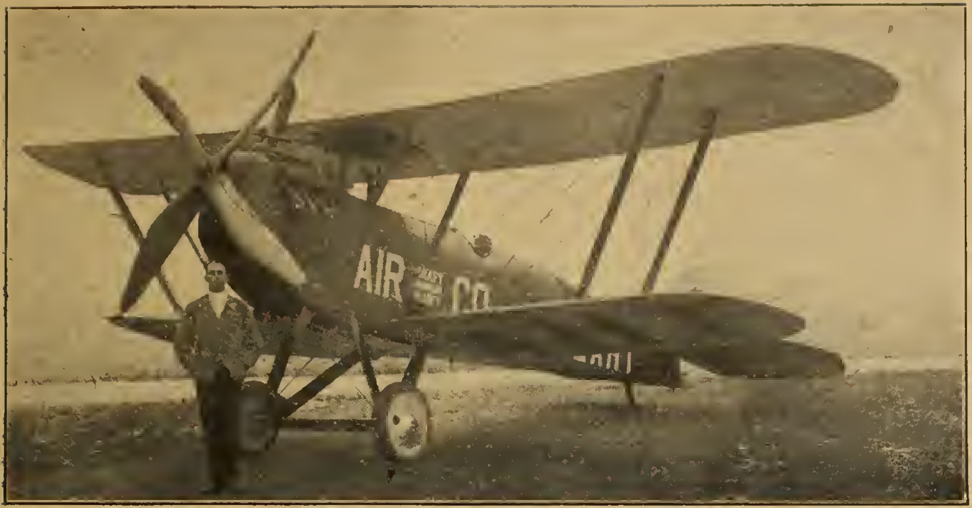
WHAT the author discloses of "Little Willie" is best passed over. If true, it makes one wonder more than ever at the mentality which could regard such a "thing" as the guiding head of anything in the world. M. Domelier, who was editor of a French newspaper at Charleville before the War, had unexampled opportunities of studying these two Imperial buffoons, as when the Germans invaded France in August, 1914, Charleville was chosen as the ex-Kaiser's headquarters, where they remained for two years, M. Domelier during all this period never ceasing his vigilant observation.

* * *

ON Monday next, the first step in the formation of a permanent Aeronautical Museum for London, is to be taken. Upon that day Messrs. Vickers, Ltd., will present to the nation the Vickers-Vimy-Rolls-Royce aeroplane on which Sir John Alcock and Sir A. Whitten Brown crossed the Atlantic. This will take its place in a part of the extension of the Science Museum, South Kensington, and will form the nucleus of an Aeronautical Museum in this building. The occasion is also to be endorsed at a luncheon given jointly by Messrs. Vickers, Ltd., and Messrs. Rolls-Royce, Ltd. The housing room lent by the Science Museum will be retained, it is understood, until a large permanent building can be secured in which to display the exhibits. A strong committee, led by Sir Richard Glazebrook, is now engaged in laying out the main lines on which the museum will be organised and making plans for securing exhibits.



THE NEW HANDLEY PAGE W.8 BIPLANE: For some considerable time there have been rumours of a new type of H.P. which was going to surpass anything hitherto seen in the way of luxury and comfort. The machine is now an accomplished fact, as will be seen from our photograph, and for once rumour has not been far from the truth. The new H.P., which is fitted with two 450 h.p. Napier Lions, is smaller and faster than the War types, and has a magnificent saloon cabin seating from 15 to 20 passengers. A feature of this is that there is no transverse cross bracing, so that the passengers have ample room to move about, while, if the machine be used for the carrying of cargo, the space available is 470 cub. ft. The machine has a maximum speed of 112 m.p.h., and a cruising speed of 90 m.p.h., while the landing speed is as low as 45 m.p.h. After a short test flight of only 20 minutes' duration, the machine was flown to Paris in 2 hours 10 minutes.



A Record Breaker: As announced in "Flight" last week, a Napier-engined Airco (De H.) 9 R, piloted by Capt. Gathergood, established a number of British records for speed on November 15, 1919. Our phntograph shows the machine used for the flights. Capt. Gathergood, the pilot, is standing in front of the machine

Santa Claus up-to-date is to be exemplified this year by the delivery of parcels of Christmas presents from Paris to London and *vice versa*, carried in Handley Page machines.

* * *

Ten million miles per annum of aerial patrol were carried out by the Royal Naval Air Service during the War. This statement of fact emerged in a lecture, entitled "How We Kept the Seas," by Capt. Evans, D.S.O., R.N., at Queen's Hall last week, when Sir Eric Geddes presided.

* * *

Sir Percy Scott is nothing, if he is not thorough. Fortunately for this country, he never misses an opportunity of rubbing in his convictions as to the vital necessity of Great Britain being supreme in the air against future contingencies. Speaking the other day upon "Probable Future Developments in the Navy" at an "At Home," given by Mrs. Ronald Greville, in connection with the Waifs' and Strays' Society, at her residence, 16, Charles Street, Sir Percy once again expressed his belief that submarines and aeroplanes would revolutionise naval warfare of the future. Of battleships costing seven millions he believed that no more would be built. Their place would be taken by submarines and aeroplanes, the latter capable of travelling 150 miles an hour.

* * *

What Manchester thinks today, the country endorses tomorrow. Therefore, it is good hearing that a special sub-committee of the Parliamentary Committee of the Manchester Corporation has been appointed to consider the possibility of taking over the Alexandra Park Aerodrome for use as a municipal aerodrome. There appears, however, to be a fly in the ointment, as it may be another of the Government's Lord Rosebery's "Dora, by Grace" ramps. According to the *Manchester Guardian*, the Air Ministry took over the land for the site from Lord Egerton some three years ago, but whether they have full power to dispose of it now appears to be a debatable point, although the Ministry assume they have such power. Much will turn on the nature of the agreement between Lord Egerton and the Ministry. The aerodrome covers an area of 165 acres. "It is highly desirable," says Alderman Kay, "that the aerodrome should belong to the city. Whether it should be used solely as a flying ground is not the most pressing point. We urgently require an exhibition ground and hall for agricultural shows and outdoor functions generally, and the nearness of the Alexandra Park Aerodrome to the centre of the city makes it an ideal place for the purpose."

* * *

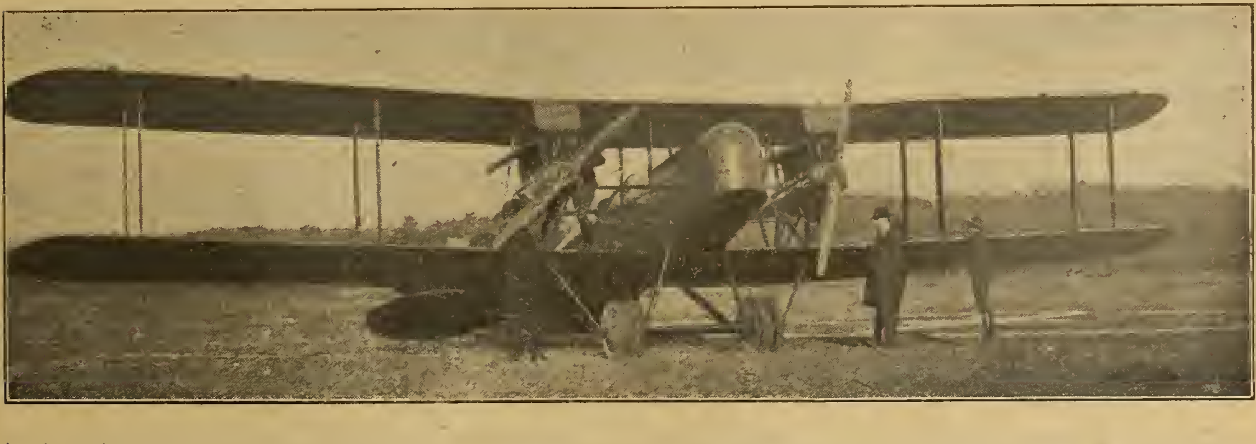
On December 4, the W.R.A.F. was finally demobilised, the "closing-down" being witnessed by its Commandant, Dame Helen Gwynne-Vaughan and the staff at Headquarters. Its spirit, however, still lives in the Women's Comrades of the War Association, brought into existence, as recorded in last week's Flight. This "Club" is the first women's corps to be so inaugurated. Run upon the democratic lines laid down in its constitution, the Association should be a marked success.

* * *

Although the French were considerably in advance of us in the early days of dirigible construction, it is, we understand, a fact that the French Government are placing an order for four airships to be built in this country. This should about balance our "imports" of the Lebaudy and Clement gas-bags, which at one time so contributed to the mirth of nations.

* * *

Last week the *Daily Mirror* gave a portrait of Miss Nancy Lees, the Handley Page chauffeuse, who recently captured a man who was stealing a motor car, and added "she is in fancy dress," for which much thanks, as the "costume" of this intrepid young lady consisted, in the main, of a model about 5 or 6 ft. long, of an aeroplane, plus a 2-ft. propeller and boss as head-gear, we *might* otherwise have thought that it was one of the latest Parisian creations to attract our *nouveaux riches* this side.



An American de Havilland converted from a single to a multi-engined machine. The engines are two six-cylindered Libertys, one of which is capable of maintaining the machine in flight. It is being used, in conjunction with the Martin "bombers" for mail-carrying, and is said to be nice and easy on the controls

AIRCRAFT UNDERCARRIAGES*

BY JOHN D. NORTH, F.R.AE.S., F.R.MET.SOC.

THE undercarriage is described in the Society's Glossary as "That part of the aircraft beneath the body intended for its support on land or water and to absorb shock on alighting."

It is my intention to confine my remarks in this paper to undercarriages designed to support aircraft on land, that is to say, colloquially, "landing gears." The reasons for this limitation are obvious; it is scarcely possible to compare even in a general manner the undercarriage problem of the land machine and the seaplane, and in the latter case the already wide subject has to be extended to consider float design.

The historical development of the undercarriage shows well-defined phases reflecting the performances and functions of the complete aircraft. In the early Wright machines, which were provided with a launching gear, the problem of alighting only required to be considered. The light weight and slow landing speed of the aeroplane demanded but slight shock absorbing capacity and long skids only were fitted to bridge inequalities in the ground.

Contemporaneously in France and in this country attempts were being made to fly without launching gears. As the amount of time spent in taxi-ing, or "rolling" as it used to be called, represented a very large proportion of the total "flying" time, the undercarriages were designed to meet these conditions. The outstanding feature was the extensive use of swivelling forks carrying the wheels, the erratic course of the machine in its frantic efforts to rise requiring a liberal measure of tracking. As these machines frequently suffered disaster, being upset by running into ditches and so forth, the idea of combining the wheel and skid was materialised in the Henri Farman undercarriage. This had very long skids, each provided with two wheels mounted on a common axle and sprung to the skid with rubber. This system was extensively adopted, but as the performance of machines improved the skid gradually became shorter and shorter till in the well-known and almost universal "Vee" type undercarriage it disappeared altogether. At the same time the arrangements of springs and radius rods provided in the original Farman also died out. It is perhaps interesting to recall that the "Vee" undercarriage was extensively condemned on its appearance as highly dangerous.

Fig. 1 shows diagrammatically the process of development culminating in the "Vee" type undercarriage.

By a similar process of development the wide-track Farman chassis developed into the typical undercarriage of the twin engined machine exemplified by the Vickers Vimy and the Handley Page, while in a different form it appears with two wheels only in the B.A.T. and the Boulton and Paul Bourges (see Fig. 2).

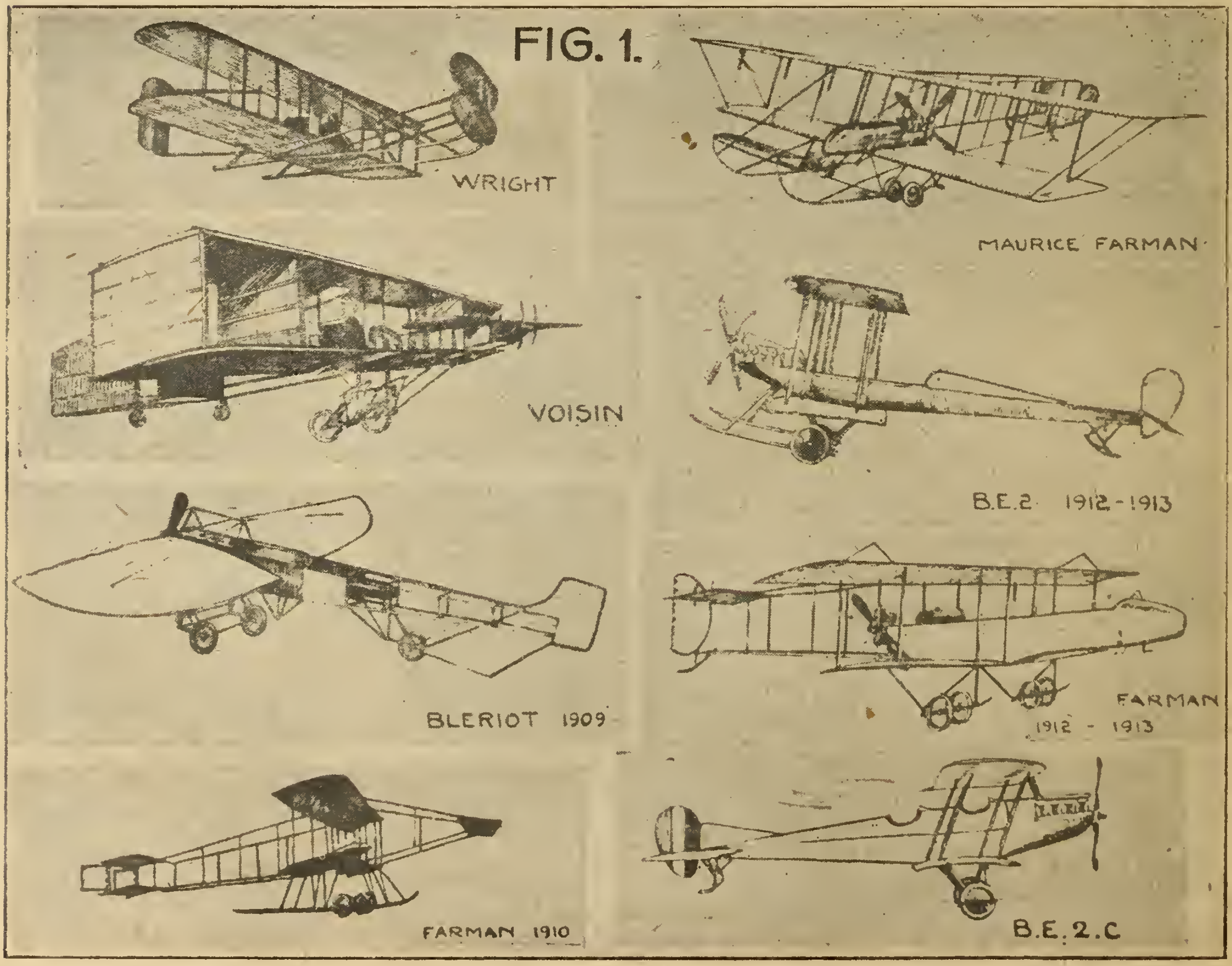
The most notable departures from these types originated in the Breguet Oleo gear, which is shown developing into the R.E.7 and F.E.2C. Oleo gears. The undercarriage of the Avro tuition machine may be traced to the early single wheel R.E.P. (Fig. 3).

I hasten to add that I do not suggest that all designs subsequent to the original type were plagiarisms, but rather that they represent natural lines of development.

Of the final types found in general use there is no doubt that the "Vee" holds the field by sheer weight of numbers, and the reason for this is not far to seek. The development of aircraft has been almost exclusively military for the last five years and, in considering the safety and utility of an aeroplane, danger from enemy action was an important item.

By cutting down the resistance of the undercarriage to a minimum a definite improvement in performance was obtained and the consequent added security in action more than compensated for any increased difficulty or danger in landing.

FIG. 1.



---

* Paper read before the Royal Aeronautical Society, at the Royal Society Arts, John Street, Adelphi, on Wednesday, December 10, 1919.

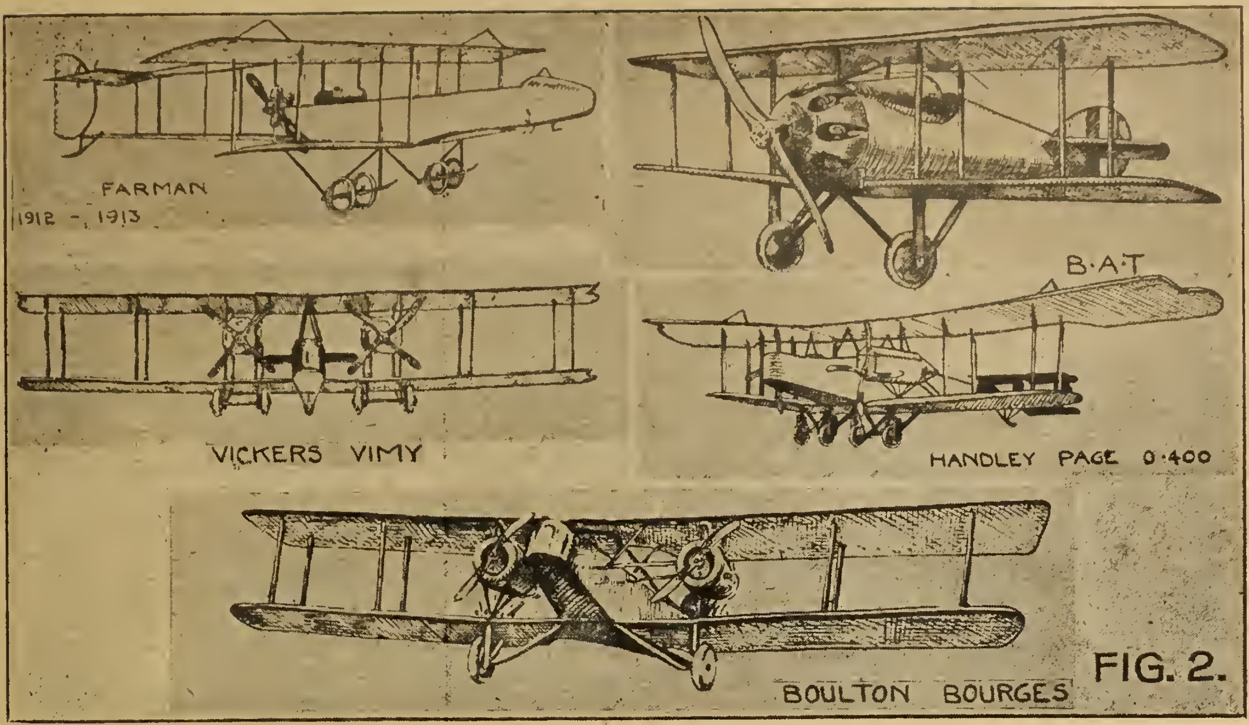


FIG. 2.

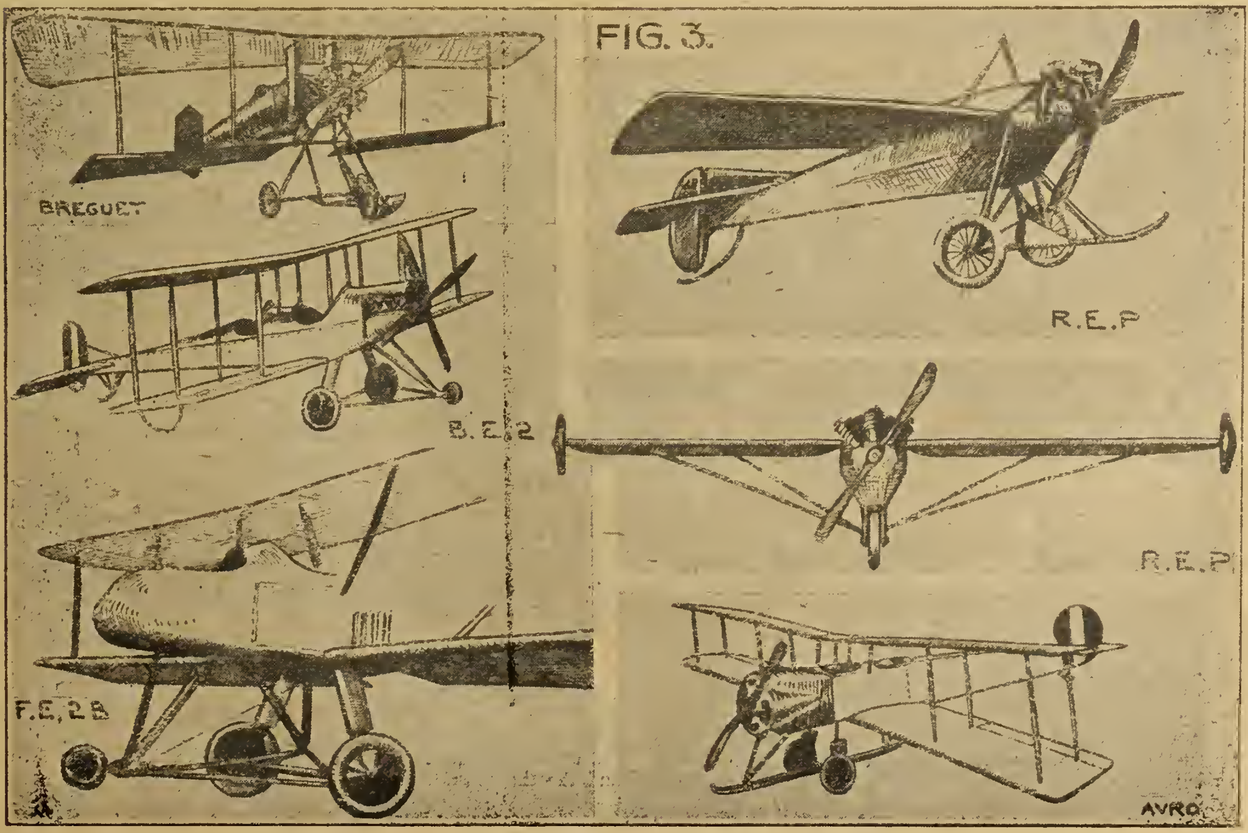
The use of the "Vee" gear has been principally confined to the smaller types of aircraft, but it must be realised that the large craft were in an elementary stage compared with their smaller sisters, and it is difficult to find a case of a large machine whose performance was in itself, or could by reducing undercarriage resistance, be made to be a protection against enemy action.

Where aircraft are to be used for civil purposes, or where military aircraft are required in peace to have a longer term of life than in war, improvements in undercarriages would seem to be an essential part of their development. There is little doubt that the shock absorbing capacity can be greatly increased, and at the same time provision made for landings side to wind or with the machine canted or tilted.

The shock absorbing capacity of an undercarriage depends on the total forces that the structure will stand without failure, and also the amount of travel of the shock-absorbing gear. We may first consider the most elementary form of undercarriage, *i.e.*, pneumatic tyred wheels mounted on a rigid axle, as shown in Fig. 4.

The machine has a vertical component of velocity u when the wheel touches the ground and, as we are only considering the machine being brought to rest in the vertical plane, we may take the kinetic energy as $mu_2/2g$ (foot-pound units).

FIG. 3.



The force P on the tyre is a function of the tyre deflection (x), hence total energy absorbed by the tyre is

$$\int_{x=0}^{x=a} F(x)\,dx$$

where a is the deflection when P has reached the maximum permissible load. Hence the limiting vertical velocity is given by

$$u = \sqrt{\frac{2g}{m}\int_{x=0}^{x=a} F(x)\,dx}$$

Fig. 5 shows an experimental curve for $P = F(x)$. The values of the deflection with diminishing load are not the same as those with increasing load. Consequently the vertical velocity after the tyre has again expanded (u_1) will be

$$u_1 = \sqrt{\frac{2g}{m}\int_{x=a}^{x=0} F_1(x)\,dx},$$

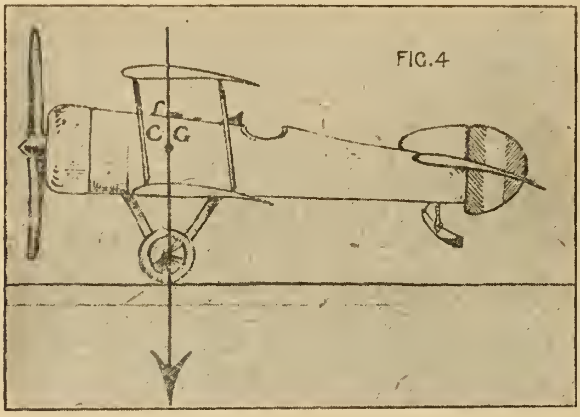


FIG. 4

The area of the hysteresis loop represents the energy dissipated in heat. In composite structures such as tyres the dissipated energy may possibly be partly accounted for in other ways, but it is not necessary to consider this in detail here.

The aeroplane, rebounding with a vertical veolcity u_1, will leave the ground and strike it again with a velocity u_2. It is obvious that $u > u_1 > u_2 \; . \; . \; . > u_n$, etc., and the C.G. of the machine gradually comes to rest in the vertical plane.

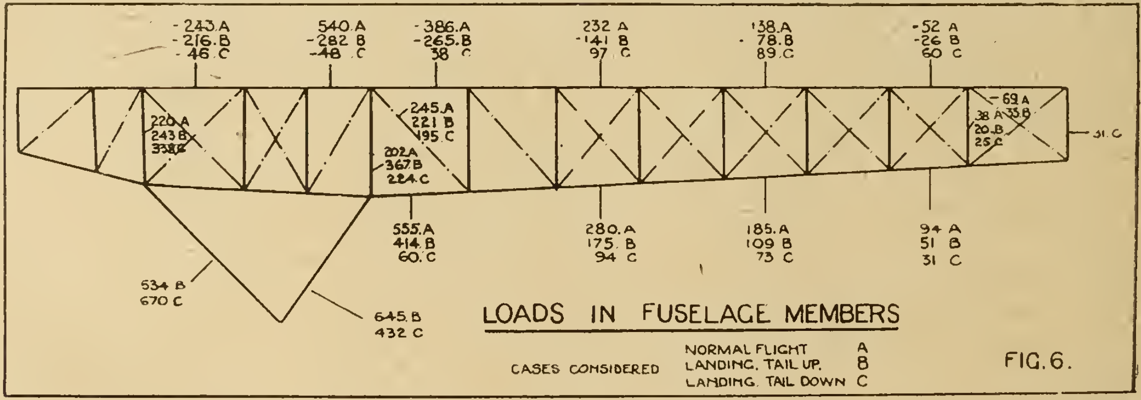


FIG. 6.

Before considering the variations in shock absorbing effect arising from different forms of landing gear, we may first discuss the permissible values of P or rather the ratio P/W (W being the weight of the aeroplane.) This is usually termed the load factor.

The value of this factor will be influenced by the structure of the aeroplane as designed for flight. It may be accepted that machines are designed with flight load factors of 8 to 4 according to type. That is to say, they are designed to withstand the stresses arising from steady flight, supposing g to be increased to $8g$ or $4g$. It is essential, therefore, if the structure weight of the aeroplane is to be kept low, that the greatest advantage should be taken of the "flight" structure and that the added weight to withstand landing loads should be a minimum.

Consider first a tractor aeroplane with "Vee" type undercarriage.

The principal vertical forces acting on the machine in flight are shown in the accompanying figures (Figs. 6 and 7). They are similarly shown for two extreme cases of landing—(1) C.G. over wheel, (2) wheel and skid touching ground simultaneously.

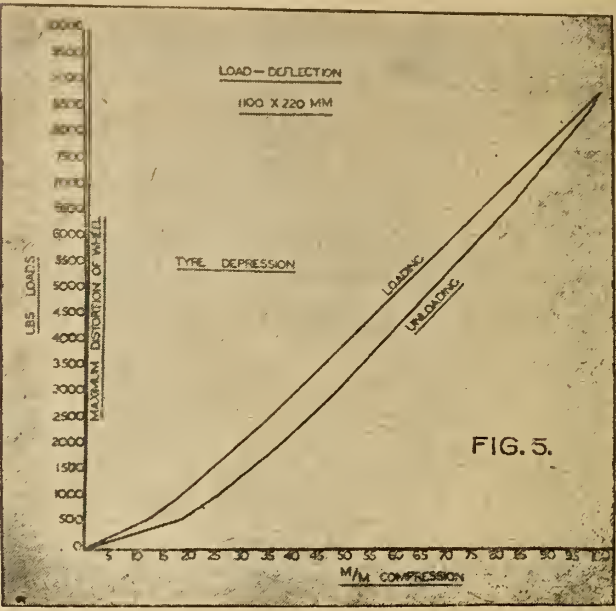


FIG. 5.

It will be seen from the stress diagrams that an "undercarriage" load factor of the same order as the "flight" factor is an economical value. In the case of an undercarriage mounted on the planes this is even more obvious.

The weight of structure to take the down loads on the wings is unimportant. The maximum tail skid load (with the chosen factor) is often of the same order as the maximum down load on the tail and of the opposite sign, hence the rear part of the *fuselage* can economically be made symmetrical (structurally if not geometrically). The load on the tail skid is determined by the position of the wheels in relation to the C.G. when the machine is at rest on the ground. It is obviously desirable that the incidence of the main planes with the tail skid on the ground should approximately correspond to the angle of maximum lift for the planes (say 14°). At the same time, to prevent the machine from turning over on its nose, the angle between the line passing through the C.G. and the point of contact of the wheels and ground and the vertical (the thrust line being taken horizontal) should not be less than a minimum angle δ. The ratio of load on tail skid to load on wheels will then be given by

$$\frac{\text{Weight on skid}}{\text{Weight on wheels}} = \tan(\beta + \delta)\tan(\beta + \epsilon),$$

where δ is defined above.

β is the angle the thrust line makes with the horizontal when the skid is on the ground.

ϵ is the angle between the line joining the skid to the C.G. and the thrust line.

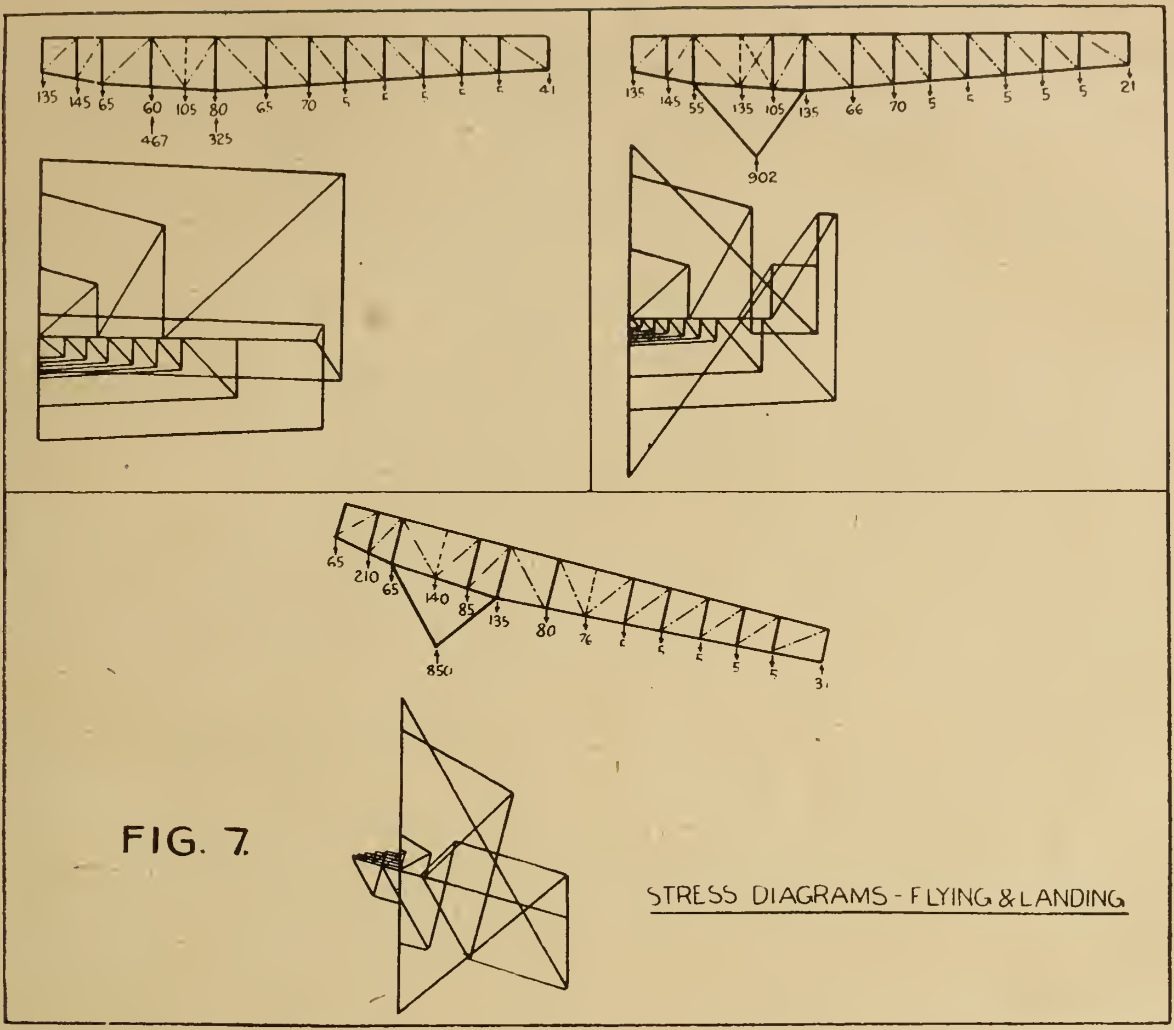


FIG. 7.

STRESS DIAGRAMS - FLYING & LANDING

As it is desirable to keep the load on the tail skid down, δ should be as small as is safely possible. At the same time it is obvious that a high value of δ will produce a big moment causing the machine to "buck" in getting off and landing.

An average taken from a large number of machines seems to show that 12° is a suitable value for δ.

The considerations briefly outlined above enable us to arrive at the maximum permissible loads on the wheels and skids.

Since the loads on the undercarriage are fixed, the definite requirements of the shock-absorbing gear may be arrived at by choosing a value for u. Exactly what this value should be is a controversial matter on which I hope to hear opinions expressed in the discussion. In any case it seems reasonable to state that it should be a function of the minimum value of $V \sin \gamma$ (gliding angle) in steady flight, engine off. In other words, if $u = V \sin \gamma$ the machine would just collapse if it struck the ground gliding without flattening out. Of course, in a good landing u is reduced at the expense of the kinetic energy of the machine.

It would appear that for machines with fairly high loadings (*e.g.*, 8-9 lbs./sq. ft.) a value for u of about 15 ft./sec., which just corresponds with the minimum value of $V \sin \gamma$, is as much as may be expected. For a good undercarriage the permissible deflection or "travel" usually depends on the geometry of the machine, and consequently in big machines it should be possible to design for higher values of u. At the same time the "flight factor" is usually lower on large aeroplanes, which will tend to limit the improvement in shock-absorbing capacity due to increased deflection.

Supposing now that a value for u has been arrived at we can turn to the details of the shock-absorbing mechanism.

Considering the problem with increasing degrees of complexity we get—

(1) Wheels and tyres.
(2) Wheels, tyres and springs.
(3) Wheels, tyres, springs and Oleo gear.

Fortunately, so far as wheels and tyres are concerned, we are in possession of a fair amount of experimental data. The Palmer Cord Tyre Co., who furnish almost exclusively the wheels and tyres used on British aeroplanes, have carried out extensive researches to aid their designs, and it is gratifying to those who appreciate the value of research to note the success which has resulted from their efforts.

(To be continued.)

◆ ◆ ◆ ◆

PERSONALS

Deaths

Sub. Flight-Lieut. WALTER HARRY EASTY, R.N.A.S., who was reported missing on an offensive patrol in the neighbourhood of Avuley Wood, on April 22, 1918, and is now presumed killed on that date, at the age of 26, was the only son of Walter and Lucy Sutton Easty, of 74, Kempe Road, London, N.W.6.

Married

Lieut.-Col. F. HOWARD JENKINS, O.B.E., M.C. (late R.F.C. and R.A.F.), second son of the late Mr. J. H. Jenkins, M.R.C.S. L.R.C.P., of Lytham, Lancashire, was married on November 26, at St. Olaf's Church, Kirkwall, to HARRIET FERNELITH, second daughter of Duncan J. ROBERTSON, O.B.E., County Clerk of Orkney.

Flight-Lieut. ALEXANDER JAMES LONG, R.A.F., only son of Mr. and Mrs. W. Alexander Long, of 140, Herne Hill, S.E.24, was married on November 29, at St. Stephens', Gloucester Road, to CHRISTINE AMY, younger daughter of Mr. S. G. Tarrant, of Great Marlow, Bucks, and the late Mrs. Tarrant, of Tulse Hill, S.W.

To be Married

The engagement is announced between Maj. M. W. NOEL, A.F.C., the King's Regiment, attached R.A.F., son of Col. Noel, Stardens, Newent, Gloucestershire, and EDITH, daughter of Mrs. Charles GAIRDNER, 88, Westbourne Terrace, Hyde Park.

THE ROYAL AIR FORCE

London Gazette, December 3

The following are granted permanent commns. in the ranks stated, with effect from Aug. 1 :—

Flight Lieutenants.—A. Gray, M.C. (A.), *A. P. Maurice, D.F.C. (A.), *O. C. Bryson, M.C., D.F.C., A.M. (A.), J. A. MacNab (O.), *D. S. Earp (O.).

Flying Officers.—*A. L. M. Van der Byl (A.), R. M. Trevethan, M.C. (A.), G. E. Randall, D.F.C. (A.), C. L. Wauchope (A.), A. Jerrard, V.C. (A.), J. M. Mason, D.S.C., D.F.C. (A.), L. C. Hootton, M.C. (A.), *H. C. E. Bockett-Pugh (A. and S.), *L. M. Hilton (A.), *A. F. Laug (O.), C. A. Bouchier, D.F.C. (A.), H. A. Haines, D.F.C. (A).

* Subject to Medical Fitness.

The classification of Capt. A. A. B. Thomson is "(A.)" and not ("S.)," as stated in *Gazette* Aug. 1.

The notification in *Gazette* Aug. 1 appointing Maj. C. S. Danby, M.C. (A.), to a permanent commn. is cancelled.

The notification in *Gazette* Aug. 1 appointing Capt. T. Gran (T.) to a permanent commn. is cancelled.

The following temporary appointment is made at the Air Ministry :—

Staff Officer, 3rd Class.—(P.) Flight-Lieut. A. H. Stradling ; Nov. 18.

Flying Branch

Capt. C. B. Dalison, A.F.C., is graded for purposes of pay and allowances as Maj. while employed as Maj. (A. and S.), from May 1 to Oct. 23 (substituted for notification in *Gazette* Oct. 21).

Flight-Lieut. (actg. Sqdn. Ldr.) S. W. Dunckley relinquishes the actg. rank of Sqdn. Ldr. on ceasing to be employed as Sqdn. Ldr. (A.) ; Nov. 11.

Flying Officer (actg. Flight-Lieut.) E. Burney, M.C., relinquishes the actg rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut. (A.) ; Nov. 11.

Sec. Lieut. S. Soothill to be Lieut. ; Nov. 13, 1918.

Pilot Officer N. Hickson to be Flying Officer ; Sept. 9.

Sec. Lieut. W. C. Snowdon (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (O.) ; June 3, 1918.

The following relinquish their temp. R.A.F. commns. on return to Army duty :—Flying Officer K. M. Harris (Sec. Lieut., Suff. R.) ; Nov. 1. Flying Officer C. Joiner (Lieut., E. Surr. R.) ; Nov. 8. Flight-Lieut. C. R. Richardson (Lieut., E. Yorks R.) ; Nov. 10. Flying Officer E. G. Williams (Lieut., Essex R.) ; Nov. 10. Flying Officer P. Perfect (Lieut., K.O.S.B.) ; Nov. 12. Flight-Lieut. R. F. S. Manduit, M.C. (Lieut., Dragn. Gds.) ; Nov. 17. Flying Officer J. C. C. Piggott (Lieut., Duke of Corn. L.I.) ; Nov. 18.

The following relinquish their temp. R.A.F. commns. on return to Naval duty :—Sqdn. Ldr. R. S. Robinson, O.B.E. (Lieut.-Comdr., R.N.) ; Oct. 14. Pilot Officer D. P. Davidson (Sub-Lieut., R.N.) ; Nov. 3. Flying Officer R. B. Gibb (actg. Lieut., R.N.) ; Nov. 8.

Flight-Lieut. G. E. Wildman-Lushington (Capt., R. Marines) relinquishes his temp. R.A.C. commn. on return to duty with R. Marines ; Oct. 23.

(Then follow the names of 91 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts relinquish their commns. on account of ill-health, and are permitted to retain their rank :—D. MacGregor (K.O.S.B.) (caused by wounds) ; Nov. 13. C. A. Bradnam (contracted on active service) ; Nov. 22. N. W. R. Mawle, D.F.C. (Lond. R., T.F.), (caused by wounds) ; Nov. 24. D. G. H. Meade (contracted on active service) ; Nov. 26.

The following Sec. Lieuts. relinquish their commns. on account of ill-health (caused by wounds) and are permitted to retain their rank :—C. Houlgrave, E. J. Norris ; Nov. 25. Sec. Lieut. R. J. Barnes resigns his commn. ; Aug. 26, 1918.

The surname of Lieut. A. H. Ashton is as now described, and not "Ashteh," as stated in *Gazette* Nov. 14.

The Christian names of Sec. Lieut. Henry Dan Lewis are as now described, and not "Henry Van," as stated in *Gazette* Nov. 4.

The initials of Lieut. J. O. Barclay are as now described, and not "J. B.," as stated in *Gazette* Jan. 21.

The surname of Lieut. F. M. McLellan, D.F.C., is as now described, and not "McLennan," as stated in *Gazette* July 22.

The notification in *Gazette* Oct. 21 concerning Sec. Lieut. L. T. Lawrence is cancelled. *Gazette* April 18 to stand.

The notification in *Gazette* April 1 concerning Sec. Lieut. N. H. Howe is cancelled.

Administrative Branch

Flying Officer F. V. Goode to be Flying Officer from (S.O.) ; Nov. 10.

Flying Officer (actg. Flight-Lieut.) W. H. Hoile relinquishes the actg. rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut. ; Nov. 13.

Sec. Lieut. E. Staples (since demobilised) to be Lieut. ; Nov. 13, 1918.

Sec. Lieut. T. Mumford to be actg. Lieut. whilst employed as Lieut. from Aug. 8, 1918, to April 30.

The following Flying Officers relinquish their temp. R.A.F. commns. on return to Army duty :—G. W. Panter, M.B.E. (Lieut., R.I. Rif.) ; Oct. 15. G. W. Nelson (Lieut., Gord. Highrs.) ; Nov. 6. T. H. Holmes (Lieut., R.F.A.) ; Nov. 15. (Hon. Flight-Lieut.) C. H. Markham (Capt., North'd. Fus.) ; Nov. 19.

(Then follow the names of 18 officers who are transfd. to the Unemployed List under various dates.)

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—B. W. A. Ordish, G. R. Smith (contracted on active service) ; Nov. 26. G. N. Wood ; Dec. 7, 1918 (substituted for notification in the *Gazette* of Aug. 6, 1918).

The notification in the *Gazette* of March 11 concerning Lieut. N. H. Kemp is cancelled.

The notification in the *Gazettes* of July 9, 1918, and Dec. 24, 1918, concerning Sec. Lieut. (Hon. Capt.) F. Grave are cancelled.

Technical Branch

F. Grave (Capt. and Qrmr., Ldn. R., T.F.) is granted a temp. commn. as Capt., Grade (B) ; April 1, 1918, without the pay and allowances of that rank prior to May 22, 1918.

Flying Officer J. L. Denman to be Flying Officer from (S.O.) ; Oct. 18 (substituted for notification in the *Gazette* of Nov. 21).

Lieut. W. L. Head to be Lieut., Grade (B.), from ("A. and S.") ; Aug. 9 (substituted for notification in the *Gazette* of Aug. 30, 1918).

Second Lieutenants to be Lieutenants :—S. A. Alder ; April 2, 1918, without the pay and allowances of that rank prior to Aug. 28, 1918. V. P. Pereth ; June 3. F. Downer ; June 6.

Pilot Officers to be Flying Officers :—A. D. Edwards ; Aug. 5. E. W. Dawson, A. E. Faver, J. H. J. Footman, L. J. Lester, R. Smith ; Oct. 1.

Pilot Officer (actg. Flight Lieut.) A. Jukes relinquishes the actg. rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut., from (S.O.) ; Oct. 18.

Flying Officer G. P. N. Hardy (Lieut., R.G.A.) relinquishes his temp. R.A.F. commn. on return to Army duty ; Nov. 17.

(Then follow the names of 16 officers who are transfd. to the Unemployed List under various dates.)

Lieut. H. J. Murphy relinquishes his commn. on account of ill-health contracted on active service, and is granted the rank of Capt. ; Nov. 26.

The initials of Sec. Lieut. H. Jacques are as now described, and not "U." as stated in the *Gazette* of Nov. 18.

The notification in the *Gazettes* of Feb. 11, March 18, May 20, concerning Lieut. (Hon. Capt.) F. Grave are cancelled.

Medical Branch

(One officer transfd. to the Unemployed List.)

Capt. H. N. Wright relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; Nov. 25.

The initials of Capt. A. Moir-Gray are as now described, and not "Q.," as stated in the *Gazette* of Nov. 14.

Memoranda

Pilot Officers to be Flying Officers :—G. H. Brown, W. J. Ryder ; Oct. 1.

The following Prob. Flight Officers are granted hon. commns. as Sec. Lieuts. :—B. C. Oades ; Nov. 16, 1918. E. F. Northey ; Dec. 17, 1918. C. W. D. Outred ; Jan. 23. R. E. Haswell ; Jan. 24. R. H. Hardman ; Feb. 12. J. G. Heriot ; Feb. 13. C. L. Harrison ; Feb. 19. C. Norris ; March 5. C. L. Mart ; March 7. H. E. Mock ; March 9. H. W. Merrill ; March 18. H. S. McLeod ; March 19. L. J. Hartnett ; April 2. D. B. Mineard ; April 6. R. S. Harrison ; April 8. T. E. Hall ; April 12. S. B. McBlain ; April 14. H. H. Mullens ; April 28. C. Moody ; May 2. L. G. Hicks ; July 24. D. H. O. Oakley ; Sept. 26.

(Then follow the names of 11 Cadets granted hon. commns. as Sec. Lieuts.)

Wing Comdr. M. G. Christie, C.M.G., D.S.O., M.C., is placed on the half-pay list ; Dec. 3.

Lieut.-Col. (actg. Col.) B. H. O. Armstrong, C.M.G. (Maj. (Bt.-Lieut.-Col.), R.E.), relinquishes his commn. on ceasing to be employed ; Nov. 15.

The following temp. hon. Lieuts. relinquish their commn. on ceasing to be employed :—R. Richardson, H. J. Wilkins ; Sept. 16.

(Then follow the names of two officers transfd. to the Unemployed List.)

London Gazette, December 5

The following officers have been granted short service commns. in the ranks stated, with effect from December 5. They will retain their seniority in the substantive rank last held by them prior to the grant of the short service commission.

In the case of officers now gazetted Flying Officer or Observer Officer, from Pilot Officer, seniority will date from the date of the *Gazette*.

Squadron Leader.—J. P. C. Sewell, O.B.E. (A.), M. E. A. Wright, A.F.C. (A.P. (T.)).

Flight Lieutenants.—A. H. S. Baker, O.B.E. (S O.), J. S. Browne (A.), B. C. Meates (A.), H. I. Hughes (T.), C. Musgrave, A.F.C. (A.), P. W. Snell, A.F.C. (A.).

Flying Officers.—F. P. Adams (A.), C. Ayling (A.), Rev. R. M. Bankes-Jones (A.), C. E. Barraclough (A.), C. O. Bird (A.), S. W. Bird (A.), G. Birkett (A.), H. Bligh (A.), V. A. Boulle (A.), W. J. Brown (A.), F. Carpenter (A.), P. J. Cox (A.), W. J. Daddo-Langlois (A. and S.), A. B. M. Dale (T.), F. G. C. Dickinson (A.), B. A. de Nevers (A.), J. MacG. Fairweather (A.), F. A. Giles (A.), A. V. H. Gompertz (A.), W. I. Hannon (A.), F. H. R. Henwood, D.F.C. (A.), R. J. H. Holland (A.), F. L. Hopps, A.F.C. (A.), W. R. S. Humphreys (T.), J. B. Jaques, M.C. (A.), A. R. Jones (A.), K. F. Jones (A.), R. Lamb (A.), R. Littlejohn (Ad.), E. R. Longhurst (A.), R. F. C. Metcalfe (A.), S. E. Mailer, A.F.C. (A.), L. G. Paget, A.F.C. (A.), L. W. Park (Ad.), R. C. Preston, A.F.C. (A.), W. C. Pruden (A.), G. Robinson, M.C. (A.), J. A. Rudd (A.), W. W. Saunders (A.), J. A. H. Savage (S.O.), C. H. Tancred, M.B.E. (S.O.), C. H. Teagle (A.), T. A. Thornton (A.), F. D. Travers, D.F.C. (A.), S. F. A. Welsh (Ad.), H. J. Young, M.B.E. (Ad.).

Observer Officers.—J. C. Bulteel, B. E. Essex, A. P. Ledger, M. J. Wyatt, M.C.

Flying Officers (from Pilot Officers).—E. H. Attwood (A.), P. Bailey (A.), C. H. Billings (A.), E. Bird (A.), A. D. L. Carroll (A.), W. J. Cooke (A. and S.) G. C. W. Dufty (A.), J. Duminy (A.), J. Edmunds (A. and S.), C. C. Gissing (T.), V. W. Helps (A. and S.), H. S. Hobby, M.C. (A.), E. R. C. Hobson (A.), H. W. Iles (A.), D. M. I. Macarthur (A.), H. N. V. Le V. Noel (A.), W. H. L. Oxland (A.), S. H. Potter (A.), R. C. Pretty (A. and S.), H. C. Price (A.), C. O. Rigden (A.), J. H. Shaw (A.), J. Silvester (A.), M. F. Tomkins (T.), G. M. Trundle (A.), E. A. Turnbull (T.), G. W. Wilson (A.).

Observer Officers (from Pilot Officers).—W. A. Armstrong, E. D. Barnes, F. H. Bugge, B. C. S. Byrne, R. T. Carter, G. S. Coggan, B. G. Drake, K. H. Holley, L. W. Kitt, T. L. Lowe.

The notifications appearing in the *London Gazettes* of the dates indicated below, appointing the following officers to short service commissions, are cancelled :—Flight-Lieut. N. R. Cook, D.S.C. (A. and S.) ; Flying Officer G. J. Fowler, A.F.C. (A.) ; Oct. 24. D. S. C. Macaskie (T.) ; Nov. 11.

The notification in the *Gazette* of Nov. 28 relative to Flight-Lieut. E. F. Turner (T.) is cancelled, and that in the *Gazette* of Oct. 24, appointing this officer to a short service commission stands.

Royal Air Force

The heading of the list of promotions which appeared in the *London Gazette* dated Nov. 28 should read "permanent and short service commissions, and re-seconded officers" instead of "permanent commissions."

Flying Officer W. B. Thomson (A.) is granted a permanent commn. in the rank stated ; Aug. 1.

The notification in the *Gazette* of Aug. 1 appointing the following officers to permanent commissions is cancelled :—Capt. E. E. N. Burney, M.C. (A.), Capt. L. M. Lilley, O.B.E. (T.), Lieut. M. Minter (A.), Lieut. G. R. Barry (T.), Lieut. D. N. Thompson, M.C. (S.O.).

The notification in the *Gazette* dated Oct. 28 appointing the following officers to permanent commissions, is cancelled :—Flight-Lieut. M. R. N. Jennings, M.C., A.F.C. (A.), Flight-Lieut. A. B. Shearer (A.), Flying Officer C. O. B. Beale, D.S.O. (A.).

The initials of Lieut. R. H. F. S. de V. Somerset are as now described, and not as stated in *Gazettes* of Aug. 1 and Sept. 16.

The following temporary appointments are made at the Air Ministry :—

Staff Officers, 3rd Class (T.).—Flight-Lieut. L. D. McKean ; Nov. 13. (Q.).—Flying Officer H. J. Birtles ; Nov. 24.

The following temporary appointments are made :—Group Capt. H. C. T. Dowding, C.M.G., is graded for purposes of pay and allowances as an Area Comdr., whilst officiating in comd. of an area (from Sept. 1 to Oct. 17).

Staff Officer, 1st Class.—(Air.).—Wing Comdr. C. W. Wilson, M.C. ; Oct. 16.

Staff Officers, 2nd Class.—(P.).—Sqdn. Ldr. H. A. Michell, O.B.E. ; Oct. 16 from (S.O.) 1st Class (Air).—Sqdn. Ldr. R. L. G. Marix, D.S.O. ; Nov. 12.

Flying Branch

Wing Comdr. W. F. MacNeece, D.S.O., D.F.C., to be Wing Comdr. (A.), from (S.O.) ; Dec. 4.

Sec. Lieut. E. Phillips to be Lieut. ; Nov. 10, 1918.

The following relinquish the temp. R.A.F. commns. on return to Army duty :—Pilot Officer (Hon. Flying Officer) A. J. Cyr (Lieut., Can. Forestry Corps) ; May 9. Flight-Lieut. (Hon. Sqdn. Ldr.) G. Disney (Maj., Essex R.) ; Oct. 27. Flight-Lieut. C. C. Clark (Lieut., R.F.A.) ; Nov. 10. Flying Officer J. K. Smith (Lieut., Lanc. Fus.) ; Nov. 12. Flying Officer V. Bayley (Lieut., L'pool R.) ; Nov. 14. Flying Officer W. F. Nickolay (Lieut., E. Yorks. R.) ; Nov. 17. Flying Officer L. Gellatly (Lieut., Gord. Highrs.) ; Nov. 20. Wing Comdr. G. E. Todd, O.B.E. (Maj. (Bt. Lieut.-Col.), Welsh R.) ; Nov. 27.

Sec. Lieut. J. E. M. Phillips relinquishes his commn. on ceasing to be employed ; Oct. 25.

Sec. Lieut. H. A. Ball, M.M. (Lieut., R.H. and R.F.A.), relinquishes his temp. R.A.F. commn. on retirement from the Army ; Nov. 23.

(Then follow the names of 80 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank :—F. K. Ratcliffe (contracted on active service) ; Nov. 27. P. W. Anderson (caused by wounds), A. D. Robertson (contracted on active service) ; Nov. 28.

Sec. Lieut. E. M. Nicholas relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank ; May 8.

Sec. Lieut. S. Le Roy Switzer is antedated in his appointment as Sec. Lieut. (A. and S.) ; May 25, 1918.

The notification in *Gazette* Sept. 5 concerning Lieut. F. G. M. Sparks, is cancelled (notification in *Gazette* June 6 to stand).

The notification in *Gazette* Oct. 17 concerning Lieut. H. W. Auerbach is cancelled (notification in *Gazette* Oct. 28 to stand).

The notification in *Gazette* Nov. 4 concerning Lieut. J. N. Catling is cancelled.

The notification in *Gazette* Nov. 18 concerning Sec. Lieut. (Hon. Lieut.) A. Cox (Lieut., R. Welsh Fus.) is cancelled.

Administrative Branch

Sec. Lieut. J. A. McGilley to be Lieut. ; March 1.

The following relinquish their temp. R.A.F. Commns. on return to Army duty :—Flying Officer Sir H. W. A. Ripley, Bt. (Lieut., 1st Drgns.) ; Feb. 17 (substituted for notification in *Gazette* Feb. 7). Flying Officer C. C. Statt (Lieut., Oxf. and Bucks. L.I.) ; April 15. Sqdn. Ldr. K. L. Buist (Maj., H.L.I.), Flying Officer J. E. G. O'Byrne (Lieut., R. Muns. Fus.) ; Nov. 19.

Lieut. T. J. Hudson (Sec. Lieut., Ex. Reg. Empd. List) relinquishes his temp. R.A.F. commn. on retirement from the Army ; Dec. 6.

(Then follow the names of 25 officers who are transfd. to the Unemployed List under various dates.)

Technical Branch

Pilot Officer F. Simpson to be Flying Officer, without the pay and allowances of that rank ; Oct. 1 (substituted for notification in the *Gazette* of July 29).

The following relinquish their temp. R.A.F. commns. on return to Army duty :—Flying Officer E. Gayton (Lieut., R.F.A.) ; Nov. 15. Pilot Officer (Hon. Flying Officer) W. W. Smith, M.C. (Lieut., actg. Capt., Shrops. L.I.) ; Nov. 18. Flying Officer (Lieut., N. Staff. R.) P. S. Laughton ; Nov. 20.

(Then follow the names of 24 officers who are transfd to the Unemployed List under various dates.)

The notification in the *Gazette* of July 18 concerning Maj. G. Dixon-Spain, M.C., is cancelled. (Notification in *Gazette* of June 27 to stand.)

The notification in the *Gazette* of Oct. 28 concerning Lieut. J. Butterfield, wherein this officer was shown on the Unemployed List, is cancelled. (Notification in *Gazette* of Nov. 7 to stand.)

Memoranda.

Lieut. W. F. Kisbey is granted the hon. rank of Capt. ; Feb. 19.

Temp. Hon. Lieut. A. R. Densley relinquishes his commn. on ceasing to be employed ; May 31.

(One officer transfd. to the Unemployed List.)

The notification in the *Gazette* of Aug. 8 concerning Capt. H. F. Atkinson-Clarke, M.V.O., O.B.E. (Scots Guards) is cancelled.

AVIATION IN PARLIAMENT

The R.A.F. Boulogne Depot

CAPT. TERRELL, in the House of Commons on December 2, asked the Secretary of State for War what transport still is maintained at the port depôt of the Royal Air Force at Boulogne ; what work is done by the lorries ; how many officers and other ranks are there still employed ; and whether there is any other reason for this depôt being kept open except that it forms a convenient booking-office for officers going East by way of Paris ?

Capt. Guest (Joint Parliamentary Secretary to the Treasury) : I have been asked to answer this question. The reply to the first part is that the mechanical transport at the port depôt of the Royal Air Force at Boulogne consists of one touring car and one light tender ; to the second part, that there are no lorries ; to the third part, that the staff consists of one officer and four airmen ; and to the fourth part, that this depôt is being kept open to deal with the drafts of airmen arriving from England daily and with the evacuation of airmen from France.

Capt. Terrell : Will this depôt be closed down ?

Capt. Guest : As soon as it has served its purpose.

Paris–London Civilian Air Service

LIEUT.-COL. GUINNESS asked the Secretary of State for War whether there are at present any facilities for the repair of British aeroplanes or the supply of spare parts in connection with the daily Paris–London air service at any aerodrome in France except the terminus at Le Bourget ?

Capt. Guest : I have been asked to take this question, the reply to which is in the negative. Certain emergency landing-grounds exist between Gris Nez and Le Bourget. The importance of establishing a civil aerodrome with full facilities in the vicinity of Gris Nez is known to the French authorities, and it is understood that they intend to provide such an aerodrome.

Lieut.-Col. Guinness : Is it not a matter for the British authorities ? Is the hon. gentleman aware that there are now three different British types of machine flying this route of 130 miles over French ground, and is it not obviously impossible for these companies to provide the necessary facilities for small adjustments before crossing the Channel ?

Capt. Guest : This question is complicated by the fact that we are dealing with a civilian service and not a military service, but the Department is in communication with the French authorities on the subject.

Lieut.-Col. GUINNESS : May we be told when we shall have an Under-Secretary able to answer for the civilian service ?

Royal Air Force

MAJ. STEEL asked the Secretary of State for War whether he can make any statement as to what will be the constitution and strength of the Air Force in the year 1920 ?

Earl Winterton asked the Secretary of State for War whether he can make any statement as to what will be the constitution and strength of the Air Force between the years 1920, 1921 and 1922 ?

Mr. Churchill : I propose at an early date to lay before the House a Memorandum by the Chief of the Air Staff showing the proposed strength and composition of the Royal Air Force for the next few years.

Mr. Pemberton Billing : Will an opportunity for debate be given ?

Mr. Churchill : Opportunities for debate are fixed in the regular course of the Parliamentary Session and do not arise in consequence of any announcement of this kind. I propose to give a very full and clear indication of the whole of the changes in the air service.

Lieut.-Com. Kenworthy : During this Session ?

Mr. Billing : Is it proposed to appoint a new Minister or anyone to answer for the air service ?

Mr. Speaker : That does not arise out of the question.

Wireless Communication (London and Paris)

LIEUT.-COL. GUINNESS asked the Secretary of State for War whether, owing to the interruptions caused by the Eiffel Tower wireless station, messages in connection with the London–Paris air-mail service can be received by the wireless installation at the Paris terminus at Le Bourget ; and whether in view of the importance of reports as to British and Channel weather conditions being received before the departure of the mail service, he is taking any steps to make arrangements with the Eiffel Tower station ?

Capt. Guest : I have been asked to reply to this question. Routine times of transmission from London to Le Bourget have been arranged so as to avoid the interference referred to by my hon. and gallant friend. In cases when it is doubtful if the message has been received by Le Bourget, a second message is always sent ; during the last week these messages have been received regularly, and no repetition has been required. Air route reports of the British and Channel weather conditions are sent from London to Le Bourget between 8 a.m. and 3 p.m.

Lieut.-Col. Guinness : Has an arrangement actually been made with the Eiffel Tower Co., and is the hon. and gallant gentleman aware that last week these messages were not getting through because, by mistake or misunderstanding, they were regularly jammed by the Eiffel Tower station ?

Capt. Guest : I am informed this afternoon that an arrangement or a special allowance of time has been made in regard to the Eiffel Tower station.

London-Paris Air-Mail Service

LIEUT.-COL. GUINNESS, on December 3, asked the Postmaster-General whether instructions have been given at the post office in Parliament Street that letters for the London–Paris air-mail service are only to be accepted for posting in the morning ; what is the reason for preventing the posting of such correspondence daily at the end of business hours ; and whether he will now arrange for its acceptance at any time of the day at the eight post offices mentioned in the original announcement ?

The Assistant Postmaster-General (Mr. Pease) : No instructions have been given for the refusal of aeroplane letters tendered at the Parliament Street branch office in the evening for despatch by the air-mail service to Paris on the following day ; and steps have been taken to prevent the refusal of such letters at any of the eight London offices at which correspondence may be posted for transmission by the air-mail service.

R.A.F. and Kenley Common

SIR ALBION RICHARDSON asked the Secretary of State for War whether the military authorities are still in possession of Kenley Common, which was taken over during the War for military purposes ; if so, when it is proposed to vacate the common and to restore to the public their right to the full use of the same ; and what is the reason for the delay in so doing ?

Mr. Churchill : The answer to the first part of this question is in the affirmative ; and to the second and third parts, that owing to the importance of this aerodrome both from a service and civil point of view it is desired to retain it as a permanent station. Negotiations are in progress with this end in view.

Aerial Route, Egypt and the East

LIEUT.-COL. MALONE on December 4 asked the Secretary of State for War whether it is intended that the aerial route to Egypt and the East should pass *viâ* Malta ?

Mr. Churchill : No decision has yet been arrived at in regard to this.

Air Ministry Staff

LIEUT.-COM. KENWORTHY asked the Secretary of State for War what is the present staff of the Air Ministry ; and how many of these are employed in connection with civil, naval and military aviation, respectively ?

Mr. Churchill : The staff of the Air Ministry at the end of November last numbered 2,539. This figure includes the staff recently taken over from other Departments in connection with the transfer of airship work and of the Meteorological Department to the Air Ministry, namely, 136 and 130 respectively. I am unable to supply the statement asked for by the hon. and gallant gentleman in the second part of his question, as it is impracticable to separate the staff into groups employed respectively in connection with civil, naval and military aviation.

R.A.F. Officers

SIR BERTRAM FALLE asked the Secretary to the Admiralty what gratuity or pension is given to petty officers promoted warrant officers after eight years' service and automatically promoted to Sec. Lieuts., Royal Air Force, on amalgamation of the Royal Naval Air Service and Royal Air Force ; and if such officers, demobilised at their own request and in receipt of the permanent officers gratuity, receive the difference between that gratuity and the gratuity given a temporary officer ?

Mr. Churchill : The whole question of the gratuities or pensions to be paid to Royal Air Force officers (temporary and permanent) who when commissioned in the Air Force were serving as warrant officers, Royal Navy, or Royal Naval Air Service, has been under consideration for some time, and it is anticipated that a final decision will be announced shortly.

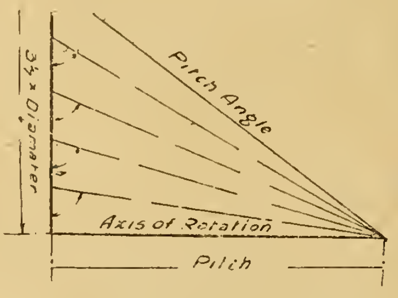
MODEL AEROPLANES

By F.J.CAMM

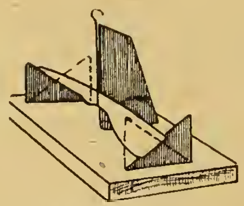
Note.—*All communications should be addressed to the Model Editor.*

Duration

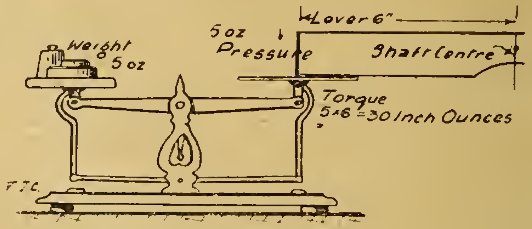
Duration contests evoke more interest than distance competitions, the latter being purely a matter of adopting a high loading per square foot and using screws of short diameter and long pitch with a superabundance of rubber driving them. I am probably correct in asseverating that many of the results at present on record have been achieved by uncertain methods, rather than by a carefully propounded scheme with which to attack the problem in hand. As in most other branches of science, so in model aeroplaning the theorist and practician are loud in their declamations of one another; in reality the two are inseparably interwoven. I have often demonstrated the difference in the results of haphazard and certain methods. So many are satisfied with the attainment of flight of their models that little thought seems to be given to the other side—the underlying principles.



Setting Out Pitch Angles



Testing Airscrews

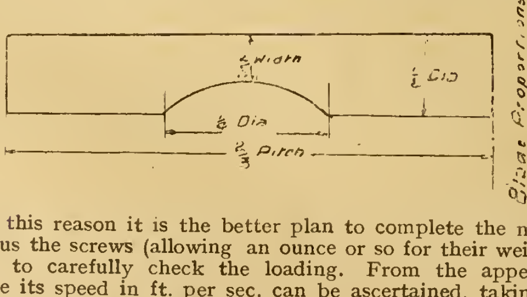


Loading.	Speed in ft. per sec.	Loading.	Speed in ft. per sec.
3 ..	15·2	6 ..	21·6
4 ..	17·6	7 ..	23·3
5 ..	19·7	8 ..	24·9

With duration the loading per square foot bears a definite relation to the pitch of the screw or screws; for suppose the loading is 6·02 per sq. ft. (about 4½ is ideal for duration), there is a corresponding air speed at which a model so loaded will fly most efficiently and with a minimum amount of power, in this case 14·7 miles per hour or 21·6 ft. per sec.

Airscrews

It is easy to observe that the pitch of the airscrews, multiplied by their revolutions per second, should equal this distance. If screws are used which fall short of this distance, the model cannot be expected to put up a good performance.

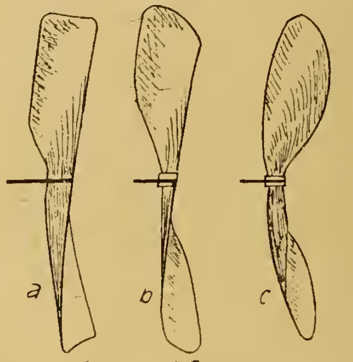


For this reason it is the better plan to complete the model minus the screws (allowing an ounce or so for their weight), and to carefully check the loading. From the appended table its speed in ft. per sec. can be ascertained, taking an average of the two nearest loadings (higher and lower) when it falls between the loadings given. Assume the loading is 6½ ozs. per sq. ft. By looking up the table it is found that this corresponds to a speed of 22 ft per sec. This constitutes the product of the pitch and the revs. per sec.

Pitch

The pitch of an airscrew is (for carved screws) the product of the thickness of the block and 3⅐ times its width inverted. With bentwood airscrews it is necessary to measure the angle the tip makes with the axis, and multiplying the tangent of the angle so found by the length of the circumference of the disc swept by the screw. If, therefore, the angle of the tip is 30°, the corresponding tangent will be ·57 approximately. Assuming the diameter of the airscrew to be 12 ins. the circumference of the disc swept by it will be 3⅐ × 12 = 37·42. Multiplying this by the tangent ·57 we obtain 22·32 ins. as the pitch of the screw.

Much controversy has ranged round the question of the comparative efficiency of carved and bentwood screws.



Types of Airscrew

Personally I am of the opinion that carved screws are some times less efficient than bentwood ones, if made by guessing some symmetrical shape and carving to it. It is well known that an efficient screw delivers as nearly as possible a cylinder of air, not a tube; in other words, it drives air back at a constant velocity along its entire length. With an inefficient screw some portions of the blade act as a drag on the others, owing to the difference in the velocities of the volumes of air driven back by each portion. Now, in order to eliminate this waste of power, and to ensure that the screw absorbs a maximum of the torque imparted to it by the shaft, it follows that the pitch angles along the blade must be so graduated that the pitch is constant along its entire length. A moment's thought will show that this must be, because the surface speed at half the screw-radius from the centre is only half that of the tip; hence the angle at this point must be double that of the screw-tip. (It is well to note, in parenthesis, that with full-size screws a small increase on this is allowed to correct discrepancies.)

Setting Out Pitch Angles

These angles may be found (as shown in Fig. 1) by erecting a line equal in length to the circumference of the disc swept by the airscrew and another equal to the pitch. By subdividing this peripheral line as shown, the angle at the corresponding points of the blade are found. The angle at any point of the blade can be found in this manner. The drawing should, of course, be made to some convenient scale.

The angles may be checked by the simple apparatus shown in Fig. 2, cutting cardboard or tin templates to the angles obtained by the method shown in Fig. 1, and erecting them at that distance from the centre to which they vie in the airscrew blade. In the light of this information it is absurd to imagine that a carved screw (if made without resorting to this method) should be more efficient than a bentwood. It is these angles which determine the shape of the screw; the varying cross sections of the block necessary to ensure the variation of the pitch angle deciding exactly the position of the curved edge in relation to the parallel edges of the block from which the screw is being carved. If the reader makes a comparative test by carving two screws of similar diameters from two blocks of equal dimensions (in one instance adopting the method outlines, and in the other, resorting to guesswork), and then tries them on a model, he will be astonished at the difference in the power required to achieve the same result. For example, it may take 1,000 turns on a 3 ft. 6-strand motor to obtain 60 secs. duration with the incorrect screw, whereas the correct one may only take 800 turns on a 5-skein motor of the same length. Expressed in a more certain way, one may take 30 inch ounces of torque, and the other only 25 inch ounces.

Measuring Torque

Torque may be computed, as shown in Fig. 3, by winding the screw and letting its tip rest on the centre of an accurate balance-pan. The pressure is balanced in the counterpoise pan by means of small weights; and torque is the product of the screw radius and the weight which just balances the pressure from the screw—in the example shown, 30 inch ounces. The thrust itself is the product of the weight of the mass of air driven back in one second by the screw and the speed (in ft. per sec.) at which the mass is moved; the speed, of course, is determined by multiplying the pitch by the revolutions per second of the screw.

It is generally accepted that better results are obtainable from screws having large diameter and moderate pitch (about 1½ times the diameter) than with screws of short diameter and long pitch—this applying to both bentwood and carved screws. I do not consider it advisable to exceed 45° pitch angle, when the pitch exactly equals the circumference of the circle described by the screw; the latter commences to lose efficiency once this angle is exceeded. In this latter respect the airscrew bears out the "critical-angle" theory of aerofoils which fixes a set angle of incidence, for a given section, at which the aerofoil will give a maximum lift.

(To be continued.)

Bentwood Screws

With regard to bentwood screws, I have obtained the best results with screws made to the proportions given by Fig. 4. Some of the types much in vogue of late are shown in Fig. 5; it is not thought that much is to be gained by imparting freak shapes to the contour of the blades. The type given by *a* is my own type, and, of *b* and *c*, *b* is the most efficient. A pair of 12-ins. screws recently made by the writer (and with which the duration mentioned in the previous issue was made) weighed 7$\frac{5}{16}$ ozs. the pair!

Competitions

With regard to my note last week, I wish to arrange a competition (the rules and prizes for which to be announced subsequently) in which provincial aeromodellists may compete. I should be glad to hear from any interested provincial readers, as well as from the London clubs. The only difficulty seems to be that of authenticating the flights, but doubtless this could be got over. I should like readers to indicate their views with regard to the rules of the competition, in order that some working basis may be decided on.

Illinois Model Aero Club

The results recently to hand of the above club portends some surprising results next spring from America. W. D. Pease created a record for America of 133 secs, in the competition for the Laura Weaver Trophy, which is awarded each year to the member putting up the best average performance. It cannot be said that America previously encouraged model aviation, and it is interesting to note the progress the numerous clubs now formed there. Many of them possess members drawn from the English clubs, probably the most enthusiastic being Mr. W. P. Dean, previously of the Manchester club, and connected with model aviation even prior to the time of Blériot's Channel crossing in 1909.

Replies to Correspondents

H. S. and H. B. (Leicester).—Many thanks for your conjoint letter. We replied direct to your queries. Why not form a club in Leicester yourselves? The model you mention did within a second or so the same performance in four consecutive flights in damp weather; no sun, and a wind! Hardly a matter of luck?

◆ ◆ ◆ ◆

"British Airships"

THERE are singularly few books in English on the subject of airships, and for that fact alone the volume by Major George Whale, late of the R.A.F., is welcome. In the opening chapter Major Whale summarises in simple language the chief principles of design and the methods adopted in operating airships. He then goes on to trace the history and development of airships in England and on the Continent previous to and during the War, giving brief descriptions of the characteristic types which were evolved from time to time and outlining the results obtained and some reasons which lead to the improvement of subsequent vessels. His book is therefore one for the general reader rather than for the technical student. At the same time it will doubtless be found useful by those who are considering the possibility of utilising airships in any way, for it shows what has been done and what is possible with the various types of motor-driven lighter-than-air craft. In the concluding chapter Major Whale, discussing the future of airships, gives some figures regarding the load capacity of some of the latest types of rigids, such as the L70, R33 and R38, and indicates what may be accomplished with airships of even larger displacement. Major Whale thinks that a small airship of the S.S. Zero type would appeal to many sportsmen who have hitherto sought their amusement and recreation in yachting, motoring or ballooning. He also points out the possibilities of utilising airships for such purposes as exploring the unmapped regions of the Amazon, searching for pearl-oyster beds, sponges, coral, etc., locating icebergs in the Northern Atlantic, policing deserts such as those in Arabia and the Soudan.

The book is illustrated by about a score of photographs of typical British airships, but we think that in future editions the selection of photographs could be added to with advantage, bearing in mind that there is no illustration in the book of the latest British rigids such as the R33 or R34. The book is published by Mr. John Lane, and the price is 7*s.* 6*d.* net.

"Cattewater Old Boys"

EX-OFFICERS and men who were stationed at the Seaplane Station, Cattewater, Plymouth, during the War, at a meeting at the Holborn Town Hall, on December 3, decided to form a club, to be called the "Cattewater Old Boys." Capt. A. T. Sketchley was elected President, and Mr. Bosher, Secretary, while the Committee consists of Messrs. Kalber, Murphy, Reid, May, Ogle, Mamstree, Balch and Courtneidge. The first dinner will be held in London at the end of January. All members who were at Cattewater during the War are asked to send their names and addresses to Mr. Bosher, 33, Langdon Road, Junction Road, Highgate, N.

Experiments in Hovering Flight

CAPT. HAMERSLEY, M.C., has been making experiments at Hamble in hovering flight. He took up the Avro "Baby" in a wind of about 40 m.p.h., faced the wind, and throttled down. By nicely calculating the respective strengths of thrust and drift, he succeeded in remaining in the same spot over the aerodrome for about five minutes. The spectators say that it was a very curious sight. At Amsterdam he had allowed the Baby to be blown backwards, and landed on the aerodrome without turning; but he wanted to see whether it was possible to actually hover over a spot for five minutes, and he succeeded.

Air Raid and Rent

AN action arising out of an air raid on March 8, 1918, was heard at the Bloomsbury County Court on Monday. A bomb fell on a flats building at Hampstead, and as a result of the damage the tenants had to go elsewhere. £13 was claimed for rent from one of them, Mrs. Steele.

Judge Bray told her that she might have an action for damages, and he advised her to consult a solicitor. There was no answer to the claim for rent, and she was ordered to pay £1 a month.

SIDE-WINDS

It is pretty difficult to make an avowedly advertisement booklet attractive, interesting and informative, but in an illustrated brochure just to hand from Messrs. C. C. Wakefield and Co., this combination of three most excellent qualities has been thoroughly achieved. It serves to indicate how closely the history of Castrol has been interwoven with that of aviation, and its pages are adorned with a large number of portraits of pioneers and pilots who have outstanding performances to their credit. Those who have been responsible for the getting-out of this brochure, which bears on its cover a charming miniature of Lord Leighton's "Daedalus and Icarus," are to be congratulated upon their work, which will doubtless be sought after. Those, therefore, who wish to secure a copy should write at once to the Aviation Department, Messrs. C. C. Wakefield and Co., Wakefield House, Cheapside, E.C. 2.

- - -

The Airco "aerial postmen" who carry the express G.P.O. mail between London and Paris completed on Saturday their fifteenth week of daily flying, having accomplished 184 aerial journeys at an average speed of 104 miles an hour. On the service to Paris Lieut. Bradley, leaving Hounslow at 12.50 p.m. with eight bags of mails, alighted at Lympne to pick up some additional mails and parcels, and arrived at Le Bourget at 3.25 p.m. On the service from Paris to London Lieut. Shaw, with mails and parcels, found visibility so bad as he approached the French coast, that he landed near Abbeville and completed his journey to Hounslow on Sunday, alighting at 4.5 p.m.

- - -

Those who are going to Paris for the Aero Show should make a note that they will be able to obtain Flight and other English newspapers at Messrs. W. H. Smith and Son's Afternoon Tea and Reading Rooms at 248, Rue de Rivoli, Paris. Both the tea rooms and the reading room were found very useful by the large number of English visitors to the recent Motor Show.

- - -

It is impossible to emphasise too strongly the importance of having adequate cooling arrangements on an aeroplane which sets out to fly to Australia. It is interesting to note, therefore, that the Martinsyde machine, which is now making steady progress to the South, is fitted with radiators made by Messrs. Baynes and Partners.

- - -

Thanks to the enterprise of the Avro Co., Londoners quickly knew the result of the Carpentier-Beckett fight. It was arranged that as soon as the result was telephoned to Hounslow an Avro should fly over London firing coloured lights to indicate the name of the victor—red for Beckett and green for Carpentier. This programme was successfully carried out. Luckily the night was clear, though the wind was strong, and Maj. A. G. Taylor, A.F.C., the Avro London manager, who was the pilot, had a hard fight against the wind on the journey back. A perfect landing was made after a flight lasting about three-quarters of an hour; practically the whole of London was covered.

- - -

Many old readers of Flight will recall Mr. W. Cecil England, who took his ticket in 1911 and flew a machine in Rangoon the following year. As soon as he could get home he joined up in the R.N.A.S., and later served in the R.A.F. Having been demobilised he has gone back to Burma, but, as will be seen from an announcement elsewhere, he is desirous of retaining his connection with the aeronautical world, and will be pleased to assist any firm who are desirous of obtaining information as to flying conditions in Burma, etc.

- - -

"Correct Lubrication," a 60-page booklet issued by the Vacuum Oil Co., Ltd., is considerably more than a mere statement of the excellence of Gargoyle Mobiloils. It is a real help to motorists, explaining in clear language the imperativeness of scientific lubrication and emphasising the reward of this practice—economy of repairs, of depreciation, and of fuel and oil. Engine and chassis troubles are delineated and their remedies stated, and a lengthy chart, embracing most types of motors, passenger and commercial, British and imported, shows the exact grade of Mobiloil to be used on each. Any one who reads this booklet—an act that involves no mental discomfiture—will gain an extension of knowledge that cannot fail to prove profitable.

IMPORTS AND EXPORTS, 1918-1919.

Aeroplanes, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "Flight" for January 25, 1912; for 1912 and 1913, see "Flight" for January 17, 1914; for 1914, see "Flight" for January 15, 1915; for 1915, see "Flight" for January 13, 1916; for 1916. see "Flight" for January 11, 1917; for 1917, see "Flight" for January 24, 1918; and for 1918, see "Flight" for January 16, 1919.

	Imports.		Exports.		Re-Exportation	
	1918.	1919.	1918.	1919.	1918.	1919.
	£	£	£	£	£	£
January ...	49,402	555,989	24,765	57,571	—	—
February	51,941	453,822	13,545	57,972	—	—
March ...	47,930	704,424	11,451	72,716	1,000	400
April ...	33,342	97,662	10,815	25,433	—	—
May ...	942,866	136,631	67,224	38,428	—	—
June ...	864,296	1,410	35,658	41,526	—	—
July	1,834,293	136,463	10,800	41,290	—	—
August ...	566,137	67,292	71,503	60,581	—	—
September	505,160	172,192	8,033	65,349	100	—
October	294,835	132,243	9,166	87,635	—	500
November	410,557	44,713	75,811	67,831	—	7,200
	5,600,759	2,502,841	338,771	616,332	1,100	8,100

◆ ◆ ◆ ◆

NEW COMPANIES REGISTERED

AERO AND MOTOR CO., 8, Peter Street, Manchester.—Capital £8,000, in £1 shares. Acquiring business of a motor car dealer carried on by A. D. Scarlett at 8, Peter Street, Manchester, as the "Aero and Motor Co.," etc. First directors: A. D. Scarlett, R. M. Papelian and A. Scarlett.

FIRST ATLANTIC FLIGHT, LTD.—Capital £100, in £1 shares.—Manufacturers of and dealers in aeroplanes and airships, etc. Solicitors, Claremont, Haynes and Co., Vernon House, Cicilian Avenue, Bloomsbury, W.C.

METRIC ENGINES, LTD., 53, Victoria Street, S.W.—Capital, £11,000, in £1 shares. Aeronautical, motor and general engineers, etc. First directors: G. E. Bacher and A. Milner.

◆ ◆ ◆ ◆

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m = motors

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 11, 1919

4,594. F. H. Page. Aircraft frame structures. (134,858.)
8,736. J. Robinson. Direction-finding. (134,560.)
18,332. H. R. Ricardo. Mounting of aircraft propellers. (134,895.)
18,373. A. Beck and Nicholson and Sons. Aeroplane dope. (134,899.)
18,464. Soc. Anon. des Etab. L. Bleriot. Regulating devices for use in electrical machinery. (130,575.)
18,558. G. H. Abell and J. S. Wheelwright. Apparatus for obtaining sea-water for ballast on airships in flight. (134,921.)
18,620. S. H. Sturtevant. Propellers. (134,929.)
20,766. H. Leitner. Metal aircraft propellers. (135,006.)

If you require anything pertaining to aviation, study "Flight's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xxxv, xxxvi, xxxvii and xxxviii).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"Flight" *will be forwarded, post free, at the following rates:*—

United Kingdom	s.	d.	Abroad*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 „ „ ..	14	1	6 „ „ ..	16	6
12 „ „ ..	28	2	12 „ „ ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "Flight," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 573 (No. 51, Vol. XI.) DECEMBER 18, 1919 [Weekly, Price 6d. Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**

These rates are subject to any alteration found necessary under abnormal conditions

**European subscriptions must be remitted in British currency.*

CONTENTS

Editorial Comment PAGE
- The Pioneer Flight to Australia .. 1605
- Imperial Air Routes .. 1606
- Encourage Private Enterprise .. 1606
- The Future of the Royal Air Force .. 1608
- Training of Officers and Men .. 1608
- Research .. 1610

Flight—and the Men: Mr. E. Boudot .. 1607
The Paris Aero Show .. 1611
The Crown of the Year. By Massac Buist, .. 1617
Personals .. 1618
The Flight to Australia .. 1619
The Air Estimates .. 1621
The Permanent Royal Air Force .. 1622
The Vickers-Vimy Presentation .. 1628
Airisms from the Four Winds .. 1629
The Bloc-Tube Carburettor .. 1631
The Royal Air Force .. 1632
In Parliament .. 1633
Models .. 1634
Side-Winds .. 1636

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Dec. 19 to... Jan. 4, 1920.	Paris Aero Show.
1920	
April 18 to May 2	Seaplane Competition at Monaco
June 1 ...	Air Ministry Competition (Small Type Aeroplanes), Martlesham Heath
July, 1920	S.B.A.C. International Aero Exhibition at Olympia
Aug. 1 ...	Air Ministry Competition (Seaplanes) Felixstowe
Sept. 1 ...	Air Ministry Competition (Large Type Aeroplanes), Martlesham Heath

NOTICE.—Owing to Christmas Day and Boxing Day falling on Thursday and Friday, it is necessary that all copy, Editorial and Advertisement, for the issue of December 25 should reach FLIGHT Offices not later than the morning of December 19.

EDITORIAL COMMENT

The Pioneer Flight to Australia

THE seemingly impossible has been accomplished and the journey from England to Australia by a single aeroplane, with the same two engines with which it started, has been successfully completed in a time well within that stipulated by the Australian Government, in its offer of a prize of £10,000 for the pioneer flight, and easily better than the fastest steamer record. To say that we congratulate the pilot, Capt. Ross-Smith, and his three intrepid companions in the flight, is merely to utter a commonplace—their achievement is one of those things which leaves the ordinary person spell-bound and incapable of adequately expressing his thoughts. Therefore, we must leave this side of the matter and pass on to consider other impressions on the bearing of the flight on the future of our commercial air routes. Nor have we the greater hesitation in doing this because by the time these lines appear in print the flight and its successful termination will be more than a week old and all that need be said of a congratulatory nature will have been enunciated.

We have said that the seemingly impossible has been achieved and that is perfectly true. It is doubtful if anyone was virtually sanguine of success in the attempts made and to be made by the six competing machines which have been entered for the flight round half the world. No one doubted that Australia could be reached by air, but, in the judgment of many, it could only be done by the use of several machines worked in relays. Nor does the success of Capt. Ross-Smith alter the fact that the commercial routes from England to the Antipodes which will undoubtedly be established in the near future will be worked in this way. Not only will this be necessary from the point of view of safety, efficiency, and the saving of time, but it is too much to ask of pilot and crew that they should undergo the tremendous strain, physical and nervous, that so prolonged a flight entails. What Capt. Ross-Smith and his companions have really done is to give the world the most striking demonstration we have yet had of the fact that the aeroplane with its engine is a practical vehicle, and neither a toy nor an instrument of warfare alone.

As an object lesson it dwarfs into insignificance even the flight across the Atlantic, although the latter was, in some respects, the more spectacular. It opens up new vistas of travel and brings us to the opening of a new era in which the peoples of the world will be drawn closer together by the new transport. In the days of the old navigators the world was unexplored and unknown, and their voyages were regarded by their contemporaries very much as the popular world regards the achievements of such pioneers as Capt. Ross-Smith. They could not foresee that these wonderful voyages were but the forerunners of similar journeys which would be commonplace in the years to come, or that these voyages which seemed —and were—heroic would one day be undertaken by millions as a part of the routine of life. The navigation of the seas then was in its infancy. To-day aviation is in the same stage of first youth and, as marine travel has developed since the days of Columbus and Vasco da Gama, so will aerial travel develop in the years to come. The one essential will be that, while it required centuries and the discovery of the steam engine to bring about revolution in travel by sea, the development of air transport is simply a matter of applying the knowledge and the material we already have at our disposal.

◆ ◆ ◆

Imperial Air Routes

From the successful accomplishment of the flight to Australia to the report of Lord Weir's Committee on Civil Aviation is an easy step. This Report, issued as a Parliamentary Paper, was published in FLIGHT last week, and its recommendations make interesting reading. Briefly, the Committee propose :—

(1) That the air route from Egypt to India should be developed.

(2) That the development should be by private enterprise backed by State assistance, and that the State assistance should take the form of providing meteorological and wireless services and of air ports, including the provision of the sheds required for running purposes.

(3) That the service proposals for these air ports should be carried through as soon as possible.

(4) That the necessity for additional expenditure on the development of these ports for purely civil purposes in order to meet the increase in frequency of the services should not be overlooked, though only experience can show what such expenditure may be.

(5) That the G.P.O. in consultation with the Air Ministry, should draw up a form of tender for an air mail contract between Egypt and India to be put up for competition.

(6) That a certain quantity of the aircraft engines and material which have been declared surplus by the Royal Air Force could be placed at the disposal of the Civil Aviation Department for distribution free in this country and the colonies.

(7) That the prohibitory bans on civil aviation in Egypt and India should be removed.

These proposals are made on the assumption that the Government intends to maintain flying supremacy by supporting the Service side at a level which will ensure the safety of our position. It is not practicable, in the view of the Committee, to recommend any large appropriation of public funds by way of investment in an entirely novel business. They are, however, of opinion that, taking a long view, any investment such as they suggest will at least bring the necessary experience to help to establish flying ultimately on a paying basis.

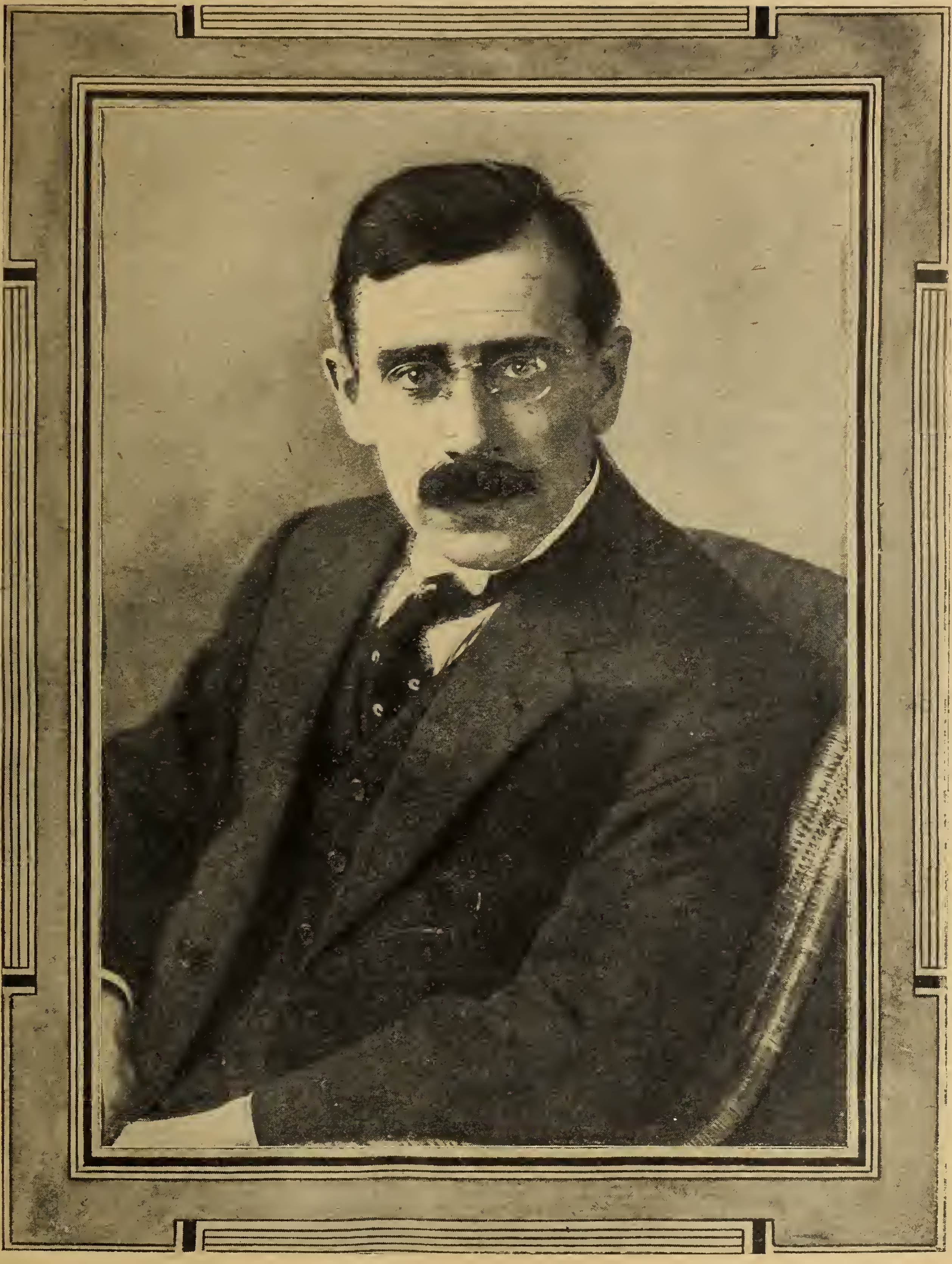
The Committee seems to be exceedingly cautious in the elaboration of its recommendations. For instance, it lays down that the problems involved in each section of an Imperial route vary greatly and thereby render the formulation of a general Government policy exceptionally difficult at present. Admitting all this, it would still seem that the basic consideration is whether or not it is considered essential to maintain aerial supremacy, commercial and military, or not. It has been generally agreed that the answer to this fundamental question is in the affirmative. That being so, surely the right policy is to take the bolder course and willingly go into the matter with the intent to create and maintain these routes even if the policy should involve a heavy initial loss. It need not be disguised that such a loss would be almost—even certainly—inevitable, as must be the case with all pioneer enterprises. But if we take the long view, it seems almost equally certain that, ultimately, these routes will pay handsomely and the true policy, therefore, is to undertake the commitment straight away, and before the possibility becomes elusive. The Committee themselves admit that private enterprise cannot inaugurate and maintain these routes unaided and that a measure of State support is essential. We would further emphasise the fact that time is also an essential factor. Private enterprise cannot fail to become weary of the long wait and it is very much to be feared that, unless the Government can very shortly make up its mind as to its real policy, when at long last it has reached a decision we shall have retrograded to a position something approaching that which existed before the War.

◆ ◆ ◆

Encourage Private Enterprise

The vacillation and indecision of the Government in the matter of the Imperial air routes and aviation in general is the less understandable when we read that no less a sum than £12,000,000 has been saved on the current year's Estimates. We are all in favour of economy, but there is economy which is twin-brother to extravagance and we urge that economy, so-called, in the matter of encouraging the development of civil aviation is of that brand. Even the most hide-bound bureaucrat of them all realises and admits that, unless we are as powerful in the air as we are at sea, we are in grave danger of attack at the " chosen moment " of any aggressive Power who may envy our possessions. On Saturday last the new scheme for the re-organisation of the R.A.F. on a peace basis was published. From it we find that the total establishment of service squadrons for the United Kingdom is to be four, excluding five squadrons for the Navy and one flight per division for the Army. There is to be one airship station only, and the establishment of lighter-than-air craft is to be reduced to one rigid and two non-rigid airships. In addition, it is proposed to provide eight squadrons for India, three for Mesopotamia and seven for Egypt. Now, this is all very well as a nucleus and we shall not presume to say that the proposed new organisation is not sufficient for our present needs. But it is most certainly not more than a moiety of what we shall require in *personnel* and machines should we be again involved in a great European war. The answer to that will be, no doubt, that there will not be another great war. That is merely absurd. There were many, and among them people of high authority, who told us the same thing about the late war—that it could never happen because no Great Power would dare to make war on account of its colossal cost. Or that, if it did happen, we could never become

Flight—And the Men



"Flight" Copyright.

Mr. E. BOUDOT, Chief Designer, Grahame-White Co., Ltd.

involved as a land Power. Even if we were drawn into the orbit of war our mission would be to keep the command of the seas and that no country could aspire to be at once a great land and sea Power. We know how the course of history falsified these prophecies and the appalling sacrifices their falsity landed us in. What guarantee have we that the prophets will not be wrong in the future as they have been proved in the past, and that, within the next decade or so, we may not be involved in another great war. Certainly there is nothing in the portents for the future to convince the average thinking person that there will be no more war

In any case, common prudence dictates that we should be prepared and, in so far as our readiness in the air is concerned, we see no reason to modify the opinions we have so often expressed, viz., that such readiness can be best attained by a relatively small active Air Force, backed up by strong reserves. The latter can only be obtained in one way by the encouragement of civilian aviation under State direction and subsidy. General Trenchard has issued his proposals for the active portion of the Air Force, but we are still awaiting a declaration on policy in the matter of civilian aviation, from which our reserves must be drawn. As we have repeatedly urged, while the Government is making up its mind on the matter, the best of the pilots and engineers, to whom we should have looked to form the backbone of those reserves, are becoming tired of waiting and are drifting off into other occupations. Those, too, who financed the industry through the war are likewise becoming tired of the delay, and are seeking fresh employment for their capital. Unless the Government makes up its mind very soon we shall find that there is but the remnants of an industry existing to carry out the active work of development, and we shall have to begin all over again.

◆ ◆ ◆

The Future of the Royal Air Force

In the scheme of organisation of the permanent R.A.F. outlined by Sir Hugh Trenchard, and which we print in full elsewhere, there are many other points which impress themselves on the mind of the one who studies this, the first, scheme for the organisation of a permanent Air Service. It is not possible for the purpose of comment to run right through the document, starting at A and ending at Z, since it is written in a manner befitting so serious and reasoned a document, and one has to go from point to point and often back again to appreciate the full measure of what it means. For example, we find under the head of "Training" that the strong necessity of infusing the proper Air Force spirit into officers and men is present in the mind of Gen. Trenchard, who says of this:—

> To make an Air Force worthy of the name, we must create an Air Force spirit, or, rather, foster this spirit, which undoubtedly existed in a high degree during the War, by every means in our power. Suggestions have been made that we should rely on the older services to train our cadets and Staff Officers. To do so would make the creation of an Air Force spirit an impossibility, apart from the practical objection among others, that the existing naval and military cadet and staff colleges are not provided with aerodromes or situated in localities in any way suited for flying training.

We agree most heartily. Indeed, we may recall to our readers' recollection that we constantly insisted upon this aspect at the time of our advocacy of the policy of "One (Air) Service, One Uniform, One Badge." *Esprit de corps* means everything in a fighting Service. Without it that Service had better be disbanded as an actual danger to the country, for it must come much nearer to being so rather than a reliable instrument of war. Having read the paragraph we have quoted, we then hark back to one of the methods by which it is proposed to secure this desirable "Air Force spirit," and we find that it has been most widely determined to preserve the numbers of some of the great squadrons who have made names for themselves during the War, in permanent service units with definite identity, which will be the homes of the officers belonging to them, and will have the traditions of the War to look back upon. A most excellent idea, this. Not only will the young officer fortunate enough to be posted to one of these famous squadrons feel that he belongs to a great Service, with great traditions, but he will have the added stimulus which comes from being a part of a unit of that Service which is above the ordinary plane, and in which he has the feeling that there are glorious personal records of service and gallantry for him to live up to.

◆ ◆ ◆

Training of Officers and Men

With regard to the training of officers and men, it is pointed out that owing to the great number of junior officers required and the comparatively small number of senior appointments, it is not possible to offer a career to all. Therefore, some 50 per cent. only of the officers have been granted permanent commissions, the remainder being obtained on short service commissions or by the seconding of officers from the Navy and Army. Great importance is attached to this last class, since an interchange of officers is bound to make for closer and more intelligent co-operation between the Services. So far as the training of officers is concerned, this will be carried out initially at the Cadet College, though a certain number of entries will be accepted from the Universities and through the ranks. The full details of the courses to be undergone at the Cadet College were made public some months ago, and were made the subject of comment at the time. There is no need, therefore, to traverse them afresh on this present occasion.

In so far as concerns the men, it has been determined to enlist those from what are termed the long apprenticeship trades as boys, who will undergo three years' training before being passed into the ranks. With a preliminary training of the nature contemplated and the practice of their trade during their service, it is confidently anticipated that these mechanics on passing to civil life will have no difficulty in securing recognition as skilled tradesmen. This is an important consideration, since any tendency for the Air Force to be regarded as a blind alley occupation would be fatal. A scheme has been drawn out for the future enlistment of boys by means of a competitive examination, and local education authorities have been circularised with a view to their nominating suitable boys to sit for the examination. By this means it is hoped to secure a really high standard.

This again is a really excellent plan. By thus making the Air Force relatively difficult of entry not only is the desired high standard likely to be attained, but it tends to lift the Force on to a higher

Drawing by Mr. J. McGilchrist

" Crossing the Coastline "

social plane, so to say, and to bring it to an equality with skilled occupations in civil life—a very direct contrast to the feelings with which the old time Regular Army was regarded in the years before the War.

Reverting to the training of officers once again, it is the intention to institute, though not during the coming financial year, a Royal Air Force Staff College.

This is to be located at Halton House, the residence of the late Mr. Alfred de Rothschild, which together with the whole estate, was purchased by the Government after his death. It is certainly ideally situated for the purpose, overlooking the Vale of Aylesbury, and there is an aerodrome within a quarter of a mile.

This has undoubtedly to come, for in spite of the gibes which are always levelled at the Staff in every war, there can be no success unless the Staff are properly trained for their work. As a matter of fact, we believe it is true that a great many of the mistakes of the early part of the War were due entirely to insufficient Staff training, not only of the improvised staffs of the New Armies but of the Regulars. Staff work has never been given the high importance in the British Army which attaches to it in Germany or France, while the agitation for the creation of a real War Staff at the Admiralty is too fresh in the minds of everyone to need more than a passing mention.

The sooner the R.A.F. Staff College is constituted and gets to work, the better it will be for the future of the Force.

Research

General Trenchard is unquestionably right when he refers to research as a matter of supreme importance. In this connection he remarks that the Departments of Supply and Research are being transferred from the Ministry of Munitions to the Air Ministry, and a portion of the experimental establishments are a charge on the Air Force Vote. Steady and uninterrupted progress in research, he says, are vital to the efficiency of the Force and to the development of aviation generally, and on it depends the elimination of accidents and the retention of the leading position we have established at such heavy cost during the War. The existing establishments are, therefore, to be retained during the ensuing financial year at a sufficient strength to ensure that urgent work shall continue.

That is good again. We are merely on the threshold of development and there remains much to be done along the lines of research. Some must be undertaken by private enterprise and we doubt not will, but for a long time to come we must look to the State to lead the way as is only right when we regard the fact that all progress is directly beneficial to the State.

The whole Memorandum is good reading. Naturally, we should have desired that it could have gone farther and thrown some light on the future of civil aviation in so far as the Government is concerned with that side of the movement. The only mention, however, is a significant disclaimer in which General Trenchard points out that he has confined himself to the Service aspect of the question.

▣ ▣ ▣ ▣

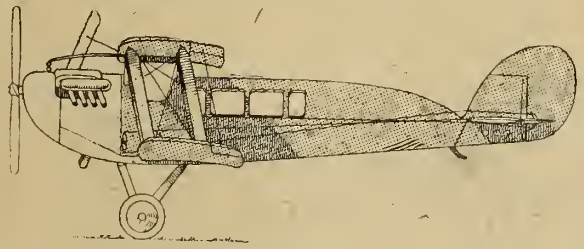
MAKING THE WORLD FEEL SMALL : The winning of the £10,000 Prize, a triumph for Australian grit and British-built aeroplane

THE PARIS AERO SHOW 1919

PRELIMINARY REPORT ON BRITISH SECTION

WHEN the doors of the Grand Palais in the Champs Elysées are thrown open tomorrow at 10 o'clock, it will be to admit visitors to the first French aero show since 1913, and the first aero show of any importance held in any country since 1914. It is, therefore, not to be wondered at that this exhibition has created a world-wide interest. Not only is the interval since the last exhibition of such duration as to cause one to look forward to the proofs, which it will furnish, of the progress made in the meantime—and this may be expected to be magnificent—but also the show is the first of its kind to give manufacturers an opportunity of placing before the public their various ideas of the commercial aeroplane in all its aspects. Progress is scarcely to be looked for in the matter of performance—as compared with War machines—nor is any increase in that respect necessary, or even desirable. Much more may we look forward to improvements in the comfort of the passengers, in general reliability, in ease of handling in the air and on the ground, in reasonable stability when flying, and in the practical considerations connected with the running and upkeep of machines.

Although Britain will be fairly well represented, better, possibly, than ever before, there are still a number of firms whom we should have liked to see included among the exhibitors. However, if British manufacturers are outclassed as regards numbers at the show, there is little to fear on the score of quality, and the excellence of British aeroplanes, it may be confidently expected, will be well brought out by the—relatively few—firms which *are* showing. It is, we think, generally admitted that British aircraft is second to none, but the fact needs emphasising just the same, and the Paris Show would have provided an excellent opportunity for doing so.



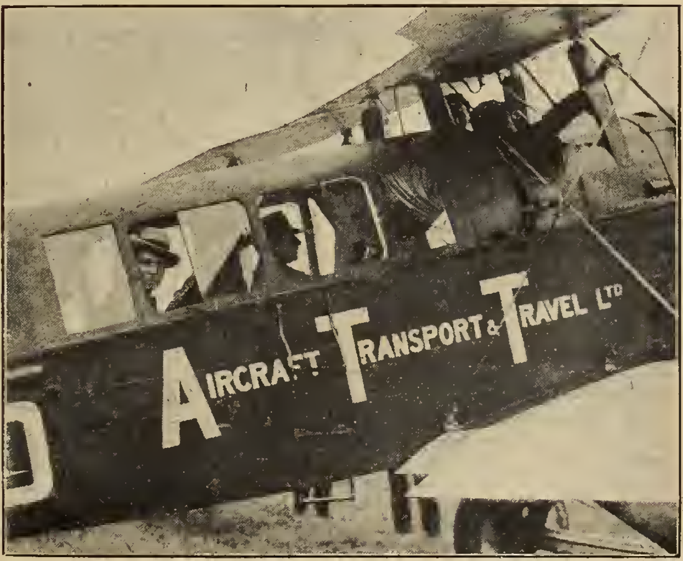
The Airco (D.H.) 16, 450 h.p. Napier Lion

At the moment of writing, six British firms are definitely known to be exhibiting at Paris. It is just possible, but not very probable, that one or two more will come in at the last moment. These six firms are: Airco, Boulton and Paul, British and Colonial, Handley Page, Vickers and Westland.

After the show is opened we hope to be able to give a detailed description of the machines exhibited by these firms; in the meantime a few brief notes indicating the nature of the exhibits may not be without interest.

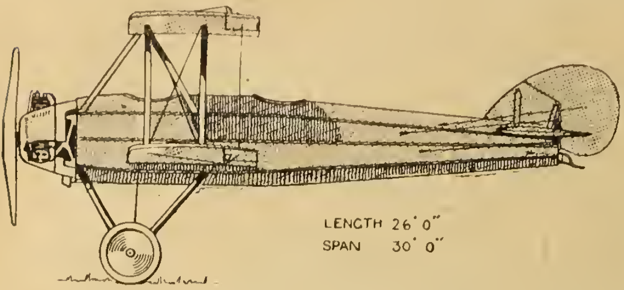
The Aircraft Manufacturing Co., Ltd. (Airco)

The main exhibit on this firm's stand will be the new Airco (D.H.) 16. Machines of similar type are, of course, already familiar from extensive use on the London-Paris air route, but the show machine will differ in several respects from the standard type. The chief alteration will be found in the engine unit, which, in the show machine, will be a 450 h.p. Napier Lion instead of the Rolls-Royce with which the standard machine has been doing such excellent work. The fitting of the Lion has necessitated a slight alteration to the nose of the machine, as the new engine is of the "broad arrow" type instead of the usual Vee. The result is a slightly shorter and somewhat differently shaped nose, as shown in the accompanying silhouette. The radiator is no longer fitted in the nose of the *fuselage*, but is placed some distance back, and protrudes through the floor of the body, much in the same manner as that of the Airco 9R on which Capt. Gathergood recently established a series of British records. The employment of the higher-powered engine has naturally



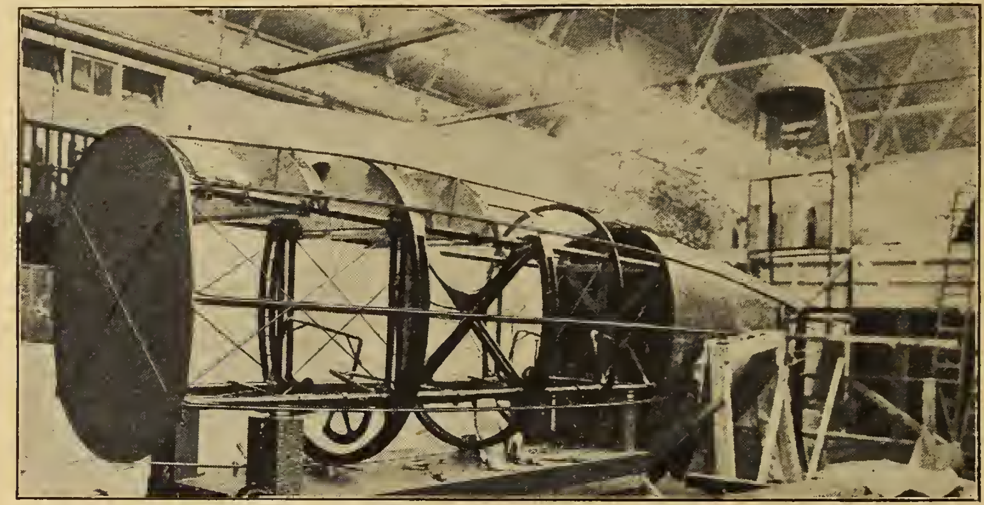
THE AIRCO 16: This photograph shows the cabin of the standard machine which has been used extensively on the London-Paris air service. The Show machine is similar, except for the engine, which is a 450 h.p. Napier Lion

resulted in a considerably increased performance. The machine is to be shown in full "show finish," with white body, polished aluminium cowl and nickel-plated exhaust pipes, black undercarriage struts and tail skid, and cream wings and tail surfaces.



The Boulton and Paul P 10, 100 h.p. Cosmos "Lucifer"

The cabin, as in the standard Airco 16, is designed to accommodate four passengers, two facing forward and two facing aft. It is most luxuriously finished, and will give visitors an excellent idea of air travel *de luxe*.



The Boulton and Paul P 10: This machine is built entirely of metal, and should prove a great attraction at the Show

In addition to the complete Airco 16, there will be shown on this stand a series of coloured photographs, similar to those shown at the E.L.T.A. exhibition at Amsterdam, which were greatly appreciated, as well as an entirely new series taken on the London–Paris air service route. A small section of the stand will be devoted to aerial photography, a new branch of the varied interests of this firm. Not the least interesting exhibition this stand will be a small scale-model of Hendon aerodrome, with the Airco works in the background, machines of different types standing about on the aerodrome, and one having its engine started by the Hucks starter.

On this stand Messrs. Airships, Ltd., will also exhibit, among other items, the aeroplane flotation gear upon which this company is specialising, as well as a model of one of their small non-rigid airships, or "aerial yachts."

Boulton and Paul, Ltd.

Probably the centre of attraction of this stand will be formed by the new Boulton and Paul all-metal machine, the P 10, with 100 h.p. "Lucifer" Cosmos engine. This machine is of very original design as regards its construction. The body is built-up of formers and *longerons* of rolled steel sections, as shown in the accompanying photograph. Between the formers and longitudinals are interposed panels of special fibre sheet, which is riveted to the metal parts. Extensive experiments in the rolling of sheet steel strips into suitable sections have enabled Messrs. Boulton and Paul to provide forms of metal construction which have excellent strength/weight ratios and which approach very close to the ideal rolled-metal section—*i.e.*, a section in which the full strength of the material can be developed.

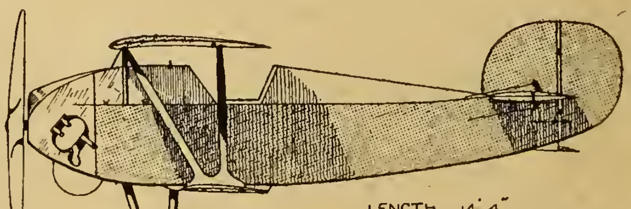
It is not only as regards the *fuselage* construction that P 10 is built of metal. The wings also are constructed entirely of steel, apart from the fabric covering, of course. The spars are of rolled-steel sections, the results of a number of experiments extending over a considerable period. Dr. Thurston, in his paper read before the Royal Aeronautical Society, mentioned and illustrated one of the Boulton and Paul spar sections, of which these new spars are a development. The ribs also are made of steel, each part being specially designed to fulfil its own particular function.

The mounting of the 100 h.p. Cosmos "Lucifer" engine on the P 10 is of special interest. It is so arranged that by removing the vertical hinge-pin on one side the whole engine and its mounting may be swung about the opposite vertical hinge, thus allowing easy access to the back of the engine for inspection and adjustments. The piping, controls, etc., are so arranged that they do not require disconnecting when the engine is swung out.

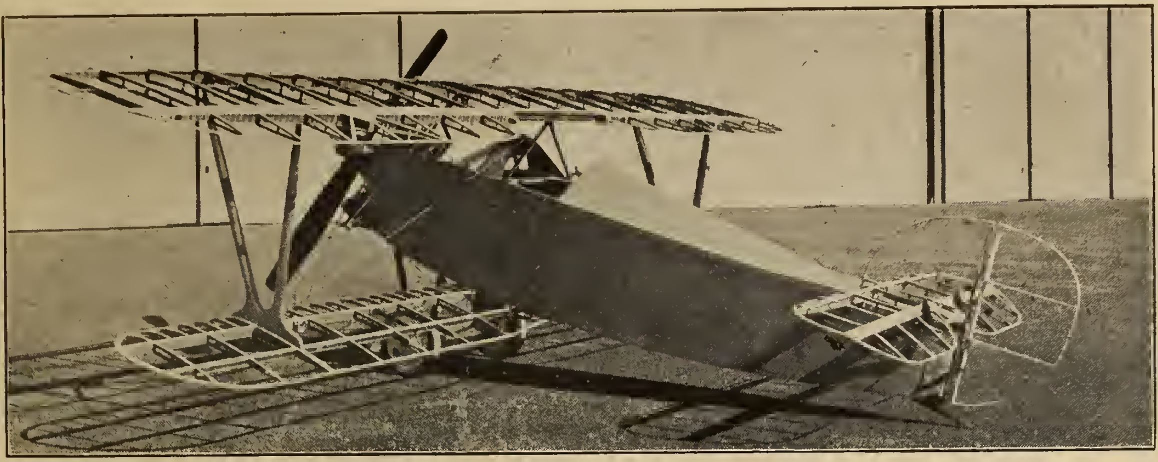
This feature of the design is one of the greatest importance from a practical point of view, and one to which other designers would do well to pay attention.

The British and Colonial Aeroplane Co., Ltd.

From the very first days of flying and of aero shows, the British and Colonial Aeroplane Co., of Filton, Bristol, have made it a rule to exhibit at the Paris Aero Salons. With the excellent workmanship for which Bristol machines were ever famous, it is not too much to say that this firm's stand has always been one of the attractions of the show, and on more than one occasion the Bristols have been the only British machines to be exhibited. This year, as usual, the Bristols are to be shown in Paris, and although the representation of Britain is not left solely to this firm, their stand will, nevertheless, be a conspicuous one, no less than three complete machines being shown, while a fourth, the Bristol Pullman, is so large as to prevent the actual machine



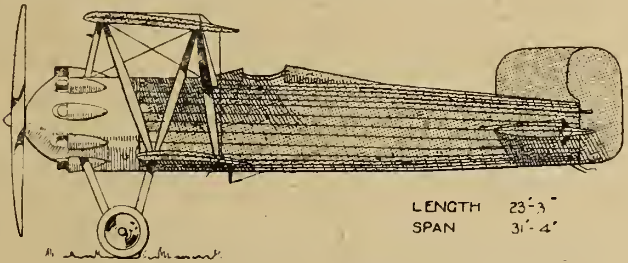
The Bristol Babe, 40 h.p. Siddeley engine from being exhibited. An excellent scale model of it will, however, be on view, and should, in conjunction with illustrations, enable visitors to form a very good picture of the luxurious "Pullman."



THE BRISTOL BABE : Photograph of the machine in skeleton form

The Bristol "Babe"

In some respects, perhaps, the small single-seater sporting machine, which will be known as the Bristol "Babe," will have a wider appeal than any of the other Bristols exhibited, as it is a serious attempt to provide the small, compact, handy and inexpensive sporting aeroplane of the future. It is of quite diminutive dimensions, the overall length being 15 ft. and the wing span 19 ft. 8 ins. The machine does not, therefore, require a large shed for its housing, while its light weight enables it to be handled on the ground with ease by one man.

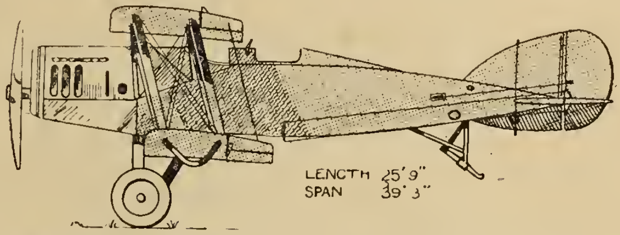


The Bristol Racer, 450 h.p. Cosmos "Jupiter"

Ease of maintenance has been aimed at in the design by doing away with as much bracing as possible. Thus the *fuselage* is covered with three-ply wood, without bracing wires, and the tail is of the cantilever type, also without external bracing. The wings are of the usual type with lift and landing wires, running to the upper and lower ends of one set of Vee inter-plane struts on each side. The *ailerons* which are fitted to the top plane only, are of large area, running in fact right from the tip to the centre section.

THE BRISTOL TOURER : This machine is similar to the famous F2B, except that it has a Siddeley engine

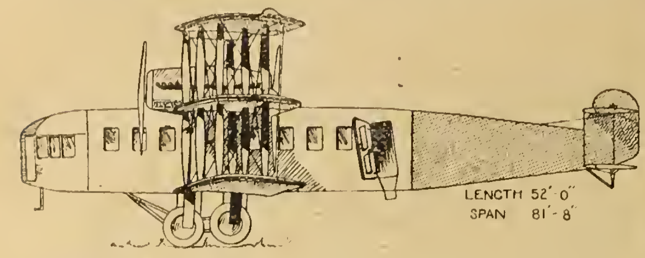
The power plant is a 40 h.p. two-cylindered Siddeley air-cooled engine, which consumes about three gallons of petrol per hour at full throttle, when the speed of the machine is 80 m.p.h. At maximum speed, therefore, the machine does about 27 miles to the gallon, while at the economical cruising speed of 65 m.p.h. even greater economy is attained. The landing speed is as low as 40 m.p.h., which enables the machine to alight in and start from quite a small field.



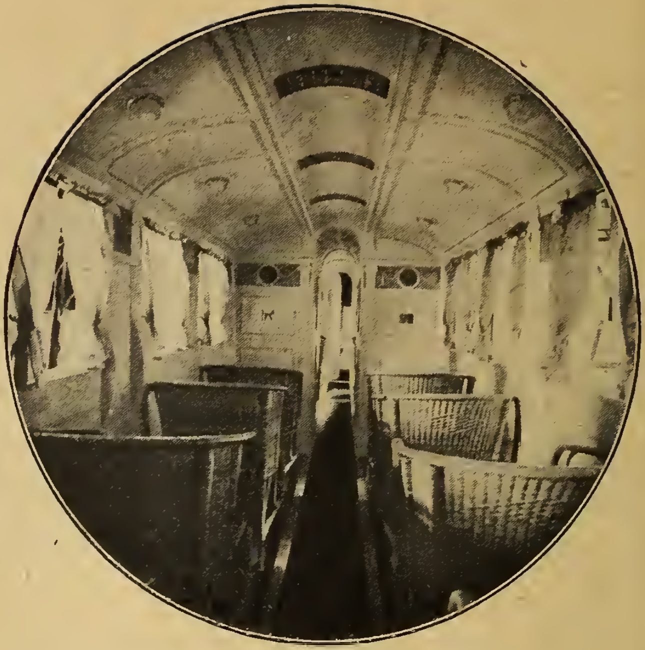
The Bristol "Tourer," 230 h.p. Siddeley "Puma"

The Bristol "Bullet"

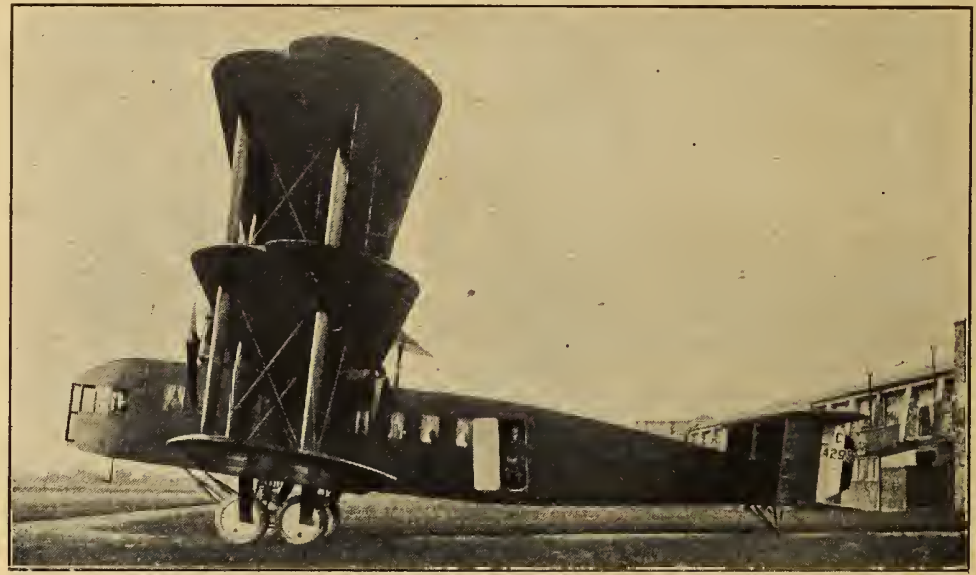
As the name indicates, this machine is one designed for high-speed racing. Its general appearance is indicated in the accompanying silhouette. Fitted with a nine-cylindered radial air-cooled Cosmos "Jupiter" engine, this machine is capable of a maximum speed of 160 m.p.h. As a racer, therefore, the "Bullet" should give a good account of itself in the events of the coming year. A feature—one might say *the* feature—of this machine, which is not apparent on a casual examination, is the exceptional strength of the wing structure. This is attained, chiefly, by the novel design of the wing spars, which are in duplicate. In this manner, while adhering to the employment of aerofoils of the usual section, extraordinarily high spar strength is maintained, and we understand that in the case of the "Bullet" the spars are so strong that any evolution of which the machine is capable may be carried out with perfect safety at the maximum speed of 160 m.p.h. As a racer and "stunt" machine the "Bullet" will probably be much in evidence during 1920. Considering the high maximum speed—160 m.p.h.—the landing speed is reasonably low, *i,e,.* 50 m.p.h. The machine has an overall length of 24 ft. 1 in. and a span of 31 ft. 2½ ins. The petrol tank has a capacity of 50 gallons.



The Bristol Pullman, four 410 h.p. Liberty engines



THE BRISTOL PULLMAN: Photo. shows one end of the cabin. Owing to lack of space on their stand, the Bristol firm are prevented from showing the actual machine, but a very fine scale model will be on view.



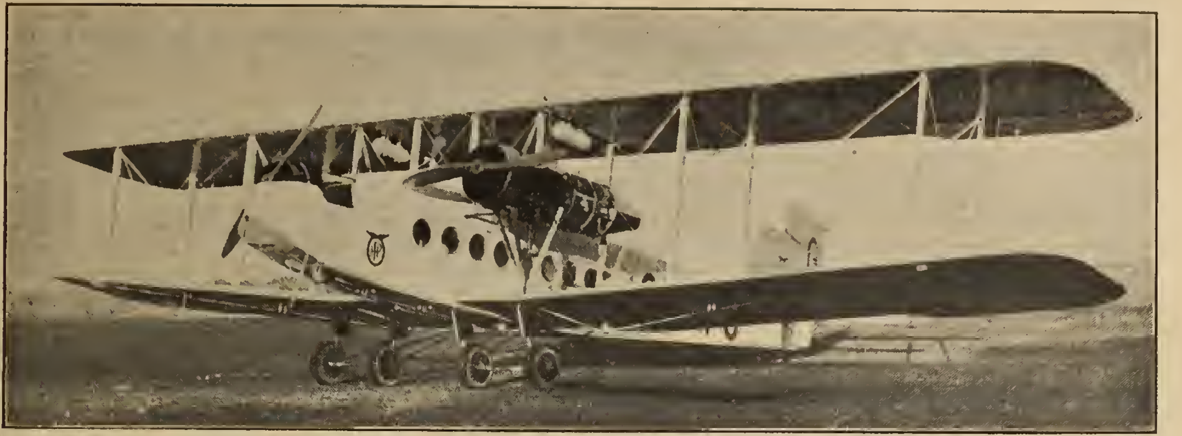
THE BRISTOL PULLMAN: This machine has a cabin seating 14 passengers.

The Bristol "Tourer"

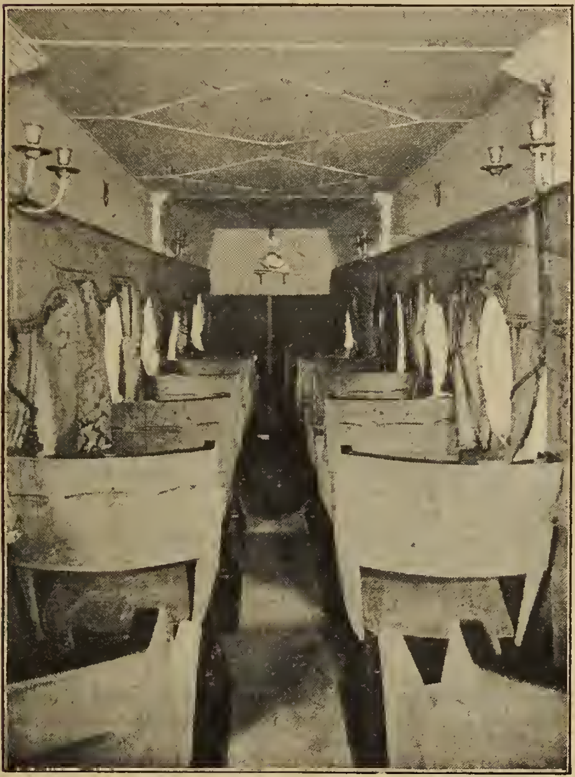
The third complete machine to be exhibited on the Bristol stand will be a two-seater of standard type, *i.e.* the "Tourer." This machine is a development of the famous F2B, and differs from it chiefly in regard to the rear cockpit, which is now minus the gun ring, while the flat *fuselage* deck aft has given place for a top fairing. The machine has already been described and illustrated in Flight, and no lengthy reference to it will be required here. Its general lines will be clear from the accompanying illustrations, and it will suffice to point out that the machine is one of great dependability, with a cruising radius of about 560 miles. Owing to the fact that the firm, through the cancelling of War contracts, have on their hands considerable quantities of well-seasoned materials which are being employed in the construction of a large number of machines of the "Tourer" type, it has been found possible to place this machine on the market at the extremely moderate price of £1,200. Added to this it should be pointed out that quick delivery can be guaranteed and it would, therefore, appear probable that the demand for this machine should be very considerable. The machine can be supplied either as a two-seater, dual-control touring machine with a radius of 560 miles, or as a cargo and/or mail carrier, when the cargo capacity is 300 lbs., which can be considerably increased if the machine is to be used for shorter flights than the distance of which the standard machine is capable. The "Tourer" can be supplied either with 275 h.p. Rolls-Royce Falcon or with 230-240 h.p. Siddeley "Puma" engine. With the former engine the maximum speed is about 125 m.p.h., and with the latter 120 m.p.h. The cruising speeds are 90 and 85 m.p.h., respectively. The overall length is 25 ft. 9 ins. and the wing span 39 ft. 3 ins.

The Bristol "Pullman"

As already mentioned, there will be exhibited on the Bristol stand a very fine scale-model of the Bristol "Pullman." This large triplane is provided with a most luxurious cabin, seating 14 passengers, who obtain an excellent view of the country over which the machine is passing, through Triplex windows in the side. One of our photographs gives a very good idea of the comfort and spaciousness of the cabin,



THE HANDLEY PAGE W 8: Three-quarter front view



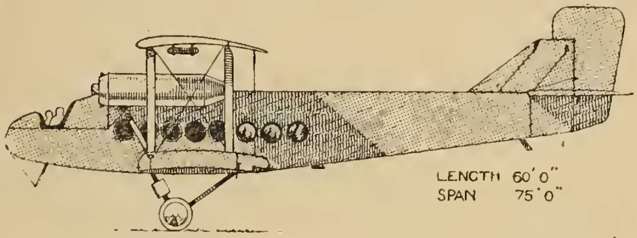
THE HANDLEY PAGE W 8 : View inside the cabin

which has a height of 7 ft., and is heated and lighted by electricity.

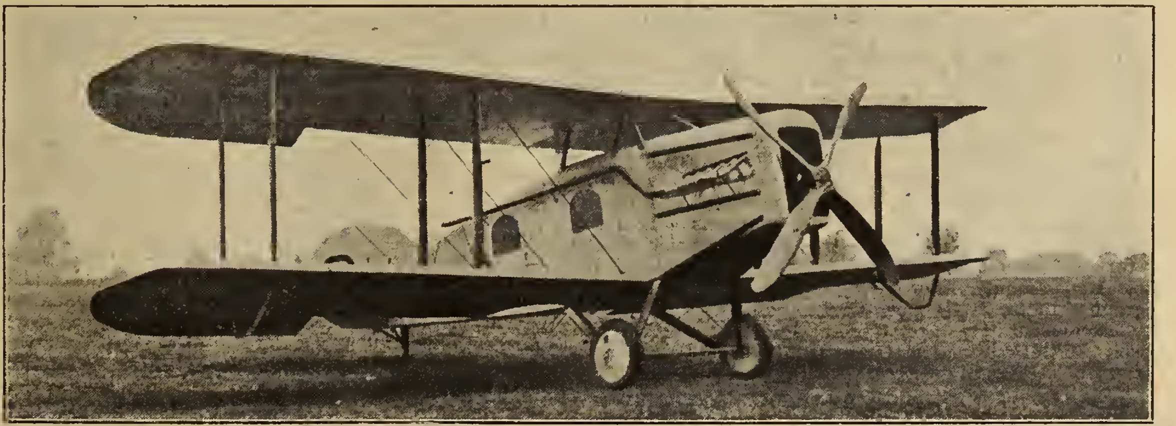
Fitted with four 410 h.p. Liberty engines, placed on the wings, the machine is capable of a maximum speed of 125 m.p.h., while the economical speed is 100 to 105 m.p.h. In addition to the two pilots (or pilot and engineer) the Pullman has a lifting capaciy of 2,700 lbs., with a fuel capacity of five hours' flight, or 4,000 lbs. with fuel for two and a half hours' flight. These figures are based on an economical speed of 100 to 105 m.p.h., *i.e.* at three-quarter throttle, giving a sufficient reserve of power to reach a maximum speed of 125 m.p.h. if necessary. If desired, the seats may be removed and the machine used for carrying mails and cargo, the space available being then 570 cub. ft. The machine has an overall length of 52 ft. and a wing span of 81 ft. 8 ins. The weight empty is 11,000 lbs., and fully loaded 17,750 lbs. Climb to 5,000 ft. in 5 mins., and to 10,000 ft in 12 mins. The ceiling is about 15,000 ft. with full load.

Handley-Page, Ltd.

The main feature on this stand will be one of the new Handley-Page biplanes, type W 8, one of which flew to Paris in 2 hours 10 mins. recently, after a brief test flight of only 20 mins. duration. The W 8 is much smaller than either the O 400 or the V 1500, having an overall length of 60 ft. and a span



The Handley Page W 8, two 450 h.p. Napier Lions



THE WESTLAND LIMOUSINE: Three-quarter front view of 75 ft. It is thus quite a "baby"! Fitted with two Napier Lion engines of 450 h.p. each, the machine is capable of a maximum speed of 112 m.p.h. With the engines throttled down to 350 h.p. each the cruising speed is about 90 m.p.h., while the landing speed is as low as 45 m.p.h. The machine is thus capable of alighting in and starting from comparatively small fields.

The engines are mounted comparatively high up in the gap between the planes, and drive two tractor air screws. Effective silencers are fitted so that it is quite possible for the passengers to converse in an ordinary voice during flight. Sufficient fuel is carried for a flight of 6½ hours' duration, or somewhat over 500 miles, and it is claimed that the machine is capable of flying on one engine entirely, should the other fail.

The passenger cabin is extremely roomy and comfortable, and provides seating accommodation for from 15 to 20 passengers. The seats are well upholstered in velvet, and have on the back pockets in which the passenger sitting behind can keep maps, books, papers, etc. Each passenger is provided with a porthole covered with Triplex glass, while at intervals windows are placed in the floor, giving the passengers a view straight down. The cabin is entered through doors in the sides, and there is also a trapdoor in the floor for the loading and unloading of freight when the machine is to be used for the carrying of goods. In that case the seats are removed and the cargo space available is no less than 470 cub. ft. The lifting capacity is then about two tons. As will be seen from the accompanying illustrations, the Handley-Page W 8 is of very pleasing appearance, and should soon become a favourite with travellers who appreciate speed and comfort.

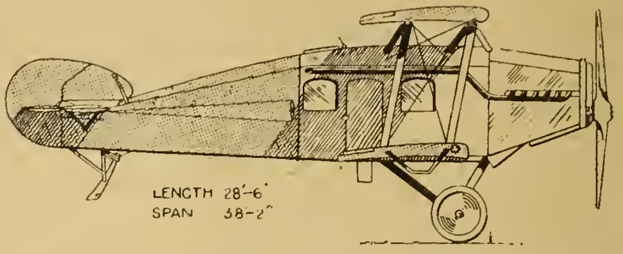
Vickers, Ltd.

We very much regret that up to the time of going to press no particulars of the machines to be exhibited by this firm were available. Owing to the two successes scored during the year by Vickers-Vimy machines—the crossing of the Atlantic by Sir John Alcock and Sir A. W. Brown, and the flight to Australia by Capt. Ross Smith—the stand is certain to prove a great attraction at the Paris show.

The Westland Aircraft Works

This firm is showing on stand No. 20 a complete Westland limousine, similar to the standard machine which has been described in FLIGHT. The colour scheme is grey and aluminium throughout. The wings and rear portion of the *fuselage* are grey, while the cabin is aluminium. The upholstery is grey Bedford cord. Generally speaking, the exhibition machine is similar to the standard. It might be mentioned that an altimeter and speed indicator are fitted in the cabin, where they can be read by the passengers. In addition to the complete machine, Westlands will show one side of a cabin, showing the construction, which, it may be remembered, is of the unit type, the engine compartment forming one unit, the cabin another, and the rear portion of the *fuselage* a third. A scale model will be shown of the limousine fitted up for mail carrying.

In addition to the machine at the exhibition there will be a demonstration machine at the Le Bourget aerodrome. This machine has been in service since last July, and has done a great deal of flying, including mail carrying during the railway strike. It will, therefore, form a good opportunity for prospective purchasers to see how the Westland limousine stands up to hard wear. The machine will be fitted with hot water heating apparatus, which can be regulated by the passengers.



The Westland limousine, 275 h.p. Rolls-Royce Falcon

Both machines will be flown across from Yeovil to Paris, and it is hoped that all the material required for the stand, etc., may be carried on board the two machines, thus avoiding the necessity for any other form of transport.

The overall length of the Westland limousine is 28 ft. 6 ins. and the span is 38 ft. 2 ins. The maximum speed, fitted with 275 h.p. Rolls-Royce Falcon engines, is 115 m.p.h. at 1,000 ft., and the cruising speed is 85/90 m.p.h. With full load of pilot and three passengers the machine will climb the first 1,000 ft. in one minute, which is sufficient for clearing obstacles around the aerodrome on taking-off.

◆ ◆ ◆ ◆

"Flight" in Paris

THOSE who are visiting Paris for the Aero Show should note that they will be able to obtain copies of FLIGHT at the comfortable afternoon tea and reading room of Messrs. W. H. Smith and Sons, at 248, Rue Rivoli, Paris, and also from the Hachette bookstalls.

Civil Aviation in India

WE have already given details of the proposals regarding commercial aviation in India, and we now publish the following official statement:—It is understood that the Government of India have decided that the development of civil aviation in India will, in so far as mails are concerned, best be attained by granting a monopoly for the carriage of mails throughout India to a single air-transport company, which will not be linked with any aircraft-manufacturing company. The monopoly will be limited to the carriage of mails, the postal rate for which will be fixed by the Government of India.

In fixing rates for the carriage of goods other than mails, and for the carriage of passengers, the company operating the mail monopoly will have a free hand in open competition with any other companies which may be established for such traffic.

Air Board in India

AN Air Board has been constituted as a purely advisory body to advise the Indian Commerce and Industry Department. This Department now deals with all questions concerning civil aviation. The members of the Board consist of the Secretary to the Government of India (Commerce and Industry Department), the Director-General of Posts and Telegraphs, India, the Officer Commanding the Royal Air Force, a representative of the General Staff, and the Financial Adviser, Military Finance Department. There is also a Secretary of the Board.

Croydon to Replace Hounslow

A GOOD deal of criticism has been levelled against the selection of Hounslow as the air terminus for London, and it is now stated that a change is to be made to Croydon aerodrome. The change-over will probably take place in about two months time, and Hounslow will then go back to the War Office for cavalry training purposes.

Among the advantages claimed for Croydon, apart from it being nearer to London, is that the aerodrome is 300 ft. higher, and, being farther away from the river, is much less liable to become fog-bound.

Aviation Regiments in France

ON January 1 the military aviation service in France will enter on a new phase, the groups of escadrilles being transformed into regiments.

It is proposed to have in France thirteen regiments of aviation, arranged in three groups—observation, chasers, and bombers. There will be seven observation regiments, and three each of chasers and bombers. There will also be one regiment for Algeria and Tunisia and one for Morocco.

Passports Necessary in Spain

THOSE who are thinking of visiting Spain by air should note that the Spanish Minister of the Interior has just issued an order to local authorities that when foreign aircraft land on Spanish territory a permit issued by the Spanish Government must be produced, otherwise the machine will be seized and the crew and passengers will not be allowed to continue their voyage. Applications for permits should be addressed either to the Spanish Embassy in London or Paris or to the Spanish Consuls in the large towns.

'Plane Post in the Congo

IT is hoped that the aerial mail which the Belgian Government is organising between Leopoldville and Stanleyville, in the Congo, should be ready to commence operations before the end of next month. The advance party went out in August, and the remainder of the staff are now on their way. The party includes the well-known pilots Franz Orta and Bastin, both of whom were on active service during the War.

It is proposed to call it the "King Albert Aerial Mail Service," and special stamps are being designed for use in connection with the air mail.

THE CROWN OF THE YEAR

BY H. MASSAC BUIST.

Travelling is eating bitterness.—Chinese saying.

The perspective of life brightens upon us.—Goldsmith, " Polite Learning."

. . . . . *changed habits of life which always follow from the advent of Europeans.*—Darwin, " Descent of Man."

At least a hundred years will pass before the feats of flying that have made this Advent the very crown of the year will be viewed in true prospective. Unable to foresee the nature of travel through the air scores of years hence, we seize upon the feature of today's achievement which will probably be held in least account when the lapse of time and the forced marches of science and engineering shall have removed those who will then people the earth so far from the conditions that govern our quest of utility aviation in these early stages that it will be possible to see how we builded better than we knew. If any doubt this, let him ask himself if, when the first numbers of Flight were issuing from the press, he foresaw either the scale, the nature, or the cardinal details of outstanding accomplishment today ?

Nunca el mucho costó poco.

Much never cost little, said a wise Spaniard ; and the making of a journey on the magic carpet of the twentieth century from the Motherland to the Commonwealth is a fact more marvellous than Oriental romancers can match with their most amazing fancies. Yet how are we to appraise exactly its various values ? Shall we first acclaim the prowess of the pilots Ross and Keith Smith and the mechanics W. H. Shiers and J. W. Beckett, whose splendid endeavour, crowned with unqualified success, stirs the blood of all who share man's common heritage of thrilling to the mere thought of high adventure ? If we do so—and who will not ?—the very act calls to mind the cost of the enterprise ; Lieut. Roger Douglas and Lieut. Ross, engaging in it, were dashed to earth at Surbiton last month ; and Capt. C. E. Howell and Airman Mechanic Henry Fraser fell into a watery grave off St. George's Bay, Corfu, at the very moment our heroes were flying the last stages by way of the Netherland East Indies to Port Darwin. Australia gave birth to all eight men ; nor shall any say that those who fell by the way were in any wise less fair than those who reached the goal.

Therefore we may learn even today that man does not fly merely by reason of the stoutness of heart and apt skill of the pilot and crew ; as Rudyard Kipling has sung :—

The game is more than the player of the game
And the ship is more than the crew.

To know which is not to detract one whit from the sheer magnificence of men whose lives prove that the twentieth century breeds heroes as splendid as were ever celebrated in an epic, or were born, did deeds of derring do and passed unsung in days of old. The airmen trust in the aircraft and, please God, the passage of every season will enable all concerned with the fashioning of them to give them better and yet more excellently serviceable vehicles of the air. Watts would probably have cut a poor figure as the mechanic-in-charge of a steam-engine day after day, year in and year out ; or Faraday of a dynamo ; Stephenson of a locomotive ; and the Hon. Sir Charles Parsons of a steam turbine. But they are the men who respectively gave us those great inventions which bring to our country such honour as is won by the nations and lead in inventing new means of locomotion, for the history of civilisation is the story of the evolution of travel.

We have not to go outside our Empire to find the men who are enabling us to put a period to that eloignment which has been perforce an outstanding feature of our personal and social relations with our kinsmen in the great and growing Commonwealth to date.

A Work of Many Minds, Hands and Years.

The wellnigh forgotten Englishman who first distilled oil in the middle of the last century, what time another Britisher dreamed of, and even made a model of an aircraft which we now know could have been developed into a practical flying machine had there been a third man to produce then an engine in which the spirit distilled from petroleum could have been used ; first began the great work which has enabled the crowning achievement in travel this year to be a flight half round the world in 124 hours actual travelling through the air ; now storm-tossed, anon sun-scorched ; through, snow, rain and drought ; running the very gamut of climate from winter weather to warmest summer. An Englishman, too, invented the liquid fuel internal combustion engine before Gottlieb Daimler, the German pioneer, conceived his version of it, built one and applied it to a tricycle with which he took the road.

From the initial to the practical stages, however, is always a long step. The War has had as much to do with making possible a flight from England to Australia this year as any man. The Vickers biplane with the Rolls-Royce aero engine that performed the feat were evolved for War service and applied to civil aerial transport when the main work of human slaughter ceased. The mere idea of an aeroplane, or of an engine, is one thing ; the scheme of a particular flying-machine or power unit fit for performing in such-and-such a fashion is another guess matter. To Mr. R. K. Pierson, the designer of the Vickers " Vimy " type biplane, and to Mr. Frederick H. Royce, the engineer who conceived the 12-cylinder water-cooled Rolls-Royce aero engines that drew it through the air stage by stage to the Antipodes, we pay the tribute of a nation made justly proud by their performance. In their turn, however, they would have us mindful of the unseen, unnameable, innumerable workers without whose collective aid they could neither have acquired the necessary knowledge nor had the means of getting their ideas bodied forth in metal, wood and fabric. No one investigator into the science of flying won all the knowledge, and it was needful to employ in fashioning the great, motionless winged aircraft and the light compact heart of it. Nor did any one metallurgist evolve all the grades of steels and alloys used. Nor any one manufacturer discover all the processes needful for production ; nor any one wood or metal worker know enough to fashion it in its entirety. A vast company of brains and endeavour has contributed to a success that is a milestone in the evolution of travel.

Vague and Erroneous Notions

Yet how do the men and women who people this world to-day grasp the bare idea of it? But dimly, if we are to search the records of the thousands of periodicals which are teeming from the press and are issuing accounts of, and comments on, the feat. Most are tied to the idea of comparison with water travel. That leads them astray alike as to the present accomplishment and future achievement of aviation. Most count the days from port to port, and so unduly belittle aerial travel. Many even go the length of forecasting, as is reasonable, the speeding up of ocean-going travel by some 50 per cent. at some future time. But these both forget that the science and practice of flight is also in advance, and fall into the obvious error of imagining that aerial travel must always be undertaken in precisely the fashion in which this entirely experimental pioneer journey from Europe to the Continent of Australia has been made. Of course, there is nothing to justify that assumption. Indeed, everything indicates that in long-distance work, even in the near future, aerial travel will differ from ocean travel as much in method as that does for the making of journeys by railroad. We know that it is a matter of months only before landing-grounds with expert permanent staffs shall be established on a scheme already arranged for linking up the Empire and the principal countries of the world. We have always known that at any given time different parts of the globe experience markedly contrasted climatic conditions. Aerial travel being so much faster than any known method of journeying by land or water, it follows that in flying half round the globe in a period which, we see, can be counted in terms of hours, it is neither practicable nor necessary for the same crew and machine to make the given journey from start to finish. Even on relatively short railway journeys in this country engines are uncoupled *en route*, and others coupled up to draw the train along the next stage; yet your engine-driver has no navigating to do. He has not even to steer.

Already it is assured that in the much more exacting work of piloting aircraft, the personnel, and even the machines, will be employed in flying certain stages only of the given long route. For one thing, that way you eliminate the fatigue factor as regards the personnel, and you enable each crew to learn their section of the given route like a lesson from a book. There is nothing impractical in employing machines on the relay system. Passengers and loads, such as mail matter, are quickly and easily passed from one machine to another. Therefore there is nothing visionary in Mr. Douglas Vickers' forecast of a relay aerial mail service between the Motherland and the Commonwealth in seven days. It does not even call for better aircraft and engines than are available at this hour.

Principle of the Independent Third Arm

The year draws to a close with a manifestation of aerial enterprise which is of more moment to our time than to posterity, because it concerns our immediate problems of national security. Our aerial arm cannot be all that we would wish to make it forthwith, because the financial burdens of the period are already wellnigh insupportable. But, if in cutting our suit according to our cloth we adopt the right principles, we shall have nothing to lament. FLIGHT is concerned with aviation, not with politics, nor with that inevitable outcrop of them, inter-Service intrigue. Most of the daily prints have not sufficient knowledge to give as clear a perspective as students of aeronautics possess concerning the potentialities of our movement, while over many of them, faced with the problems of how to divide national expenditure between the three arms, have little knowledge of the proved effectiveness and possibilities of the youngest, hence they cannot conceive of it as being a thing apart from either of the older services. These are the circumstances in which the nation owes a debt of gratitude to Vice-Air-Marshal Sir Hugh Trenchard for the scheme he has just evolved to a cost limit which necessity imposes. Whatever faults it may have when viewed in this light or that, fundamentally it is the only desirable scheme, because it is based on the Air Service being the Third Arm, independent, yet ever ready to co-operate. It is the duty of every man and woman interested in aviation alike to welcome the scheme, and by talking to their fellow-citizens, to educate them to an appreciation of the correctness of its basic principle. Service instinct apart, it is unreasonable to expect that either sailors or soldiers can yet understand the rôle of aviation in national defence of the present and near future. We have much to fight for, even before the public in general shall become sufficiently educated in the matter; the situation being the more complicated, in that sections of the general Press may be described as tied houses, wherein the advocates of aviation may present their views either partially, or not at all. Hence the need for a strong and influential technical Press; and for all enthusiasts to carry on, each as he can make occasion, the all-important work of championing.

◆ ◆

London-Berlin Flight

A COMMERCIAL Handley Page, carrying five British civilians, landed at the Allgemeine Elektricitats-Gesellschaft's aerodrome at Spandau on the morning of December 10, coming from London *viâ* Cologne, reported *The Times* correspondent in Berlin. The passengers are staying in Berlin pending a decision by the German authorities as to whether they shall be allowed to continue their flight to Warsaw.

Ex-Soldiers to Learn Flying in Tasmania

THE Australian Government's encouragement of civil flying will include free instruction for returned soldiers taking up commercial flying, says the *Daily Mail* correspondent in Hobart, Tasmania. Numerous companies are forming passenger and commercial air services, both home and inter-State. He adds that many aeroplanes have arrived, mostly Sopwiths.

A New French Prize

AT a general meeting of the Aero Club of France on December 5 M. Soreau announced the creation of a new prize of 100,000 francs. The regulations are now under consideration.

To Map the Sahara

IN connection with the aerial survey of the Sahara which is to be made by three French aces, Commandant Vuillemin and Lieut. Dagneau arrived at Algiers on December 2, having flown the 550 kiloms. from Alicante in 2 hours 40 mins. They will also investigate the possibilities of linking up the different French posts in the desert areas by means of aerial services.

Across the Mediterranean

AT one time flying across the Mediterranean was considered somewhat of a feat; now it is all in the day's work of the French aviation service. On December 5 one squadron of seaplanes under Lieut. Lefranc left St. Raphael for Dakar, and another, under Lieut. Guerre, left the same place for Algiers and Bizerta.

THE ENGLAND TO AUSTRALIA FLIGHT

In our last issue we were able to briefly record the fact that Captain Ross-Smith and his three companions, on their Vickers-Vimy-Rolls, had arrived safely at Port Darwin, in Australia, and so had won the £10,000 prize offered by the Commonwealth Government. As soon as the news reached this country the following messages were at once transmitted to Captain Ross-Smith :—

From H.M. the King.—" Delighted at your safe arrival. Your success will bring Australia nearer to the Mother Country, and I warmly congratulate you and your crew." (Signed) George, R.I.

From the Prime Minister.—" Heartiest congratulations. Your flight shows how inventions of war can advance progress of peace." (Signed) D. Lloyd George.

From the Secretary of State for War.—" Well done. Your great flight shows conclusively that the new element has been conquered for the use of man." (Signed) W. S. Churchill.

From the Air Council.—" Air Council congratulate you and crew on great skill and endurance shown in your achievement." (Signed) W. A. Robertson, Secretary, Air Council.

From the Comptroller-General, Civil Aviation—" Most sincere congratulations on successful termination of great flight. Your progress has been watched by all here with keenest interest." (Signed) F. H. Sykes.

The following telegram was also sent by the High Commissioner of Australia to Mr. Hughes, the Prime Minister :—

" Have been requested by Royal Aero Club to transmit the following to you : ' Subject to verification of machine, Captain Ross-Smith has fulfilled the conditions laid down by Australian Government for £10,000 prize for flight from Great Britain to Australia. The Royal Aero Club, under whose competition rules and auspices the flight was made, will award prize to Captain Ross-Smith. Royal Aero Club tenders its heartiest congratulations to the Prime Minister and all Australians on the successful accomplishment of this epoch-making flight.' (Signed) Fisher."

Below we publish by the courtesy of the *Sydney Sun* and the Melbourne *Herald*, Captain Ross-Smith's diary, of the historic flight, up to the time of his arrival at Singapore :—

November 12.—The Vickers-Vimy leaves Hounslow, after receiving farewell messages from Prince Albert, Major-General Seely, and Sir F. Sykes, Captain Ross-Smith carries copies of *The Times* for the Governor-General and the editors of the Sydney *Sun* and the Melbourne *Herald*.

Weather misty as far as Lympne, but Channel clear. Encountered heavy cloud of snow at Etaples, and climbed to 8,000 ft. Flew by compass course. Next saw ground three hours later over Roanne, after meeting further snow. Intense cold, 75 deg. frost ; instruments frozen, machine covered with ice ; food too frozen to eat. From Roanne ground visible times. Very relieved to see Lyons. Favourable wind throughout, but much time wasted avoiding storms. Vimy behaved splendidly. Arrived Lyons 3.40.

November 13.—Left Lyons 10.6, fine weather. Sunshine all day ; few heavy clouds, otherwise perfect flying day. Flew along Riviera, crossed Gulf of Genoa ; Remo, Spezia. Landed Pisa 2.40, too late to get to Rome. Going Taranto to-morrow. Alps looked very fine in sunlight. Vimy O.K. : crew well.

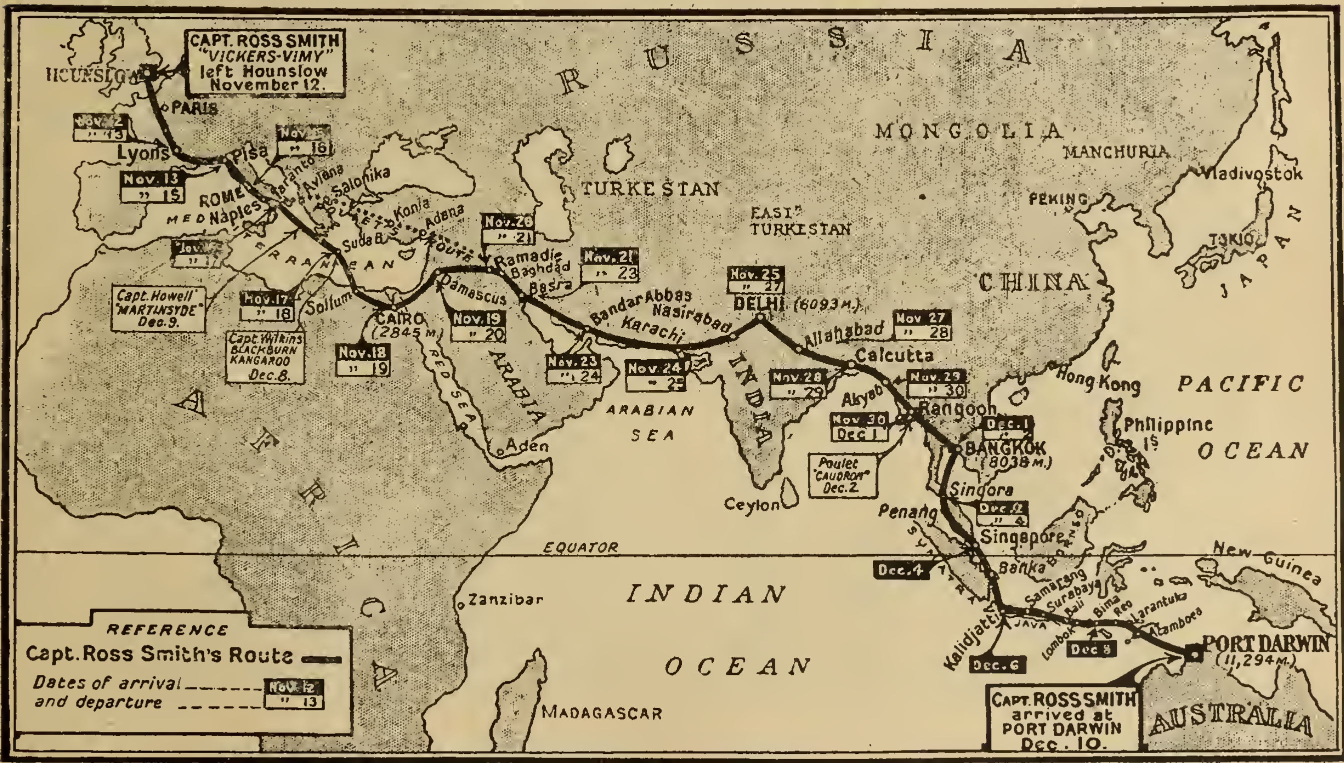
November 14.—Yesterday at Pisa heavy rain, aerodrome under water. Attempted to start, got bogged, and spent day on machine.

November 15.—Had engines running 8 o'clock to-day ; bogged badly in taxi-ing. Used planks and Italian mechanics dug out machine ; bogged again, but finally got out. Start sensational. Sergeant Bennett (mechanic) held tail down until machine working, then made running jump at rear cockpit, hauled aboard by Shiers as machine was leaving ground. Aerodrome two inches under water, but Vimy rose beautifully. Crew very wet but cheerful. Encountered strong head wind, ground speed only 50 miles per hour. Passed through some heavy clouds, otherwise hazy and bumpy. Landed Rome 3 o'clock.

November 16.—Left Rome 9 a.m. Landed Taranto 11.45. Again low clouds, visibility bad. Passed over Capua and Naples, then turned east over mountains ; flew low over Vesuvius, but weather too bad to photograph. Very bumpy over mountains, machine falling several hundred feet at times. Good wind helping us. Greatest assistance afforded us at Taranto by aerial route. Spent afternoon on machine.

November 17.—Left Taranto 8 to-day, arrived Suda Bay 3.45. Strong wind on our beam, low clouds, rain all the way to South Greece. Attempted to get above clouds, but too high, so flew at 800 ft. Following coast, nearly hit small island in mist. South Greece to Crete good weather, slight head wind.

November 18.—Left Suda Bay 8 to-day, arrived Cairo 3.30. Weather again bad. Low clouds made crossing Cretan mountains difficult. Wind slightly favourable, steered south course after leaving, but had to fly through rain at 2,000 ft. most of the way across the Mediterranean. Passed two steamers half-way ; checked ground speed and drift on them. Crossing took 2½ hours. Struck African



LONDON-AUSTRALIA FLIGHT : Map of route, reproduced by courtesy of *The Times* coast at Sollum, then flew east to Cairo across desert *via* Matruh. Hope to reach Damascus or Baghdad to-morrow. All very pleased to have got here. Hope for better weather now. So far have taken 30 flying hours, mostly through rain and storms. Throughout greatest assistance rendered by aerial route stations, nothing being too much trouble. It is largely due to their excellent organisation that we are here so soon. Vimy going perfectly.

November 19.—Left Cairo 10.30; dull weather. Crossed Canal at Kantara, then over Romani along coast under thick cloud to Gaza. Turned inland to Ramleh, then Haifa. Owing to heavy rain flew low to Jordan over Sea of Galilee, thence to Damascus. Interesting seeing old places again, recalling memories of the war. Landed, Damascus 3. Met many old R.A.F. friends.

November 20.—Delayed until 11. First rain since March. Ground getting sticky. Oiled tires to stop mud sticking, and left. Flew low to Tadmor, turned east, crossed desert Abu Kemal, followed Euphrates. Met head wind and landed at Ramadie battlefield at dusk. Pegged down machine. Heavy gale at night. Turned out troops to hold machine; anxious time for two hours, but Vimy weathered the storm.

November 21.—Left Ramadie 1.15; good wind; first good flying day of journey. Passed Baghdad, Kut, Garden of Eden, landed Basra 4.40. Overhauling to-day; Bunder Abbas to-morrow. Yesterday weather cheered all considerably after ten days' trying conditions. Crew well; engines behaving beautifully.

November 22.—At Basra overhauling machine and engines, making adjustments; nothing wrong.

November 23.—Left Basra 6.30; perfect day, beautiful sunrise. Flew over Bushire along coast Persian Gulf, landed Bunder Abbas (Persia), 2.20. Nearly eight hours in the air; machine never faltered. Persian coast very rough and barren. Passed several R.A.F. emergency grounds. Welcomed here (Bunder Abbas) by British Consul, the O.C. troops, and the local Persian Governor. Great interest manifested by local inhabitants; some had never seen an aeroplane. Hope to reach Karachi to-morrow if wind favourable, otherwise Charbar.

November 24.—Left Bunder Abbas to-day 7.30; arrived Karachi 4.10. Good day, uninteresting scenery. Followed coast all the way. Engines and machine no trouble; crew rather tired after nearly nine hours' flying. Welcomed in India by General Fowler and Air Force, also a party of Australians who "coo'eed" lustily. Weather much warmer—a contrast with England 13 days ago. Hope to reach Delhi to-morrow if wind favourable.

November 25.—Left Karachi to-day 7.40, arrived Delhi 4.30. Journey uneventful. Good day, slight head wind. Met by General MacEwan and numerous others. All Air Force arrangements perfect; greatest assistance. During last three days have flown 25 hours, covering 1,600 miles. Machine and engines no trouble; crew well. Allahabad next, possibly to-morrow.

November 26.—Remained at Delhi resting.

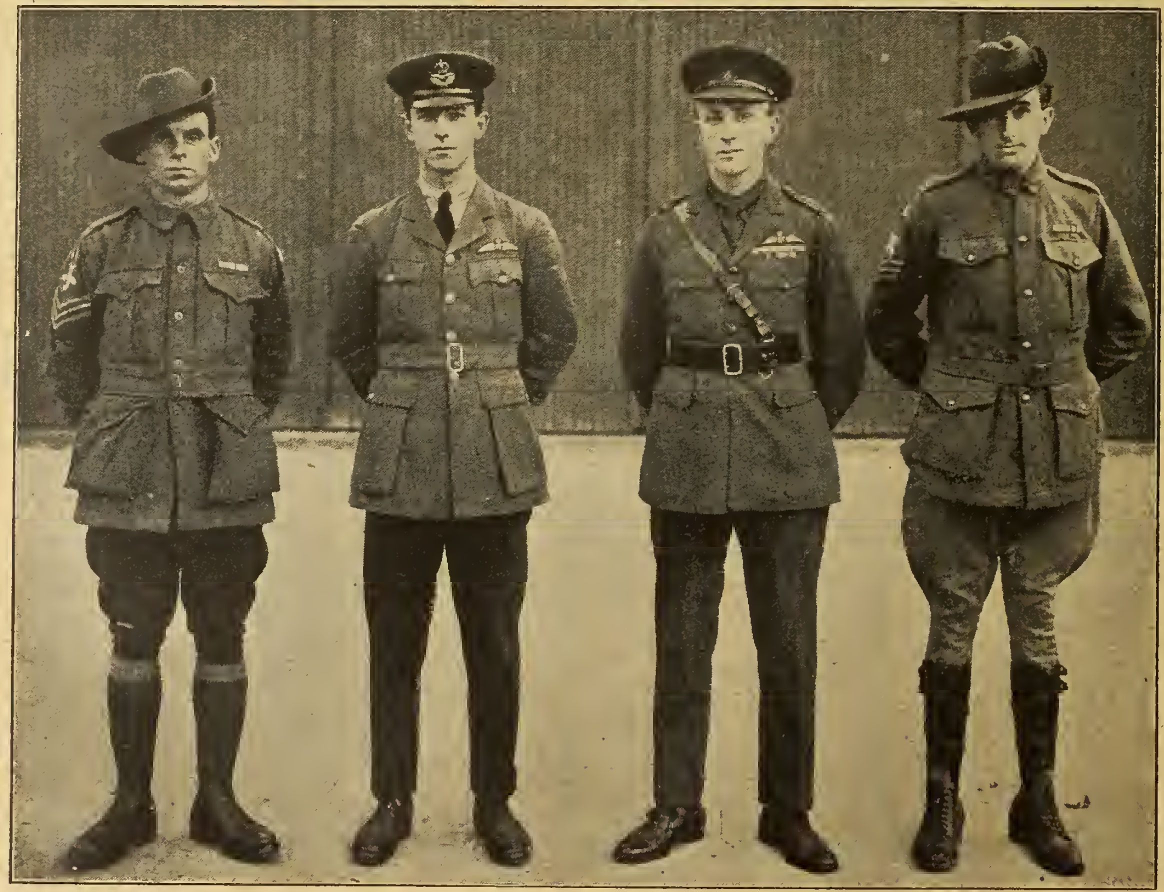
November 27.—To-day at 10.30 flew over city 10 minutes, then started Allahabad. Near Muttra one oil gauge "dud." Landed and repaired. Continued; after 90 minutes landed at Allahabad 5 p.m. Good flying. Passed Taj Mahal at Agra; Cawnpore. Crew and machine well.

November 28.—Left Allahabad 8.30, arrived Calcutta 1.45. Good trip. Following wind, clear sky, uneventful. Landed on the racecourse; large crowd. All well. Akyab to-morrow.

November 29.—Left Calcutta 8.30; landed Akyab 1 p.m. A large and distinguished gathering to see us off, including Lady Ronaldshay and many cinemas and cameras. Great interest was displayed in machine, especially in the parts which flew the Atlantic with Alcock. The racecourse at Calcutta is small when taking off. Many hawks were circling round close to the ground. We were very frightened that a hawk would hit the propeller and smash it.

Just off the ground the machine struck two hawks, one hitting the propeller at a nasty moment as the machine almost hit the trees in avoiding more birds. No damage to the propeller, but pieces of hawk were hanging on the machine the whole journey.

Circled Calcutta and flew east to Chittagong across mouths of the Ganges, and then south in good weather. Poulet here. Both machines leave for Rangoon to-morrow. All well.



The WINNERS OF THE £10,000 PRIZE: the crew of the Vickers-Vimy-Rolls. From left to right: Sergt. W. H. Shiers, A.F.M., Lieut. K. M. Smith, R.A.F., Capt. Ross Smith, M.C., D.F.C., A.F.C., and Sergt. J. M. Bennett, M.S.M., A.F.M.

December 1.—Arrived at Bangkok Greatest assistance and courtesy shown by Prince Pitsanoluke and aviation corps.

December 2.—Left Bangkok 7.0 and arrived at Singora at 1. Escorted first 50 miles by four Siamese machines. Course south along east coast of Malay Peninsula. First two hours good, then met heavy monsoon; rain, wind strong and changeable, sometimes helping and sometimes against. Necessary to fly 500 ft. three hours, following coast. Almost blinded with rain, but country impossible for landing. Had to continue, hoping for the best. Worst flying conditions ever encountered. Last hour better. The aerodrome at Singora is bad and stumpy. Had to land in a crosswind on a small dry patch. Safely down with luck. Later, taxi-ing the machine, tail skid caught root and broke fitting; not serious. Great interest of local population in seeing their first aeroplane. Decided that, owing to weather, we could not reach Singapore without more petrol. Wired Asiatic Petroleum Company, Penang, to send urgently. During night heavy squalls; crew held machine all night. Great assistance and hospitality, Prince Yugala and local officials.

December 3.—Torrential rain with wind. Repaired skid, crew wet through, working on machine all day cheerfully. Petrol arrived evening; raining too hard to put in.

December 4.—My birthday. Weather bad. Decided to try for Singapore. Left Singora 10, arrived Singapore 5. Take off at Singora very rough, but convicts had cleared stumps yesterday. Aerodrome very wet in patches Got off in a cross wind—lucky. Rain all the way. Flew 2,000 to 500 ft. all the way. Great reception here, huge crowd.

After leaving Singapore, on December 6, Capt. Ross Smith flew round a large thunderstorm and travelled down the east coast of Sumatra for 200 miles, then over the sea to Batavia and Kalidjatti, where the Dutch Governor-General gave a warm welcome. The next day the stage to Sourabang was completed, but the machine was bogged on landing. It was necessary to make a path of bamboo mats in order to get off, but the next day they went on to Bima. Another stage to Atamboca in Timor Island was completed without mishap, and on Wednesday, December 10, the last lap to Port Darwin was successfully made, the machine landing at Fannie Bay at 3.40 p.m. (5 a.m. G.M.T.).

The Air Ministry announces that messages of congratulation on the successful termination of the flight to Australia have been sent to Messrs. Vickers, Ltd., constructors of the Vickers-Vimy machine, and Messrs. Rolls-Royce, Ltd, the manufacturers of the engines with which the machine is equipped. Sir Frederick Sykes, Controller-General of Civil Aviation, sends sincere congratulations to both firms on their achievement "in providing the winning machine for the Australian and Atlantic flights." The Air Council sent the firm's congratulations on "the great feat of building and equipping the machine."

The machine is a Vickers-Vimy, fitted with two 350 h.p. Rolls-Royce Eagle Mark VIII engines. The span is 67 ft. overall length, gap 10 ft., chord 10 ft. 6 ins. The maximum speed is 100 miles per hour. The weight of the machine empty is 3 tons. A description of the machine with scale drawings appeared in our issue of November 6.

The Tragedy at Corfu

It is with the greatest regret we have to record the fatal ending of the attempt of Capt. Howell and Air-Mech. H. Frazer to fly to Australia on the Martinsyde-Rolls machine. The news came in the following telegram from Lloyd's agent at Corfu on December 13:—

"Information just received British aircraft wrecked off St. George's Bay, Corfu, December 10. No hope of survivors. Log washed ashore. Certificate number 33. Identification mark G.U.M.R., Capt. C. E. Howell, Melbourne. No. licence 412, Hounslow for Melbourne."

The machine had arrived at Taranto on December 8, and left on the following day for Athens. Mrs. Howell is travelling to Australia in the s.s. *Orsova*.

No further news has been received of Poulet, but strong representations have been made in Australia that the Commonwealth should invite the Frenchman to continue his journey to Australia, and offer him £1,000 in the event of his completing the flight. In the meantime it is understood that Poulet is to be awarded the Medaille Militaire for his work during the War and for his present flight. He intends to return by air to Paris, and to prepare for a flight round the world.

◆ ◆ ◆ ◆

THE AIR ESTIMATES

The Air Estimates of effective and non-effective services for the year 1919-20 were issued as a White Paper on Dec. 13. In a statement issued therewith, Mr. Churchill writes:—

"The Air Estimates as now presented to the House of Commons amount to a net sum of £54,030,850, which is less by £12,469,150 than the forecast of £66,500,000 shown in the White Paper presented last March.

Since the forecast of £66,500,000 was framed, it has been arranged that provision shall only be made in Air Estimates for the cost of aircraft and equipment which the Air Ministry agreed to accept after the Armistice and not for the cost of liquidation of all aircraft contracts placed by the Ministry of Munitions. As a result of the progress made with the organisation of the Air Force on a peace basis, it has also been possible to reduce the programme for the supply of aircraft and equipment. By these means a reduction of approximately 13¾ millions has been effected.

The reduction of the programme has also resulted in a saving of approximately 1¼ millions in respect of building accommodation and land.

A further reduction of approximately £2,000,000 has been effected in consequence of the programme of the Controller-General of Civil Aviation and the Director-General of Supply and Research being still in the process of development and not having yet fully matured. In addition it has been found possible to meet the requirements of these departments from existing stocks to a greater extent than was originally anticipated.

It has, on the other hand, been necessary to make additional provision of approximately 4 millions for certain services which could not be foreseen in March. The chief of these items are as follows:—

	Millions.
Demobilization of officers proceeding more slowly than was anticipated and decision to pay outfit gratuities to cadets, etc., *less* reduction due to decision to abolish Women's Royal Air Force, and to the demobilization of men proceeding more rapidly than was anticipated	¾
Increased charges for fuel, provisions, etc. ..	1¼
Cost of the airship service on transfer from the Admiralty	2

It is necessary to bear in mind that a very large proportion of the sum required for 1919-20 is in respect of charges arising out of the war and for which no provision will be required in a normal year. Amongst these items may be mentioned the war gratuities to officers and men, the pay and maintenance of surplus *personnel*, the repatriation of officers and men from the Colonies, and the maintenance of surplus aerodromes, etc., pending their disposal.

Regard should also be had to the fact that the amount required for 1919-20 includes provision for the purchase of large stocks of aircraft, engines and equipment which were ordered prior to the Armistice, but which will be available, so far as can at present be foreseen, to meet requirements during two or three years.

Finally, it must be remembered that at the date of the Armistice the total expenditure in respect of the R.A.F. was in excess of £1,000,000 per diem, and that the provision for the present financial year is necessary not only to meet the normal requirements of the Force, but also to meet the heavy charges involved in a transition from war to peace conditions.

Moreover, the R.A.F. has been engaged in active operations in India, Egypt, North Russia and the Baltic almost continuously throughout the year."

The Estimates show that the maximum number of officers and men on the establishment of the R.A.F. at home and abroad, exclusive of India, is 150,000. This number will be reduced by March 31, 1920, to 35,000. The estimated expenditure, after deducting appropriations in aid, is £54,030,850, made up as follows:—

	£
Pay, etc., of the Air Force	21,051,000
Quartering stores (except technical), supplies, animals and transport	6,103,000
Technical and warlike stores	19,322,850
Works, buildings and lands	6,402,000
Air Ministry	692,000
Miscellaneous effective services	203,000
Half-pay, pensions and other non-effective services	257,000

The £692,000 to defray the expense of the Air Ministry is divided into: salaries and allowances, £613,323; pay of messengers and porters, £76,777; and contingent expenses, £2,000.

In the Vote for the non-effective services the largest sum, £233,000, is devoted to pensions and gratuities to wounded officers.

THE PERMANENT ROYAL AIR FORCE

The following outline of the scheme for the permanent organisation of the Royal Air Force, prepared by Air-Marshal Sir H. Trenchard, was issued as a White Paper on December 13, with the following prefatory note by the Secretary of State for Air :—

The scheme outlined in the following memorandum on the permanent organisation of the Royal Air Force has been prepared during the course of the present year under my directions by the Chief of the Air Staff, and has in principle received the approval of the Cabinet.

The many complications of the Air Service and its intricate technical organisation are not perhaps fully appreciated, even by those who take a general interest in the subject. It therefore appears desirable to lay this memorandum in both Houses of Parliament, in order that they may understand the character of the problem and the complications that are being faced.

It should be added that the financial provision which the Cabinet have approved as governing the scale of the Royal Air Force during the next few years is approximately £15,000,000 per annum. It is upon this basis that this scheme has been prepared, and it is upon this basis that it is hoped the Estimates of next year will, apart from any extraordinary expenditure which the military situation may render necessary, be framed.

WINSTON S. CHURCHILL.

December 11, 1919.

Memorandum by the Chief of the Air Staff.

1. *The problem confronting us.*—The problem of forming the Royal Air Force on a peace basis differs in many essentials from that which confronts the older services. The Royal Air Force was formed by the amalgamation of the Royal Flying Corps and the Royal Naval Air Service, and one may say, broadly speaking, tha tthe whole Service was practically a war creation on a temporary basis, without any possibility of taking into account that it was going to remain on a permanent basis. The personnel with few exceptions was enlisted for the duration of the War, and put through an intensive but necessarily hurried course of training. Material was created in vast quantities, but rapid development often rendered it obsolete almost before it had reached the stage of bulk production. The accommodation provided had perforce to be of an entirely temporary character. The force may in fact be compared to the prophet Jonah's gourd. The necessities of war created it in a night, but the economies of peace have to a large extent caused it to wither in a day, and we are now faced with the necessity of replacing it with a plant of deeper root. As in nature, however, decay fosters growth, and the new plant has a fruitful soil from which to spring.

The principle to be kept in mind in forming the framework of the Air Service is that in the future the main portion of it will consist of an Independent Force, together with Service personnel required in carrying out aeronautical research.

In addition there will be a small part of it specially trained for work with the Navy, and a small part specially trained for work with the Army, these two small portions probably becoming, in the future, an arm of the older services.

It may be that the main portion, the Independent Air Force, will grow larger and larger, and become more and more the predominating factor in all types of warfare.

2. *Governing principles.*—In planning the formation of the peace Royal Air Force it has been assumed that no need will arise for some years at least for anything in the nature of general mobilization. It has been possible therefore to concentrate attention on providing for the needs of the moment as far as they can be foreseen and on laying the foundations of a highly-trained and efficient force which, though not capable of expansion in its present form, can be made so without any drastic alteration should necessity arise in years to come. Broadly speaking, the principle has been to reduce service squadrons to the minimum considered essential for our garrisons overseas with a very small number in the United Kingdom as a reserve, and to concentrate the whole of the remainder of our resources on perfecting the training of officers and men.

It is intended to preserve the numbers of some of the great squadrons who have made names for themselves during the War, in permanent service units with definite identity, which will be the homes of the officers belonging to them, and will have the traditions of the War to look back upon.

There will be found in the Appendix a statement showing detailed particulars of squadrons, stations, schools, depôts, etc., which it is hoped to provide in the next three years at home and abroad. It will be understood that this programme is to be regarded as provisional only.

3. *Service units.*—It is proposed to provide eight squadrons for India and three for Mesopotamia, with the necessary facilities for repair. As regards India this is in accordance with a proposal put forward from India and now under consideration by the Government of India. The cost of the units in India will fall on the Government of India on exactly the same basis as in the case of the military garrison. Recent events have shown the value of aircraft in dealing with frontier troubles, and it is not perhaps too much to hope that before long it may prove possible to regard the Royal Air Force units not as an addition to the military garrison but as a substitute for part of it. One great advantage of aircraft in the class of warfare approximating to police work is their power of acting at once. Aircraft can visit the scene of incipient unrest within a comparatively few hours of the receipt of news. To organise a military expedition even on a small scale takes time, and delay may result in the trouble spreading. The cost is also much greater, and very many more lives are involved.

In Egypt it is proposed to station seven service squadrons. Under existing conditions in that country aircraft are a most valuable means of communication. Distances are long and ground communication confined to a few main routes. On the other hand the country and the climate are both ideal for flying. From a wider aspect Egypt is the Clapham Junction of the air between east and west, and is situated within comparatively easy reach of the most probable centres of unrest, and this, added to its natural advantages for aviation, makes it the obvious locality for a small Royal Air Force reserve.

As regards our Naval bases and important coaling stations overseas, future developments will almost certainly lead to the necessity of providing aircraft as part of their garrisons, but in the majority of cases the need of this is not urgent under existing conditions, and for the present it is only proposed to station a small seaplane unit at Malta, and a similar unit in the Eastern Mediterranean, probably at Alexandria.

The Service squadrons quartered in the United Kingdom apart from those for co-operation with the Army and Navy will eventually number four, but not more than two of these squadrons will be formed in the next financial year. These squadrons will be employed on communication and similar duties in peace and will form a small reserve in case of need. For co-operation with the Army it is proposed to provide eventually squadrons on the basis of a flight per division for work with the troops at all stages of their training, and in addition one or more squadrons for co-operation with the artillery both during their winter training and their annual gun practice. During the next financial year it is proposed to form two squadrons in all, one at Farnborough for co-operation with the troops at Aldershot and Salisbury, and the second at Stonehenge for work with the artillery. Small units will, if necessary, be provided in addition for co-operation with the Garrison Artillery School at Golden Hill, and the Anti-aircraft School when formed.

There remain the Service squadrons for co-operation with the Fleet. It is proposed eventually to provide at home three aeroplane squadrons and two seaplane squadrons. To secure economy and to give the units a corporate existence and ample facilities for practice it has been decided that aeroplanes will no longer be carried normally in capital ships as was done during the War, but will only be embarked when required to take part in Fleet exercises. The aeroplane squadrons will consists of one reconnaissance and spotting squadron, one squadron of fighter machines and one of torpedo-carrying machines. The two former will be based on the Firth of Forth where ample facilities exist for practice and for the embarkation and disembarkation of machines, a most important point. The torpedo-carrying squadron will be located at Gosport, the most suitable station for torpedo work, and it is proposed to provide a small experimental unit at the same station in order to develop fully this form of co-operation with the Navy, which is of primary importance. Of these three squadrons it is only proposed to provide one, the reconnaissance squadron, at full strength in the ensuing financial year. This is necessary in order to study and perfect the system of observation of artillery fire which from various causes was not so highly developed on the naval side as on the land side during the War. The torpedo squadron will be maintained at sufficient strength to carry on the essential research work while the fighting squadron will be formed in the first instance at a strength of one flight only.

In addition, the Admiralty propose to keep two aircraft carriers in commission. One of these will be equipped with seaplanes for service abroad, while the other will remain at home and be used primarily for training and experimental purposes and ready if necessary to embark a flight of torpedo or other machines.

The provision of these two carriers is of the first importance since we must look forward to the time, as suitable machines develop, when fleets will so to speak take their aerodromes with them in the shape of a carrier, and the carriage of aircraft on capital ships with its attendant disadvantages and dangers will be a thing of the past.

Of the two seaplane squadrons, it is only proposed at present to form one flight only. The seaplane has obvious advantages over the aeroplane for long distance work over water, and a time may probably come when all work in co-operation with the Navy will be done by this class of machine. For this reason, if for no other, it is essential to have a few such units.

The lighter-than-air service is a difficult problem. The cost of providing such a service on a large scale in peace is prohibitive, and the use of airships in war may be said to be still in the experimental stage. It is proposed therefore to keep one airship station only, namely Howden, where sufficient accommodation exists for two rigid and a few smaller ships, and to retain as a commencement one rigid and two non-rigids only. This will allow research work and development to continue, and the use of airships in peace and war to be further studied.

4. *Reserves.*—Although mobilization on a large scale is not taken into account, it is very necessary to provide a small reserve to meet any sudden call in the case of a small war anywhere in the Empire. For the next year or two there will, doubtless, be no difficulty in enrolling as many ex-officers and men as are likely to be required, and all that will be necessary will be to provide facilities for their training and practice flying.

It is intended, however, if possible, in addition, to lay the foundation of a future Air Force on a territorial basis. No detailed scheme has yet been worked out, but it is probable that the eventual organisation will provide for training both on a unit and on an individual basis. It is hoped that the manufacturing and commercial firms will assist by forming units of their employees. In addition there will doubtless be many individuals who will be glad to train themselves voluntarily with a certain amount of state assistance, and to undertake to serve, either overseas or at home, if called upon to do so. It is not intended to embark on the formation of any units during the next financial year, but it is proposed to commence with the training of individuals in the populous centres. This training will be carried out at the flying training wings whose functions will be described below.

5. *Extreme importance of training.*—We now come to that on which the whole future of the Royal Air Force depends, namely, the training of its officers and men. The present need is not, under existing conditions, the creation of the full number of squadrons we may eventually require to meet strategical needs, but it is first and foremost the making of a sound framework on which to build a service, which while giving us now the few essential service squadrons, adequately trained and equipped, will be capable of producing whatever time may show to be necessary in future.

Before explaining our proposals in detail it is necessary to lay down certain postulates.

Firstly, to make an Air Force worthy of the name, we must create an Air Force spirit, or rather foster this spirit which undoubtedly existed in a high degree during the War, by every means in our power. Suggestions have been made that we should rely on the older services to train our cadets and staff officers. To do so would make the creation of an Air Force spirit an impossibility apart from the practical objection, among others, that the existing naval and military cadet and staff colleges are not provided with aerodromes or situated in localities in any way suited for flying training.

Secondly, we must use every endeavour to eliminate flying accidents, both during training and subsequently. This end can only be secured by ensuring that the training of our mechanics in the multiplicity of trades necessitated by a highly technical service, is as thorough as it can be made.

The best way to do this is to enlist the bulk of our skilled ranks as boys and train them ourselves. This has the added advantage that it will undoubtedly foster the Air Force spirit on which so much depends.

Thirdly, it is not sufficient to make the Air Force officer a chauffeur and nothing more.

Technical experts are required for the development of the science of aeronautics, still in its infancy. Navigation meteorology, photograph and wireless are primary necessities if the Air Force is to be more than a means of conveyance, and the first two are requisite for safety, even on the chaffeur basis.

6. *Training of officers.*—It is now necessary to sketch very briefly the training proposed for both officers and men. Owing to the necessity of a large number of officers in the junior ranks, and to the comparative paucity of higher appointments, it is not possible to offer a career to all. Consequently some 50 per cent. only of the officers have been granted permanent commissions, the remainder being obtained on short service commissions or by the seconding of officers from the Army and Navy. Great importance attaches to the last class since an interchange of officers is bound to make for closer and more intelligent co-operation between the services.

The channels of entry for permanently-commissioned officers will be through the Cadet College, from the Universities and from the ranks. The cadet college will be the main channel The course will last two years, during which the cadets will be given a thorough grounding in the theoretical and practical sides of their profession, and will in addition learn to fly the approved training machine, at present the Avro. The college is to open at Cranwell in Lincolnshire early next year, an ideal place for the purpose, with a large and excellent aerodrome and perfect flying surroundings. It will be necessary to accommodate the college temporarily in huts erected during the War, but every endeavour has been made to render these as suitable as possible, and it is proposed to erect a permanent college in the near future. On leaving the college, cadets will be commissioned, and will undergo a short course in air pilotage and practical cross-country flying at Andover. This school will probably not be required before early in 1921. As soon as the cadets have passed this course they will be posted to a service squadron, as it is most important that they should join a unit which they can regard as their home, as the sailor does his ship or the soldier his regiment, as early as possible. Subsequently they will undergo a course in gunnery, without which no flying officer can be regarded as a service pilot. The gunnery school will be established at Eastchurch, but, as the bulk of our present pilots have war experience, will not be required in the next financial year. After five years' service, officers will be required to select the particular technical subject they will make their special study during their subsequent career, *e.g.*, navigation, engines, wireless. Short and long courses will be provided in these subjects in order to cater both for the officer who wishes to continue primarily as a flying officer with a working knowledge of one or more technical subjects, and for those who wish to become really expert in a particular branch. Technical knowledge will, *inter alia*, qualify an officer for selection for high command.

The career of officers commissioned from the Universities or from the ranks—except in the case of boy mechanics receiving commissions, whose case will be dealt with later—will be identical with that of those from the cadet college, except that they will be taught to fly at a flying training wing before joining their squadrons. Short service and seconded officers will be taught to fly at training wings and will attend a course of aerial gunnery and probably one of air pilotage. In view of their short service, it is not proposed, save in special cases, to send them through the advanced technical courses. These officers will be eligible for promotion during their service in exactly the same way as the permanent officers. The technical schools required at once are those dealing with navigation, wireless, photography and engineering. Aerial navigation is practically a new science. An attempt has been made during the current year to work out the theoretical principles in practice at Andover, and considerable progress has been made, but it is obvious that the chief need of aerial navigation will arise when flying over the sea, where the map is of no service, and it is consequently proposed to reopen this school at Calshot in the spring of next year.

Schools of wireless and photography are now in existence at Flowerdown, near Winchester, and at Farnborough respectively, while it is proposed to commence an engineering course, at a suitable station, shortly after Christmas.

For the training of University candidates, short service and seconded officers and officers of the reserve or Territorial Force, it is estimated that seven training wings would eventually be required.

In view, however, of the fact that the short service list has been filled by officers who have already been trained as pilots during the War, it is only proposed to form two of these on a reduced basis during the next financial year to deal with the training of University candidates, a small number of reserve officers and of certain officers granted permanent commissions, with the proviso that they must learn to fly within 12 months.

In view of the exceptional facilities for training in Egypt, it is proposed to locate, at least, one of the training wings, together with branch schools of gunnery and air pilotage in that country, but whether it will be convenient to do so next year cannot yet be definitely foreseen.

One other most important school in connection with the training of the officer is essential, and it will probably be necessary to start it on a small scale in 1920. This is a school for flying instructors. The first school of this kind was started during the War at Gosport, and it is hardly too much to say that it revolutionised the art of flying. The science of flight was carefully analysed and the analysis practically applied to the problem of tuition with remarkable results. It is essential in future that all instructors in training wings and all officers of or above the rank of flight commander in service squadrons should have passed through this course. A liberal amount of dual control with a qualified instructor is one of the chief safeguards against the faulty flying which is the cause of the majority of accidents.

Although it is not proposed to open it during the next financial year, an Air Force Staff College must be formed as soon as possible. It is intended to establish this at Halton in the house of the late Mr. Alfred Rothschild, purchased by the Government at his death with the whole estate. The house and its surroundings are eminently suited for the purpose, and there is an aerodrome within a quarter of a mile.

7. *Training of men.*—The most difficult problem of all in the formation of this force is the training of the men. Demobilisation has removed most of our best mechanics, and the efficiency of the squadrons to be formed depends on the most thorough instruction of those who are to take their place. It has, therefore, been decided to enlist the bulk of those belonging to long apprenticeship trades as boys, who will undergo a course of three years' training before being passed into the ranks. With a preliminary training of the nature contemplated and the practice of their trade during their subsequent service, it is confidently anticipated that these mechanics on passing to civil life will have no difficulty in securing recognition as skilled tradesmen. This is an important consideration, since any tendency for the Air Force to be regarded as a blind alley occupation would be fatal.

The training of all these boys will eventually be carried out at Halton Park, where ample and well-equipped technical shops are already in existence. Pending the erection of permanent barracks to replace wooden war-time huts, use will also be made of Cranwell, in Lincolnshire. It has been necessary to speed up the training of some 5,000 boys enlisted during, and shortly after, the war, and the residue of these, some 3,000, will complete their training, at Halton. A scheme has been drawn out for the future enlistment of boys by means of a competitive examination, and local education authorities have been circularised with a view to their nominating suitable boys to sit for the examination. By this means it is hoped to secure a really high standard. The first entry under this scheme will take place early in 1920, and the boys will commence their training at Cranwell and will be moved to Halton as soon as the permanent accommodation is ready.

The boys, on successfully passing their final examination, will be graded as leading aircraftsmen, and a certain number will be specially selected for a further course of training, at the end of which they will either be granted commissions, or promoted to corporal. Those granted commissions will join the cadet college.

It is intended to enlist the remainder of the mechanics, of whom more than half will belong to short apprenticeship trades as men, and these will undergo 12 months training at Cranwell as soon as the boys have moved to Halton. Pending the move, it is proposed to carry out the training of these men at Eastchurch, which, as has already been said, will not be required in its eventual capacity as a gunnery school for another 12 months at least.

Non-technical men will be given a short course of recruit training at the depôt at Uxbridge.

8. *Higher organisation at home.*—As regards higher organisation in the United Kingdom, all units working with the Navy have lately been formed into one command, known as the Coastal Area Royal Air Force. The two remaining commands, now known as the Southern and Northern Areas, will, early in 1920, be amalgamated into one command to be known as the Inland Area. This cannot be done earlier owing to the very large amount of work entailed in closing up surplus stations, demobilising surplus personnel and generally clearing up the after-effects of the War.

9. *Depôts.*—Each of the two Areas in the United Kingdom will have its repair depôt at Henlow for the Inland Area; and at Donnibristle, near Rosyth, for the Coastal Area. During the next financial year it will be necessary to retain three of the existing stores depôts, but it may prove possible at a later date to reduce the number to two, though this is by no means certain.

It is hoped that eventually arrangements will be made for all Royal Air Force mechanical transport to be repaired at Slough, but in view of the arrears of work it will be necessary to retain for the present our own repair depôt at Shrewsbury. Each overseas theatre will have a combined repair and store depôt of a size suitable to the number of squadrons based upon it.

10. *Necessity for large capital outlay on accommodation.*—From the above outline of our proposals it will be seen that every endeavour is being made to reduce expenditure on personnel during 1920-21 to the minimum absolutely essential to create the framework of our future Air Force. This is necessary, if for no other reason, owing to the peculiar position in which the Royal Air Force is placed as regards permanent accommodation.

Though some of the wartime buildings can be made to serve for a year or two in their present state, the Air Force does not possess one single permanent barracks, and a large capital outlay on the provision of new buildings and the adaptation of the most suitable of the temporary buildings is inevitable during the first few years. This will be balanced to a certain extent during the next two years by the small requirements in technical equipments due to the large stock remaining over from the War. The principle followed has therefore been to exercise rigid economy at the outset over personnel and technical equipment in order to free as large a part as possible of the total sum provided towards the provision of barracks. As time goes on, the building services will absorb less, while the cost of technical equipment, and, to a lesser extent, of personnel, will increase, until eventually the works vote will be little in excess of the cost of maintenance.

It must be recognised, however, that the total cost of building will be large. The boys' barracks at Halton, for instance, with the necessary accessory buildings and the cadet college will no doubt be a heavy item. These are undoubtedly the two most expensive services, but the accommodation for personnel at the majority of our stations will have to be rebuilt or adapted at considerable cost. The outlay must, however, be faced, and it is undoubtedly wise to undertake the bulk of the work in the first few years, while the expense of other services can be kept down.

11. *Research.*—One matter of supreme importance has not yet been mentioned, namely, the provision to be made for research. The departments of Supply and Research are now being transferred from the Ministry of Munitions to the Air Ministry, and a portion of the experimental establishments are a charge on the Air Force votes. Steady and uninterrupted progress in research is vital to the efficiency of the Air Force, and to the development of aviation generally, and on it depends both the elimination of accidents and the retention of the leading position we have established at such heavy cost during the War.

The existing establishments must therefore be retained during the ensuing financial year at a sufficient strength to ensure that urgent work shall continue. Some of the work which was urgent under war conditions can, however, now be postponed until progress with the building programme liberates more money for other purposes. The principal aeroplane-research establishments are at Farnborough, Biggin Hill, Martlesham Heath and Grain, while airships' research will be undertaken at Cardington and Howden.

12. *Civil aviation.*—No allusion has been made to civil aviation in this paper, which has been confined to the Service aspect of the question.

H. M. TRENCHARD,
Chief of the Air Staff.

AIR MINISTRY,
25th November, 1919.

THE PERMANENT R.A.F.—*continued.*

APPENDIX.

— —	Existing or to be formed in 1920–21.	Increase during 1921–22 to.	Increase during 1922–23 to.
I.—UNITED KINGDOM.			
Striking Force	2 Squadrons.	4 Squadrons.	No increase.
Training Wings	2 Wings each of 3 Squadrons.	5 Wings.	6 Wings.
Co-operation with Army Divisions.	1 Squadron.	2 Squadrons.	No increase.
Co-operation with Fleet (Home Waters).	1 Squadron Reconnaissance and Artillery machines.	No increase.	No increase.
	1 Flight Ships' fighters.	1 Squadron Ships' fighters.	No increase.
	½ Squadron Torpedo machines.	1 Squadron Torpedo machines.	No increase.
	1 Flight Flying Boats.	1 Squadron Flying Boats.	2 Squadrons Flying Boats.
	1 Flight Float Seaplanes.	No increase.	No increase.
Communication Squadron.	1 Squadron.	No increase.	No increase.
Experimental Stations	4 Stations for Aeroplanes, Seaplanes, Torpedo Machines and Wireless respectively.	4 Stations as before and trial ground for bombs and machine guns in addition.	No increase.
Schools and Training Centres	Cadet College. Navigation School. Flying Instructors' School. Administrative and Technical School for Officers. Wireless and Electrical Training School School of Photography. School of Co-operation with Navy. School of Co-operation with Army. Balloon Training. Airship Training.	As for 1920–21, and in addition School of Air Pilotage. School of Gunnery. (N.B.—The majority of the Schools will be on a reduced basis in 1921–21, and will gradually increase to full strength in the two succeeding years.)	As for 1921–22, substituting Staff College for Administrative and Technical School for Officers, and in addition Flying Officers' Training College (for the preliminary training of direct entry Officers).
	Boys' Training Centre. Technical Men's Training Centre. R.A.F. Depôt and Non-Technical Men's Training Centre.	No increase.	No increase.
Depôts	2 Aeroplane Repair Depôts 1 M.T. Repair Depôt. 3 Stores Depôts.	As for 1920–21 except that the M.T. Repair Depôt will drop out as soon as the repair work for R.A.F. vehicles can be undertaken at Slough.	As for 1921–22.
Airships	1 Station.	No increase.	No increase.
II.—OVERSEAS.			
India	8 Squadrons. 1 Depôt.	No increase.	No increase.
Egypt	7 Squadrons. 1 Depôt.	7 Squadrons. 1 Depôt. 1 Training Wing.	7 Squadrons. 1 Depôt. 1 Training Wing. 1 School of Air Pilotage. 1 School of Gunnery.
Mesopotamia	3 Squadrons. 1 Depôt.	No increase.	No increase.
Malta	1 Flight Seaplanes.	1 Squadron Seaplanes.	No increase.
Alexandria	1 Flight Seaplanes.	1 Squadron Seaplanes.	No increase.
Mediterranean	1 Flight Float Seaplanes on Carrier.	No increase.	No increase.

CIVIL AVIATION ABROAD.

The following synopsis of the progress of civil aviation in foreign countries up to 31st October, 1919, prepared by the Air Ministry, was issued as a White paper on Monday :—

I. INTRODUCTION

In connection with the Command paper dated 1st November, entitled "Synopsis of Progress of Work in the Department of Civil Aviation," and also with the "Report of the Advisory Committee on Civil Aviation," dated 30th October, 1919, it is thought that it may be useful briefly to summarise the progress in civil aviation made by the more important foreign countries.

It should be borne in mind that, with the exception of Great Britain, no country has as yet a separate Air Ministry or a department corresponding to our Civil Aviation Department, and it has not been easy in the majority of instances clearly to distinguish Service operations from Civil enterprise.

Missions manned by Service personnel have been despatched by France and Italy to foreign countries in order to inculcate a taste for products which it is hoped may be difficult to eradicate, even if the goods subsequently offered by others may be superior. Aircraft and agents have been despatched by British firms to various parts of the globe, but hitherto no official foreign missions have been despatched by the British Government owing to :—

(*a*) a shortage of available Service personnel and a reluctance to confuse Civil and Service enterprise, and—

(*b*) the traditional British policy that an industry should be left to develop, as far as possible, on its merits.

II. ALLIED AND ASSOCIATED POWERS

(*a*) **France.**—The French are fully alive to the possibilities of aviation, and are making every endeavour both to secure foreign markets and assist internal development. The control of civil aviation has been placed under a branch of the Department of Aviation, which is in itself directly under the Ministry of War.

With regard to civil aviation, the French have followed their usual policy for the encouragement of new industries, and have adopted the principle of subsidy. A sum of 18,000,000 francs out of a total of 37,000,000 francs voted for civil aviation this year has been earmarked for this purpose. The subsidies are paid subject to the proviso that the nationality of the enterprises so assisted is entirely French as to ownership, management, material used, and personnel employed. They take the following form :—

(*a*) Bonuses on distances flown (including flights by machines used for purely private purposes).

(*b*) Bonuses to pilots and crew for good work.

(*c*) Premium on tonnage carried.

(*d*) Special bonus up to 25 per cent. per annum of the total value of machines of military type immediately available in emergency for use by the State.

Various contracts for carrying mails have been granted, and an agreement has been signed with the British General Post Office for the transport of mails by air between England and France. The principal mail routes in operation are :—

Paris—London (in conjunction with a British firm).
Paris—Lille—Brussels.
Toulouse—Rabat.

Various other internal civil aviation routes in respect of which mail contracts have not as yet been granted are in operation, and an ambitious programme of projected routes is under preparation.

In the Near East, France is neglecting no effort to achieve aerial predominance, and military machines have been carrying civil mails on the following routes :—

Athens—Salonika (weekly service).
Constantinople—Salonika (irregular).
Constantinople—Bukarest (bi-weekly).
Bukarest—Galatz—Kichenef (irregular).

These routes were primarily military communications, but are gradually assuming the character of civil aerial mail services.

Apart from the Near East, energetic pioneer work is being carried out in Spain and Czecho-Slovakia. Missions have been despatched to the Argentine and Japan. In the case of the former, it is estimated that the cost will amount to 100,000 francs, but this can hardly include the cost of the machines, which will presumably be allotted free, nor that of transport. In Japan, the French have established themselves firmly and are at present engaged in instructing Japanese officers. Amongst other missions contemplated the principal are those to Brazil, China, Finland, Greece, Peru, Poland, Roumania, Siberia, Switzerland and Turkey.

The most important Transport Companies are :—The Compagnie de Messageries Aériennes, which is working in conjunction with Messrs. Handley-Page; the Compagnie Générale Trans-Aérienne, working in conjunction with Aircraft Transport and Travel Co.; the Compagnie de Navigation Aérienne; and the Farman Company. Of these, the first-named is a combination of various activities under the direction of M. Breguet. There are signs that, in order the better to meet foreign competition, endeavours are being made to bring certain of the more important firms into large working combines. The first two mentioned above have contracts for running mails, and it is probable that the third will also receive a contract.

With regard to airships, it is understood that the present policy is for the Government to supply the material for a commercial airship service, the running of which will be carried out by a company under guarantee of a fixed minimum dividend.

Contracts have been invited and tenders have already been received for the construction of four rigid airships of approximately 3,000,000 cub. ft. capacity, and for the erection of sheds at Paris, Marseilles and in Africa.

The airship line or route contemplated will probably be Paris-Marseilles and from Marseilles to Africa, and later to South America, *via* Dakar.

It is understood that a sum sufficiently large to ensure the carrying out of this programme has already been voted.

(*b*) **Italy.**—Aviation in Italy is divded into three separate organisations—Military, Naval and Civil. Military aviation is attached to the War Office, Naval aviation to the Admiralty, and Civil aviation to the Ministry of Transport. Schemes for the organisation of internal routes have been drawn up, but, owing to the present financial strain, have not yet been put into effect. By a series of long demonstration flights, by the despatch of missions to—

The Argentine,
Brazil,
Ecuador,
Spain,
Scandinavian countries,

and by the gift of machines to various countries, Italy is endeavouring to press her aircraft products and to obtain a footing in the countries concerned.

Among recent notable performances was a non-stop flight by a flying boat from Italy to Amsterdam, while a similar machine was the only competitor which succeeded in completing the course of the Schneider Cup competition in England. It is also intended shortly to despatch a flight of machines from Italy to Japan.

Efforts are being made to form a combine to strengthen the position of the aircraft industry, and several of the larger firms, such as Caproni, F.I.A.T., and Iota-Fraschini have already joined.

The airship M. 1 has been handed over to the Department of Civil Aviation, and is being flown by service personnel for propaganda purposes from Rome to Naples. By means of a false deck fitted above the car the vessel is able to carry about 12 passengers.

A semi-rigid airship of about 1,100,000 cub. ft. capacity, now under construction for the use of civil aviation, should be ready for trials shortly. In this vessel it is believed that the Italians intend to attempt a flight from Italy to Rio de Janeiro.

(*c*) **U.S.A.** An important part was played by American firms in the production of aircraft and accessories during the war, but the majority of those thus engaged have now diverted their activities to other directions.

Separate air services are maintained for Army, Navy, and Post Office. From the reduction of the Army and Navy air estimates to $25,000,000 each, it may be necessary for the military and naval flying services to amalgamate.

A sum of $300,000 was allotted to the Post Office in December, 1918, for the inauguration of postal services, and a further $8,000,000 have now been requested in order to start services between New York and Omaha, and Boston and Atlantic City. An aerial route between Atlantic City and Chicago is also contemplated.

Civil aviation is not yet under the control of one centralised office, but it is understood that a Bill for the purpose of setting up an Air Department for the co-ordination of all air matters is under consideration. There has as yet been no great activity in the formation of private companies for the exploitation of civil aviation.

No system of direct Government subsidies appears to have been established other than by the gifts of military aircraft.

The Post Office Department is conducting an aerial mail service between New York and Washington, and New York and Chicago. The former of these two routes was inaugurated by the War Department in co-operation with the Post Office. The cost of maintenance and responsibility for operating were later transferred to the Post Office. It is understood that both these services have been equipped with aircraft given free of charge by the Army. The Assistant Postmaster-General has recently left for Cuba with a view to examining the possibilities of opening up a flying boat service between Key West and the West Indies. In California a system of forest fire patrols run by Government machines has been established.

The military aeroplane service is surveying aerial routes throughout the United States in order to ascertain the most suitable positions for landing grounds and emergency landing grounds.

Hitherto the United States have embarked on no foreign missions. A seaplane base, however, is being laid out at Rio de Janeiro, with the assistance of American engineers, and an unofficial mission is operating in Scandinavia.

Negotiations have been completed with the British Government for the purchase of the rigid airship. R.38, now under construction at Bedford. The British Government has agreed to train U.S. Airship personnel, and a party of officers and men will proceed to England for this purpose.

A contract has been placed for the erection of an airship shed at Lakehurst, New Jersey. The dimensions are 800 ft. × 265 ft. × 174 ft. (high), and it is estimated that the shed will hold two 5,000,000 cub. ft. airships. A helium production plant is also being constructed at Fort Worth, Texas, but particulars as to output, etc., are not available.

(*d*) **Belgium.**—Owing to more urgent reconstruction measures Belgium has not yet had sufficient time to develop civil aviation. Although handicapped financially, an efficient Army Flying Corps is in existence, and steps are being taken to organise civil aviation as a department of the Ministry of War. The duties of this department, which are wide, will in the first instance lie mainly in the application of the International Conventions and rules. It will also be responsible for the general organisation and control of aerial navigation within Belgium. Special attention is to be paid to the control of aerial work, infringement of the regulations being punishable by terms of imprisonment varying from eight days to one year, and by a fine of 50 to 5,000 francs. It is laid down that all aircraft must be registered, and that such registration confers Belgian nationality.

It is to be noted that the present provisions governing import and export of goods by land and sea will also apply to the import and export of goods by air.

A consultative committee, including representatives of military and civil aviation and of the ministries and legislative chambers concerned has been set up under the head of the air department to deal with all problems that may arise.

A powerful company, to be known as the National Syndicate, is being formed to encourage civil aerial transport. Several important motor-car manufacturers are interested in the company, and foreign capital will not be admitted above a limit of 25 per cent.

Aeroplane construction is also receiving serious attention, but it is realised that neither France nor Great Britain are likely to purchase Belgian products. The erection of an aircraft factory in Belgium by a foreign firm would not be encouraged.

(*e*) **Japan.**—Japan has not as yet made great progress in aviation either Service or Civil. No machines are manufactured nor is she inclined to purchase modern aircraft from abroad. It is probable that when once certain types have been decided upon she will build from these original models rather than make extensive purchases of foreign machines.

An important French mission reached Japan shortly after the Armistice, and although the majority of the officers and personnel returned to France in September, a few have remained in Japan to supervise the organisation and training of the Japanese Flying Corps.

The establishment of an aerial postal service between Tokyo and Osaka is under consideration, and experimental flights between these two towns are shortly to be undertaken by Japanese personnel.

(*f*) **Rumania.**—Civil aviation, as such, is not yet existent in Rumania, but the French are showing enterprise, and it is important for British manufacturers to make a bid both for military and civil orders. From recent information received it would appear that efforts in this direction would be sympathetically met.

Throughout Rumania railway and road communications are bad; sites suitable for aerodromes are, however, numerous, and, as a means of transport, civil aviation should have a distinct future.

(*g*) **Greece.**—Owing to its position on the way to the East, Greece is an important strategic air point. No definite proposals have yet been put forward for the development of civil aviation in this country. France, however, is active, and proposals have been made for the establishment of an aerial mail service between Smyrna and Athens.

At the present moment a British mission is responsible for the training of the Greek Naval Air Service and a French mission for the training of the land service.

An important base is being constructed at Phalerum, which is to be used as a general supply and training station for both sea and land pilots.

(*h*) **China.**—China, with her vast spaces and lack of means of communications, offers a wide field for the development of aviation. A request has recently been received from the Chinese Government for the assistance of a British aeronautical adviser, and it is hoped that the appointment of this official will assist British aviation.

Certain concessions have already been obtained by British firms in China, Messrs. Vickers having recently floated a loan of £1,800,000 for the development of aviation. At the moment, however, there cannot be said to be any national flying.

III. ENEMY COUNTRIES

(*a*) **Germany.**—Of late enemy countries by far the most serious competitor is Germany.

Partly to avoid the terms of the Peace Treaty, and partly to make an early bid for foreign markets, large numbers of aeroplanes and aeroplane engines have been sold at extremely low figures to Norway, Sweden, Holland, Denmark, and Switzerland, and there can be no doubt that Germany has secured a substantial footing, so far at least as the aeroplane is concerned, in neighbouring countries.

In her present endeavour to develop civilian aircraft, both airships and aeroplanes, Germany is apparently of the opinion that the leading commercial power in the air will have the strongest reserve air force in the event of war, and Herr Euler, the President of the Imperial Air Board, has stated that the Government intend boldly to foster civil aviation.

Hitherto, no definite policy has emerged, but certain aerial mail contracts have been granted, and all Post Offices in Berlin accept aerial letters for:—

Berlin	Leipzig	Dortmund
Munich	Weimar	Gelsenkirchen
Vienna	Hamburg	Duisburg
Dresden	Hanover	

to which towns aerial mails are in operation. A fee of 1 mark per 20 grammes (about ⅔ oz.) over and above the ordinary internal letter rate is charged.

Several passenger services have been operated more or less regularly, although it is understood that flying has had to be suspended temporarily owing to shortage of petrol. An airship service is carried out on alternate days between Berlin and Friedrichshafen (about 400 miles), for which 690 marks per passenger is charged; and it is hoped shortly to inaugurate airship routes between Berlin—Copenhagen—Christiania—Berlin and Stockholm. The Hamburg-Amerika line is particularly interested in this new means of transport, and it is believed to have ordered one or more large airships.

The following civil aerial policy is foreshadowed:—

(i) That at first Government assistance in the shape of subsidies will be necessary.

(ii) That existing aerodromes and material will be retained, and privately owned aerodromes acquired by the State, thus forming a strong nucleus for civil aviation under Government support and control.

(iii) That a combine will be formed of all firms for working purposes, each firm to standardise a type, and all types to be approved by the Government.

(iv) That there will be co-operation between military and civil services.

(v) That propaganda will be employed especially in the State schools.

A number of influential companies have been formed, notably the Flugsverkehraktiengesellschaft, which will run six regular services from Cologne to Munich, Stuttgart, Basle, Hamburg, Berlin and Breslau; the Deutscheluftreederei, which works in conjunction with the Zeppelin Company and the Hamburg-Amerika line. The Bavarian Luft-Loyd and the Saechsische Luftreederei are also new companies now operating.

Police patrols have been in existence for some time, and a network of these patrols is to be established throughout the country.

In order to keep in touch with ex-service men, an Airmen's Union has been formed, with branches at Baden, Mannheim, Karlsruhe, Frankfurt and other centres; and a German Air Fleet Union, somewhat similar to the German Navy League, has been formed with the object of fostering national interest in aviation.

(*b*) **Austria, Hungary, Bulgaria and Turkey.**—Owing to internal conditions and the uncertainty of the future, little has been reported as being done in Austria, Hungary, Bulgaria or Turkey towards the advancement of aviation, and it is unlikely that there will be any great progress in aviation in any of these countries for some time.

In connection with military operations, the Italians have been running a regular service to Vienna, and various attempts have been made by Austrians to interest foreign countries in the development of aviation in their country.

Bulgaria, it is understood, like Germany, is anxious to maintain an aerial police service equipped with military machines, ostensibly for the purpose of preserving internal order, and to form a nucleus for civil aviation.

Turkey is still under the occupation of the Allies, and, except for mail services which are being carried out by French military machines from Constantinople to Salonika, no attempt has yet been made by the Turks to establish aviation on a definite basis.

IV. NEUTRAL STATES

(*a*) **Holland.**—Germany has neglected no opportunity to obtain a footing in the Dutch aeroplane trade.

Partly owing to Herr Fokker's efforts, and partly to the fact that the sympathies of a proportion of Dutch merchants are pro-German, it is probable that British products may have difficulty in competing.

There is as yet no Dutch national civil aviation, and, owing to the comparatively short distances to be covered, it is impossible that it will be extensively developed internally. It would appear rather that Holland is desirous of becoming an air junction for machines bound further afield. Aerodromes, however, are as yet few, and, as a whole, the country is more suited to flying boats than to aeroplanes.

An agreement, similar to that in force with France, has, however, recently been signed by the British and Dutch Governments for the establishment of an aerial mail between the two countries, and it is hoped that the service will shortly be instituted.

The purchase of flying boats for use in the Dutch East Indies is in contemplation for the linking up of other air routes with those islands, and an important company has been floated under the title of the Royal Air Transport Company for the development of aviation in the Netherlands and her colonies.

(*b*) **Spain.**—Civil aviation is as yet undeveloped in Spain, but good results have been obtained from the enterprise displayed by the British aircraft industry in sending machines to that country and from the visit of a detachment of R.A.F. machines in May.

It is understood that the Spanish authorities are eliminating all aeroplanes of old types from the Flying Corps and that this Service is to be re-equipped. The Naval Air Service is also being organised. It is understood that a British type of machine is to be adopted for instructional purposes.

Here again foreign competition is extremely keen, and both the French and Italians are making every effort to secure the Spanish market. Both countries had the advantage of being first in the field with military machines.

A decree has recently been signed by the King, authorising the establishment of an aerial postal service for linking up the Spanish possessions in Africa and the Balearic Isles with the mainland. So far as is known, no definite steps have yet been taken for putting the project into practice, the proposal being mainly for experimental work.

Permission has been granted to the French for the establishment of a route between Toulouse and Rabat via Barcelona and other Spanish towns. This route was originally utilised for the purpose of the delivery of French military machines to Morocco, but it is now developing into a civil mail route.

(*c*) **Norway, Sweden and Denmark.**—No opportunity has been lost by the Germans to strengthen the geographical and other ties that exist between Germany and Norway, Sweden and Denmark; and by propaganda and the flooding of the countries with goods sold at very low prices, the German aircraft industry has already secured a strong position.

All three countries are anxious to develop aviation, and a considerable amount of interest was aroused by the visit during the summer of British flying boats to Scandinavian waters. The opinion was generally expressed that the large British flying boat was too expensive and that a smaller single engined machine was more likely to secure a market.

The three Scandinavian countries and Finland have formed a Northern Aerial League. A conference of this League has been summoned to meet at Stockholm to consider certain proposals by the British Air Ministry, which ultimately may result in the adoption by these countries of the International Air Convention.

(*d*) **Switzerland.**—Owing to the restrictions placed on aviation in Switzerland during the war, when flying was confined to certain definite areas, little progress has been made during the last five years. There is, however, keen appreciation of the possibilities of aviation, and since the termination of the war, service pilots and machines have been freely used on work of an educational nature and the running of experimental postal services.

From the configuration of the country the development of the aeroplane is perhaps limited, but there are large possibilities before flying boats, and the Swiss are anxious to see this type of craft introduced, both for purposes of communication and tourist traffic.

The Swiss tendency is to develop internally rather than to welcome foreign construction, but for the time being, and until her own resources have been developed, she is prepared to welcome foreign aircraft. At present German influence predominates both in design and organization. In conjunction with a British firm an instructional school has been started in Lausanne.

The aerodromes already in existence are small, except that at Dubendorf, near Zürich.

Switzerland hopes to become the main route for machines bound for Italy and the East, and plans are under consideration for the construction of important air-stations near Geneva and Thun.

(*e*) **South American States.**—The South American States, with their large rivers, undeveloped communications, and great distances, combined with prosperous conditions, offer favourable markets for aircraft. Both France and Italy have dispatched missions of a military character to various of the States, and other missions are projected. Signs are not wanting that the United States will also endeavour to obtain a footing in this quarter. Individual machines and agents have been dispatched by British firms, and a certain headway has been made. Important concessions have been granted to British firms, including in one case the provision of land for the erection of aerodrome stations.

Brazil has recently voted a credit of 500,000 francs to cover the expenses of a projected air mail service, and to provide for the formation of a bombing and reconnaissance squadron.

V. CONCLUSION

To sum up, it would appear that Great Britain's most serious competitors in securing an international aircraft trade are France, Italy, and Germany. Neutral countries, although generally benefiting financially, did not share in the impetus given by the war to aviation, and have on the whole made little progress in that science. Nevertheless, on the whole, compared with that made by other countries, British progress has been considerable.

Meanwhile, from experience gained, the following points may be noted:—

Missions to foreign countries of a civil character both as to personnel and machines may still prove of value. The cost in equipment and personnel of such expeditions, is, however, large.

Propaganda is of prime necessity both at home and abroad. Apart from missions, one of the best methods of carrying it out abroad is by carefully planned and executed "demonstration" flights. There is no doubt, for instance, that the successful flight of the Atlantic both by aeroplane and airship largely increased the prestige of British aircraft. Isolated action is unlikely to be as fruitful in result as that of combined action by a number of firms.

It would appear that as Commercial Attachés are requisite for assisting British trade in foreign countries, so are Air representatives of great utility in the same way. Hitherto, in order to effect economy Service Air Attachés have combined in their own persons the duties of Service and Civil work. This plan has not always proved a success from the civil point of view, since regular officers do not necessarily possess the requisite qualities. In any case the posts of Service Air Attaché are very few in number. In instances where the Service Air Attaché has had commercial experience excellent results have been obtained.

On occasions it may be possible for Commercial Attachés to assist in aviation matters in addition to their normal duties, but it must be remembered that considerable technical knowledge is essential and that those representing the Air should have flown themselves, and to report not only on the progress of aviation in the country to which they are accredited, but also to advise on the type of machine most fitted for use in that country.

◆ ◆ ◆ ◆

THE McCUDDEN MEMORIAL

SOME months ago a few friends of the late Major J. T. B. McCudden, V.C., and of his two brothers, William McCudden and Anthony McCudden, who were also killed while flying in the King's Service, decided to get together a small fund with which to erect a memorial to the three brothers. It is the wish of their father and mother that this memorial shall be set up at Chatham, where all three were born.

The following subscriptions have already been received:—

Lord Weir of Eastwood, £10 10*s*.; Air Marshal Sir H. M. Trenchard, Bart., K.C.B., D.S.O., £2 2*s*.; Maj.-Gen. Sir F. M. Sykes, G.B.E., K.C.B., C.M.G., £2 2*s*.; Air Commodore H. R. M. Brooke-Popham, C.B., C.M.G., D.S.O., A.F.C., £5; Air Commodore P. W. Game, C.B., D.S.O., £1 1*s*.; Air Commodore C. A. H. Longcroft, C.M.G., D.S.O., A.F.C., £1 1*s*.; Wing Com. R. G. Blomfield, D.S.O., £4 4*s*.; Wing Com. L. W. Rees, V.C., O.B.E., M.C., A.F.C., £2 2*s*.; "Five Years in the R.F.C.," £3 3*s*.; The Sopwith Aviation Co., Ltd., £2 2*s*.; Martinsyde, Ltd., £2 2*s*.; C. G. Grey, £2 2*s*.; Major C. C. Turner, £2 2*s*.; Stanley Spooner, £2 2*s*.; Capt. P. D. Acland, £2 2*s*.; Major E. L. Gilchrist, M.C., D.F.C., £2 2*s*.; Mrs. Rhys Davids, £2 2*s*.; Capt. G. J. C. Maxwell, M.C., D.F.C., A.F.C., £2 2*s*.; Capt. T. B. Marson, £2 2*s*.; Capt. Doyle, D.F.C., £2 2*s*.; Capt. Leighton, M.C., £2 2*s*.; Capt. G. W. Robarts, M.C., £1 1*s*. Total, £57 4*s*.

This amount is in itself sufficient for the proposed memorial at Chatham, but it is thought by those responsible for the fund that many more friends of the McCudden family would like to subscribe, and that very probably a number of admirers of the work of these young men who died for King and Country would like to add to the amount though they did not know them personally.

Also, as far as is known, there is no other instance of three brothers being killed as pilots, and so there is good reason why all those who are concerned with flying should contribute to a memorial to a family which has made a greater sacrifice than any other in winning for this country the Command of the Air.

If the response to this appeal is as great as it should be, it is proposed that after erecting the memorial at Chatham the balance of the fund shall be devoted to endowing another form of memorial which will be of direct use to those who fly in years to come. This might take the form of a McCudden Memorial Bed at the R.A.F. Hospital, or a McCudden Memorial Scholarship in Aeronautics at one of the Universities, according to the wishes of the majority of the subscribers.

It is hoped that a large number of the officers who served with either of the three McCudden brothers, and a still larger number of those who know them only by reason of their deeds, will subscribe to the fund. Subscriptions, which are limited to a maximum of £2 2*s*., should be sent to Capt. Gerald C. Maxwell, M.C., D.F.C., at Room 663, Air Ministry, Kingsway, W.C.2.

◆ ◆ ◆ ◆

PERSONALS

Deaths

Sec. Lieut. WILLIAM HENRY LOFFILL HALFORD, R.A.F. who was reported missing on September 28, 1918, and is now presumed to have been killed on that date, was the younger son of Charles Henry Halford, of Deodora, Harrietsham, Kent.

Married

Capt. J. R. HOWETT, R.A.F., younger son of Mr. and Mrs. R. Howett, of Market Harborough, was married on December 10 at the Catholic Church, Farnborough, to HILDA MAY, youngest daughter of Mr. and Mrs. W. A. ALDRICH, Woolwich.

Lieut. FRANK ALEXANDER URQUHART, R.A.F., of Edmonton, Alberta, was married on December 10 at St. Ann's, Aigburth, to GERALDINE LUCY MILNE, elder daughter of Col. G. Adshead WILSON, V.D., and Mrs. Wilson, of Aigburth, Liverpool.

Items

GEN. SEELY was unanimously elected an Alderman of the Isle of Wight County Council last week.

DAME HELEN GWYNNE-VAUGHAN, late Commandant of the W.R.A.F., is a candidate for the Chair of Botany in the University of Aberdeen, where she was examiner in botany for four years before becoming Chief Controller of the Q.M.A.A.C. in France.

The first annual dinner of the 100th Squadron, R.A.F., will be held at the Holborn Restaurant, London, for officers on January 3, 1920, at 7 p.m.; for W.Os., N.C.Os. and men on December 31, 1919, at 6.30. All members who can attend please write at once to Capt. C. Gordon-Burge, Dent-de-Lion, Westgate-on-Sea, Kent.

TRANSATLANTIC VICKERS-VIMY AT SOUTH KENSINGTON

ON Monday last the new Aeronautics Section of the Science Museum at South Kensington was inaugurated with the formal presentation to the nation by the Vickers and Rolls-Royce firms of the Vickers-Vimy-Rolls machine, on which Captain Sir John Alcock flew across the Atlantic.

Dr. F. G. Ogilvie, Director of the Science Museum, presided, in the absence of the President of the Board of Education.

Sir Richard Glazebrook, representing Sir Hugh Bell, Chairman of the Advisory Council, congratulated Messrs. Vickers upon the fact of the Atlantic flight and also on Captain Ross-Smith's successful flight to Australia. He pointed out that the object of the exhibition was not merely to get together a collection of historical models, but, further, to show how science could help industry and commerce in the future. It was gratifying to know that the Government were seriously taking up the question of research.

On behalf of Messrs. Vickers, Mr. Douglas Vickers said that the machine would form an historical landmark. It was not in any sense a special machine, but only one of a large number designed during the War for the bombing of Berlin. They were not ready until the last month of the War. In crossing the Atlantic it carried a certain number of special navigating instruments and a special petrol tank. With those exceptions, it was practically a war machine built twelve months ago. It had had to be slightly repaired, because it landed in an Irish bog, and had to be dragged out. The curio-hunter was there and made booty of certain portions of the machine—so that that was not the only place where relics of the Atlantic machine would be shown. Perhaps the flight to Australia was greater than the Atlantic achievement. It showed that, with relays of machines, letters might be carried to Australia within a week; that would really be a most astonishing first product of war.

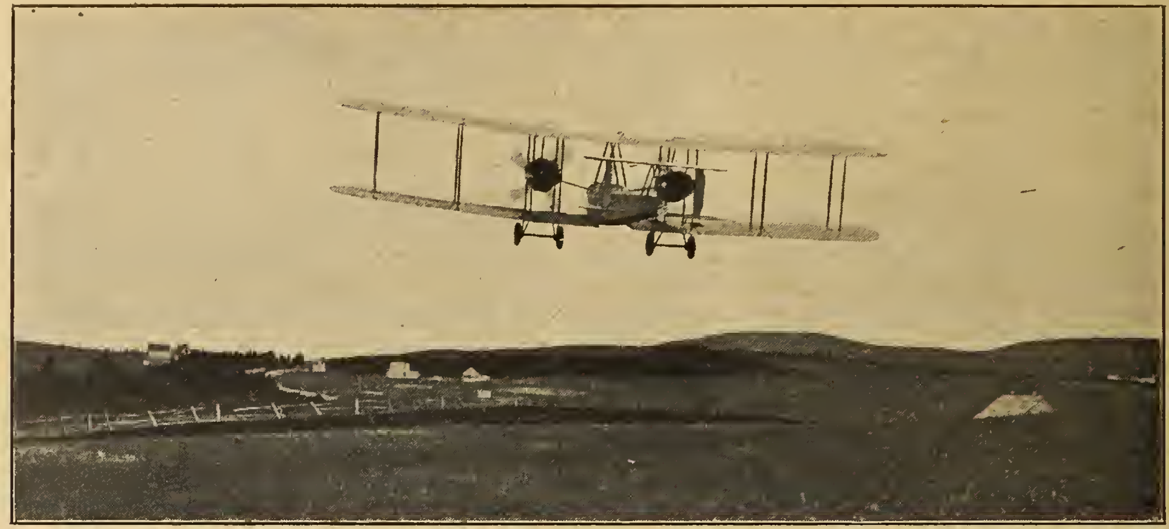
Mr. Claude Johnson said the engines were designed by Mr. Royce, engineer and chief designer to Messrs. Rolls-Royce, Ltd. A book had been got together containing memoranda on design by Mr. Royce and his designers, and it was known familiarly as the "Rolls-Royce Bible." A copy of it was given to every engineer who entered the works. It showed the tremendous amount of thought it was necessary to give to the subject in order to arrive at a successful engine. He hoped a monument would be erected to commemorate the flight, and that it would be placed, not in the wilds of the west of Ireland, but in London.

In accepting the aeroplane on behalf of the nation, Dr Ogilvie said that he had received a message from the Prince of Wales, who hoped to see it at an early date.

Apart from this centre-piece there are already many interesting exhibits on view. They include a replica of Montgolfier's balloon of 1783, two models of the early Wright machines, and one of Stringfellow's, and a set of model Sopwith aeroplanes. There is also to be seen Mr. McEvoy's portrait of Sir John Alcock, a wind channel which demonstrates how lift is obtained by the movement of air beneath the aeroplane, and several Zeppelin relics.

Mr. Douglas Vickers later presided at a luncheon given at the Hyde Park Hotel by Messrs. Vickers, Ltd.

Mr. Fisher, High Commissioner for Australia, responding to the toast of "The Closer Bond Between the Mother Country and Australia," said that Captain Ross-Smith's machine would never return to this country; it would be kept in Australia.



The historical start from Newfoundland of the Vickers Vimy-Rolls machine for the Atlantic crossing

The Atlantic Flight: Presentation of the Vickers Vimy-Rolls-Royce aeroplane to the nation. At the ceremony at the Science Museum, South Kensington, on December 15. On the platform, from the left, are Sir Richard Glazebrook, Sir Robert E. Cooper, Mr. Andrew Fisher, Sir John Alcock, Mr. Douglas Vickers, Dr. F. G. Ogilvie (Museum Curator), Mr. Claude Johnson, Air-Marshal Salmond, Col. Lyons, Mr. W. Longridge

"Flight" Copyright.

AIRISMS FROM THE FOUR WINDS

If there is one world-fact outstanding more than another this week it is the accomplishment of the flight from London to Australia—" Hands across the Sea " with a vengeance.

- - -

Of absorbing interest also is the story of the journey as told in Capt. Ross Smith's diary. It is an historical document, the original MSS. of which should be treasured in his native country equally with the actual machine, which Messrs. Vickers, Ltd., have agreed with the Australian Government, should be held by them as a milestone in linking up the farthest unit of the Great British Empire with the parent country. So mote it be.

- - -

Capt. Ross Smith naturally would not seek to repeat the journey under similar conditions, and endorses the only feasible system under which the various limbs of the Empire can be kept in easy physical touch with each other through the air, viz., by relays of machines and pilots for definite stages of the journey. Irrespective of the speeding up and comfort thus assured, one solid reason is sufficient to emphasise this form of organisation. In passing through different climates with great variations of heat and cold, much strain and very heavy labour were caused as they expanded or contracted in adjusting the stays and parts of the machine. Another milestone in aviation. This time a very big double terminus one.

- -

The Predominant Partner and Lord Fisher. " Somewhere about 600 years before the Christian Era, Baruch (a friend of Jeremiah) made this caustic remark," writes the Admiral:

" 'Give not the things that are profitable unto thee to a strange nation.'

" So, though daily receiving the 'pin-pricks'—'Why don't I describe in detail the future Air Navy and the future submersible Navy?'—I refrain for Baruch's reason—but really almost any fool could make the plans—they are so idiotically simple! This is the beauty of the future war. No mountains, rivers, protected harbours, no snow-bound Alpine passes are in the business—you just fly above all these things and drop your multiple ton bomb! Selah!

" But isn't it funny?:—

" Just when the air is clearly the predominant partner—Seely is sacked!—and the '400-million-a-year' War Office and the '158-million-a-year' Admiralty, instead of being subservient and squashed, trample on Seely and Co.

" There will be types in the air, as there were types on the

MOST ANNOYING!—IV. To do a good turn for a pilot and get in the way of the " prop."

water—the destroyers swifter than eagles (175 miles an hour guaranteed), the equivalent battle-cruiser with peculiar armour (but that's another story), and the lethargic bomb-carriers.

"As usual, the experts will say I am mad.

"*N.B.*—The Royal Society said the man was mad who predicted aeroplanes."

This is Lord Fisher's last shot at the end of his letter.

* * *

Thank goodness the Realm of the Air has so far-seeing and powerful a champion as Admiral Fisher, second only to Sir Percy Scott. Both carry much weight with the people (and, after all, it is they who have to pay)—and they are so persistent, that there is hope for our Air policy before it is too late. A very good start has been made with General Sir Hugh Trenchard's scheme for the organisation of the R.A.F., and there is abundant matter for reflection and congratulation in the debate which has this week taken place in Parliament. In the meantime, Sir Percy Scott does not spare the Admiralty in his criticism of their obsolete methods, when advocating more generous consideration for aircraft. In his most recent utterance he lays down that "it has no appreciation of the value of time, it has always been opposed to change and reform, it is hidebound with routine and red-tapeism, and has no time to think of the needs of the future and how they should be met.

* * *

"I will quote a small example," he writes. "When I was in charge of the Defence of London I wanted some guns; I knew that Lord Kitchener had some that he could spare; so I went over to the War Office and asked him for some; he said that he thought I could have them, but would let me know for certain in half an hour. In a quarter of an hour he telephoned to me that I could have them. I thought that it would be only polite if the Admiralty thanked him, so I sent a chit down to the Secretary submitting that such a course might be taken. In a commercial house the secretary would have called in a shorthand writer and dictated to him: 'I am commanded by their Lordships the Commissioners of the Admiralty, to thank, etc.,' he would have signed it, and Lord Kitchener would have received it in an hour. How did the Secretary deal with it? He dealt with it according to the Admiralty custom. My request was put in a docket and passed round to all the Lords of the Admiralty and most of the heads of Departments for their opinions; it was marked 'Immediate,' so it only took six days. Here was waste of time and labour, and we were at war. As this is a fair sample of how business is done at the Admiralty, no wonder Mr. Walter Long found the staff tired."

* * *

"As regards the future policy of the Navy," Sir Percy continues, "Mr. Walter Long practically tells us that they have not got one, but that they are thinking about it. This will be poor consolation to parents who are trying to make up their minds whether they should put their sons into the Navy or not." Coming to Sir Percy Scott's next point, we are afraid we disagree with his views upon this particular detail entirely. He rightly thinks there must be great changes in the future Navy, and he follows this up by saying: "In my opinion its most important arm of offence and defence, the aeroplane, has been taken from it; we are going back to the customs of 100 years ago, when we had our ships worked by sailors, but the guns manned by artillerymen from the shore. Now we shall have our aeroplane-carrying ships worked by sailors, but the 'planes they carry will be fought by members of the Royal Air Service; a scheme which I do not think will ever work satisfactorily."

* * *

We may be wrong, but we shall be in company in that respect with a very big section of hard-thinking men of the new school. All this jibbing at the basis of a successful Air Service is merely the result of, in a measure, being bitten with the very "hide-bound routine and red-tapeism" which Sir Percy so thoroughly despises and condemns. Time will tell, and as the Air Ministry as a separate entity is once more and we hope finally disposed of, we prophesy that in a very few years it will be wondered at how any serious opposition could have been put up against the R.A.F., as it is now conceived.

* * *

Carrying his arguments for aircraft development a step further, Sir Percy points out that Mr. Walter Long tells us that there are two sides to the question as to the surface battleship being dead, in part because of attack from the air. One side, says Mr. Long, is that aircraft will destroy the big battleships by dropping bombs on them; the other that they will not be able to do this, as they will be counter-attacked; but, Sir Percy claims, there is a third side to the question—aircraft will destroy the battleships by torpedoes. "This is an arm that could have been, and ought to have been, developed during the War, but the Admiralty had no appreciation of the value of it, and it was not perfected until the War was over. The introduction of dropping mobile torpedoes from aeroplanes has made the existence of the battleship still more precarious. If we or the Germans had at the battle of Jutland 40 aeroplanes, carrying torpedoes, one of the two fleets would never have reached home; the low visibility which obtained during that battle would have been all in favour of the aeroplanes; they could have come quite low down and made sure of their targets; they would, of course, have been accompanied by fast fighting machines to ward off counter-attacks.

"Mr. Walter Long only mentioned bombs. The use of mobile torpedoes introduces a question which will require very careful consideration before we even think of building another surface battleship."

* * *

These discussions cannot help but do good to the cause. By spreading the light, in time the most moleish person cannot help but see where rigid adherence to red-tape tradition must ultimately land us.

* * *

It's Christmas now when d'Annunzio hopes to be getting away for his Rome–Tokio flight. And this time, by latest reports upon Fiume, it really looks as if he had prophesied correctly.

* * *

In spite of all the egg-dropping on the Mahsuds, this pugnacious tribe has managed to carry on, after all, as the peace which they apparently sought for as a result of the first operations appears to have faded away somewhat. At the same time, it is early days yet to condemn bombing methods as useless, as the inner history of the effects has still to be written, and by latest news to hand, it would seem as if these warlike tribes are much inclined to call a halt, and it may well be that those bombs from the air *have* been a consideration in their minds. *Nous verrons.*

* * *

Quite an amusing, if exciting, episode is reported from Berlin by Mr. George Renwick, the special correspondent of the *Daily Chronicle*, in connection with the first aeroplane to fly from London to Berlin. Mr. Renwick, writing under date December 13, says:—

"Two British ex-Army officers, Capt. Herne and Capt. Macnaught Davis, are probably the first two fliers who have had an encounter with German frontier officers in the air (always excepting the numerous encounters with German frontier guards which our fliers had, during the War, when they made a daily practice of invading the enemy's welkin).

"Messrs. Herne and Davis left London some little time ago on a Handley Page machine in order to take it to Warsaw, there to give exhibition flights.

"Five hours took them to Cologne, where they were held up for some time by bad weather.

"But the weather was not the only dilemma which faced them in the zone of Cologne.

"They applied to the German Pass Bureau in the Rhine zone for permits to travel over Germany, and in reply they were informed that:—

1. Passes would be given them; but
2. The Bureau had no authority to grant a permit for the entry of the aeroplane into the country.

Nevertheless, the two airmen decided to 'chance it,' and they left Cologne a few mornings ago for Berlin.

"They ran at once into more bad weather, and when not very far beyond the bridgehead (which extends about 20 miles east of Cologne) two single-seater German aeroplanes approached them.

"From the single-seater flew forth the signal to the Englishmen, 'Alight!' 'Descend!'"

* * *

Taking up the episode at this point, Captain Herne, who has been interviewed by a correspondent, said:—

"I suddenly saw two German machines in full war paint, Iron crosses and all, making for us. They flew close alongside, the airmen motioning to us with their hands to land. We did not want any explanations except with the proper authorities in Berlin, so we flew on, waving our hand in a friendly way.

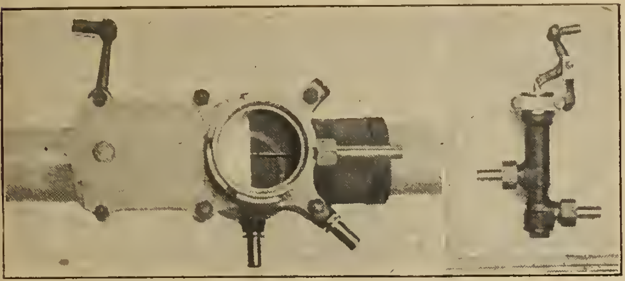
"When the Germans saw that we were not coming down, they were furious and flew round us for twenty minutes, crossing so close as almost to graze us with their wing tips and shaking their fists at us angrily.

"At Spandau the Germans were simply amazed to find that we were a British civilian machine, and had never seen our international markings before, but they treated us very well, gave us hot drinks, and drove us to Berlin."

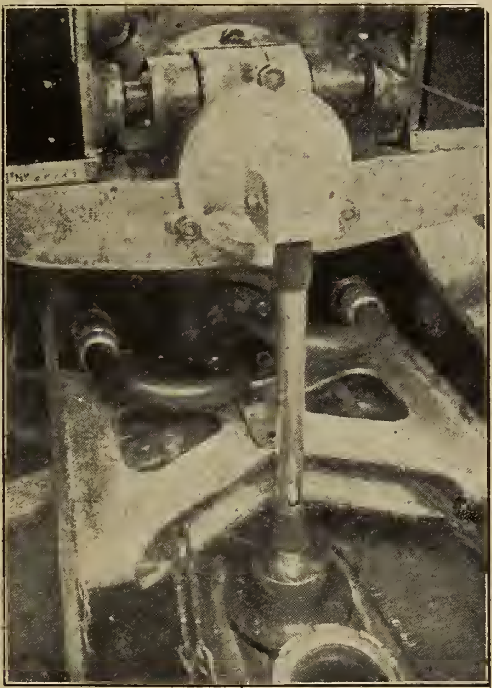
All's well that ends well, and after a while, the necessary passes having been furnished to the voyagers, they were able to resume their journey, expecting to reach Warsaw in about five hours.

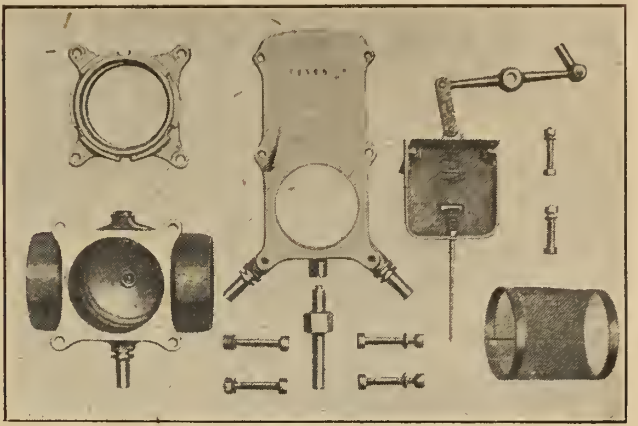
THE BLOC-TUBE CARBURETTOR

It would be difficult to secure a more expressive name for a carburettor than that selected by M. Rene Tampier, for it explains the principle upon which it has been designed. When he set to work on the problem of producing an aero-engine carburettor, M. Tampier set himself two guiding rules: 1, that the flow of the petrol from the tank to the engine should be free and not controlled by any automatically-operated device, and 2, that the final aperture through which petrol must pass should be capable of being cleaned when necessary and be free as far as possible from any possibility of being choked by any particles of dirt or foreign matter. He also realised that the conditions under which an aero-motor works are quite different from those which prevail for a motor-car engine. He noted that when the throttle of an aero-engine is being opened gradually the revolutions of the propeller increase in a definite ratio whether the machine be on the ground or in the air, or in other words the number of revolutions varies with the proportion of petrol supplied to the engine.


THE BLOC-TUBE CARBURETTOR: Photograph showing the complete device. On the right the new Tampier Fine adjuster for controlling the amount of petrol fed to the carburettor

From the photographs showing the Bloc-tube carburettor complete and in parts it will be realised that the device is a very simple one. The amount of petrol which passes to the engine is controlled by a tapered needle working in a nozzle at the end of the fuel supply pipe, while the air is regulated by the flat slide working across the circular inlet port. As a result, when the engine is running the petrol is sprayed into the column of air, and so forms the explosive mixture; when the engine is stopped the needle cuts off the supply of petrol and is held down by a light spring, contained in the slide, pressing on its upper end. In order to obtain the correct proportions of petrol and air for various speeds of the engine, the needle is given a special shape, this being determined, according to the type of engine, by experiments on the test bench and in the air.

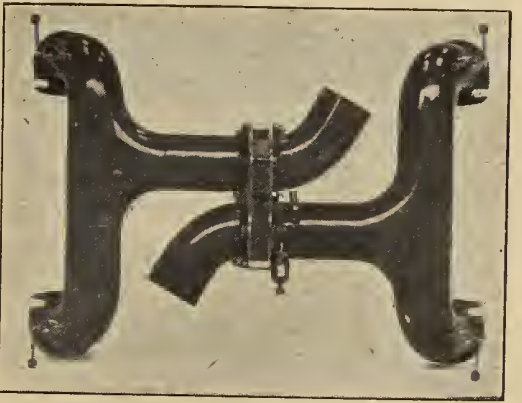

Fitting of Bloc-tube petrol pump and drive on a Spad


The Bloc-tube carburettor dismantled, showing its various component parts

Further, in order to obtain the weakest mixture under all conditions, M. Tampier thought out another device, which he calls a fine adjustment. It is in effect a cock, but designed on the same principle as the carburettor, inasmuch as it has a needle working in a jet, the position of the needle being controlled by a rod and lever. The fine adjustment also embodies a filter screen.

Having got thus far, M. Tampier set to work to produce a satisfactory control-lever, and eventually designed one which is held fast in any position by means of a friction-spring. This is connected up to the carburettor by rods and levers, and has proved so satisfactory in service that we understand it is a standard fitting on French machines, and has been used extensively on Allied machines.

Although the use of the Bloc-tube carburettor has been most extensive in connection with rotary motors, it has also given good results on fixed engines, and one of our photographs shows a twin carburettor fitted to a Hispano-Suiza engine. In this connection M. Tampier has devised a petrol pump worked positively, by means of a small bevel gear, from the engine. One of these pumps, working inside the petrol tank was tested for 500 hours at the French Government factory at Chalais Meudon, and when it was taken to pieces, every part was found to be in very good condition with no signs of undue wear and the inside of the pump was found to be quite clean.


Twin Bloc-tube carburettor for Hispano-Suiza engine

These are but a few of the many ingenious devices which have been produced by M. Tampier, who, it is interesting to note, worked for some time as a practical engineer at the Napier works at Acton. ¶So great has been the demand for the Bloc-tube carburettor that the original works at Danemere Street, Putney, and Boulogne-sur-Seine proved insufficient and new factories were started at Lyons and Turin. M. Tampier, however, keeps in touch personally with these branche sand during the Waf he has been ably assisted by a British officer, Lieut. George Nicolet, to whom, we understand, much of the credit for perfecting the Bloc-tube devices is due.

◆ ◆ ◆ ◆

THE ROYAL AIR FORCE

London Gazette, December 9

Flying Officer G. Archer (O.) is granted a permanent commn. in the rank stated, with effect from Aug. 1.

The notification in the *Gazette* of Aug. 22, appointing Capt. G. L. Godden, O.B.E. (T.) to a permanent commn. is cancelled.

The notification in the *Gazette* of Oct. 28, appointing Flying Officer C. T. Black (A.) to a permanent commn. is cancelled.

The notification in the *Gazette* of Dec. 2, appointing Flying Officer A. L. M. Van der Byl (A.) to a permanent commn. is cancelled.

The following temporary appointments are made :—

Staff Officers, 2nd Class.—(P.)—Sqdn. Ldr. R. J. F. Barton, O.B.E.; Dec. 4. (Q.) Sqdn. Ldr. F. A. J. B. Wiseman, O.B.E.; Oct. 18, from (S.O.), 1st Class.

Staff Officers, 3rd Class.—(P.) Flight-Lieut. L. A. K. Butt; Dec. 4. (T.) Flight-Lieut. W. J. B. Curtis, O.B.E.; Oct. 18, from (S.O.), 2nd Class.

Flying Branch

Sqdn. Ldr. D. L. Allen, A.F.C., to be Sqdn. Ldr. (A.), from (S.O.); Oct. 18.

The following Capts. are graded for purposes of pay and allowances as Majs. whilst employed as Majs. (A'ship), from May 1 to July 31 :—R. A. Cochrane, A.F.C., G. M. Thomas, D.F.C.

Flight-Lieut. D. G. Donald, A.F.C., to be actg. Sqdn. Ldr. whilst employed as Sqdn. Ldr. (A.), without the pay and allowances of that rank; Aug. 1.

Flight-Lieut. F. N. Halsted, D.S.C., D.F.C., to be Flight-Lieut. (A. and S.), from (S.O.); Nov. 24.

The following Lieuts. are graded for pay and allowances as Capts. whilst employed as Capts. :—R. B. Gibb (A'ship) to Sept. 8; L. W. Baker, D.F.C. (K.B.), to June 3; May 1. Lieut. S. G. Barlow to be Lieut. (O.), from (Ad.); July 22.

Flying Officer (actg. Flight-Lieut.) C. E. Maitland, D.F.C., relinquishes the actg. rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut. (A.); Sept. 21.

Second Lieutenants to be Lieutenants.—(Hon. Lieut.) J. Duncanson; June 1, 1918 (since relinquished his commn.) (substituted for notification in the *Gazette* of Oct. 14. (Hon. Capt.) W. E. Dowling; Aug. 11, 1918. F. L. W. Dowling; May 16. K. S. Eagles; June 7. H. Nattrass, I. C. Slater; June 20.

Pilot Officers to be Flying Officers.—J. E. Phelps; Aug. 7. J. F. Mehigan; Oct, 1.

P.F.O. H. W. Symmes (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A.); Aug. 1, 1918.

787002 Cdt. H. L. Edwards is granted a temp. commn. as Sec. Lieut. (O.); July 6, 1918 (substituted for the notification in the *Gazette* July 16, 1918, wherein this Cadet was described as "Harold Edwards").

Sqdn. Ldr. F. E. Sandford, A.F.C., is placed on the half-pay list; Dec. 10.

The following relinquish their temporary R.A.F. commns. on return to Army duty :—Lieut. G. F. Elliott (Lieut., Canadian A.S.C.); March 25. Lieut. C. A. Hore, M.C. (Lieut., N. Staffs. R.); June 26. Flight-Lieut. K. H. Riversdale-Elliott (Lieut., Scottish Rifs.); Nov. 9. Flying Officer R. J. E. P. Goode (Lieut., R. Dublin Fus.); Nov. 12. Flying Officer C. V. A. Bucknall (Lieut., Dragoons); Nov. 18. Flying Officer R. H. F. De V. S. Somerset, D.S.O. (Lieut., Coldstream Guards); Flying Officer (actg. Flight-Lieut.) A. D. K. Perkins (Lieut., R. Irish Fus.); Nov. 20. Pilot Officer (Hon. Flying Officer) C. B. Crawford (Lieut., Oxford and Bucks L.I.); Nov. 21. Flight-Lieut. S. P. Simpson (Lieut., Bedford and Hertford R.); Nov. 24. Pilot Officer (Hon. Flying Officer) H. J. Vickers (Lieut., Indian Army Res.); Dec. 3. Flight-Lieut. S. B. Horn, M.C. (Capt., Dragoon Gds.); Dec. 4.

(Then follow the names of 158 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank :—J. N. Catling (contracted on active service); Oct. 20. F. O. Rooks (contracted on active service); Nov. 6. R. K Mackenzie; Nov 29 (substituted for notification in the *Gazette* Sept. 6, 1918. W. E. B. Oakley (contracted on active service); Dec. 2.

Sec. Lieut. H. C. Belore relinquishes his commn., being physically unsuited for the duties of Pilot or Observer; Oct. 23, 1918 (substituted for notification in the *Gazette* of July 26, 1918).

The following Sec. Lieuts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank :—W. C. Taylor; Oct. 17. H. B. Mills; Nov. 13.

The notification in the *Gazette* of Sept. 5 concerning Sec. Lieut. F. R. James is cancelled (notification in the *Gazette* of May 2 to stand).

The notification in the *Gazette* of Oct. 14 concerning Maj. A. K. Robertson is cancelled.

The notifications in the *Gazette* of Nov. 7 concerning the following officers are cancelled :—Lieut. W. S. Camphell (notification in *Gazette* of Oct. 24 to stand); Sec. Lieut. (Hon. Lieut.) E. Lawson (notification in *Gazette* of Nov. 25 to stand). Sec. Lieut. W. C. Taylor.

Administrative Branch

Flight Lieutenants to be Flight Lieutenants, from (S.O.).—H. W. M. Paul, O.B.E., M.C.; Oct. 13 (substituted for notification in the *Gazette* of Nov. 18. G. C. Anne, O.B.E.; Oct. 18.

Sec. Lieut. (Hon. Lieut.) E. T. Fielding to be Sec. Lieut. (Hon. Lieut.), from (T.), from May 1 to Sept. 17, and is graded for purposes of pay and allowances as Capt. whilst employed as Capt. from May 1 to Sept. 17.

Lieut. C. M. McGorrery to be Lieut., from (O.); Dec. 18, 1918 (substituted for notification in the *Gazette* of March 4).

Flying Officers to be Flying Officers, from (S.O.) (Oct. 18) :—C. S. Fulton, W. Myers, M.C., D.C.M. (Hon. Flight Lieut.) H. Pallett, and to be Hon. Flight-Lieut., A. G. Stradling, R. W. Ward, B H. Godfrey; Nov. 12. Flying Officer E. G. Williams to be Flying Officer, from (A.); Oct. 27.

Second Lieutenants to be Lieutenants.—T. Gill; Oct. 22, 1918 (substituted for notification in *Gazette* of July 29). A. L. Kidd; May 4. W. E. G. Heanley, M.B.E.; July 10.

Sec. Lieut. (Hon. Lieut.) T. Mumford to be actg. Lieut. whilst employed as Lieut.; Aug. 8, 1918 (substituted for notification in *Gazette* of Oct. 29).

Sec. Lieut. S. A. Hipple (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut.; March 1.

Capt. (Hon. Maj.) T. M. Ross (Qmr. and Maj., Dragoons) relinquishes his commn. on ceasing to be employed; Nov. 19.

The following relinquish their temp. R.A.F. commns. on return to Army duty :—Lieut. C. E. Bright (Lieut. (actg. Capt.) E. Lancs. R.); Feb. 8. Flight-Lieut. K B. Harbord (Capt., R.F.A.); Nov. 23.

(Then follow the names of 27 officers who are transfd. to the Unemployed List at various dates.)

Lieut. C. S. Bignell relinquishes his commn. on account of ill-health caused by wounds), and is granted the rank of Capt.; Dec. 2.

Sec. Lieut. A. F. P. James relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Dec. 1.

The notification in *Gazette* of Nov. 7 concerning Capt. E. P. L. Baker is cancelled.

Technical Branch

Wing Comdr. (actg. Group Capt.) A. V. Bettington, C.M.G., relinquishes actg. rank of Group Capt. on ceasing to be employed as Group Capt.; Nov. 17.

Sqdn. Ldr. F. H. Unwin, O.B.E., to be Sqdn. Ldr., Grade (B), from (S.O.); Oct. 18.

The following Capts. are graded for purposes of pay and allowances as Majs. whilst employed as Majs., Grade (A.) :—A. M. Low; May 1. H. L. Rutty (from May 1 to July 31).

Sec. Lieut. R. G. Meech is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (A) (from May 1 to Aug. 28).

Sec. Lieut. C. W. Bentley to be Lieut., Grade (A.); May 16 (substituted for notification in *Gazette* of July 29).

Second Lieutenants to be Lieutenants.—P. A. Edmonds, R. H. B. Tomlinson; May 16.

Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts., Grade (A) :—R. J. Shanks (from April 1, 1918, to Aug. 31, 1918); (Hon. Lieut.) P. A. Albrecht; June 22, 1918, to Feb. 27.

Sec. Lieut. J. Parsons is graded for purposes of pay and allowances as Lieut. whilst employed as Lieut., Grade (A) (from Feb. 15 to July 21).

Lieut. (Hon. Capt.) W. C. Green, M.C., to be Lieut., Grade (B), from (Ad.); July 1 (substituted for notifications in *Gazettes* of July 29 and Sept. 12).

Sec. Lieut. F. Denham to be actg. Lieut. whilst employed as Lieut., Grade (B.) (from Sept. 30, 1918, to April 30) (since demobilised).

Pilot Officer (actg. Flying Officer) L. Freehorn, M.B.E., relinquishes actg. rank of Flying Officer on ceasing to be employed as Flying Officer, Grade (A); Nov. 22.

Sec. Lieut. A. G. Allan to be Sec. Lieut., Grade (A.) from (Ad.); Aug. 10 1918.

Sec. Lieut. H. L. Vahey to be Sec. Lieut., Grade (A) from Unemployed List; Nov. 6, with prec. next below S. Maunder.

Pilot Officer J. H. Furniss, M.B.E., relinquishes the grading for pay and allowances of Flight-Lieut. on ceasing to be employed as Flight-Lieut., Grade (B); Nov. 30.

Flight-Lieut. P. P. Gaskell relinquishes his commn. on ceasing to be employed, and is permitted to retain his rank; Sept. 22.

Sqdn. Ldr. A. W. Colley (Maj., N. Lancs. R.) relinquishes temp. R.A.F. commn. on return to Army duty; Nov. 20.

(Then follow the names of 28 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. (Hon. Lieut.) M. W. J. Kelly relinquishes his commn. on account of ill-health (caused by wounds), and is permitted to retain the rank of Lieut.; Dec. 2.

Lieut. J. G. Proger is dismissed the Service by sentence of a General Court-Martial; Oct. 23.

The notification in the *Gazette* of Nov. 7 concerning Sec. Lieut. E. W. Barton is cancelled.

Medical Branch

Flight-Lieut. (actg. Sqdn. Ldr.) W. Darling, M.C., to be actg. Wing Com. whilst specially employed; Nov. 1.

Flight-Lieut. (actg. Sqdn. Leader) H. M. S. Turner, M.B.E., to be actg. Wing Comdr. whilst so employed; Dec. 1.

Flying Officers to be Flight Lieutenants :—P. C. Parr; Aug. 14. M. Hyman; Oct. 31. A. Briscoe; Nov. 19. E. G. O'Gorman; Nov. 21. C. McC. Jones; Nov. 25. S. G. Seymour; Nov. 26. W. E Shéil; Nov. 27.

(Two officers transfd. to the Unemployed List.)

The surname of G. Packham is as now described and not "Packman," as stated in *Gazette* Aug. 8, 1918.

Chaplains' Branch

The Rev. B. W. Keymer, O.B.E., relinquishes appointment of Deputy-Chaplain-in-Chief and relative rank of Sqdn. Ldr. on ceasing to be employed as Deputy Chaplain-in-Chief, and reverts to rank of Chaplain, with relative rank Flight-Lieut.; Oct. 20.

(One officer is transfd. to Unemployed List.)

Memoranda

The following Prob. Flight Officers are granted hon. commns. as Sec. Lieuts. :—H. J. Drew; Feb. 23. N. J. C. Clark, H. Knight; March 7. E. W. Alston-Smith; April 11. N. G. Durham; May 19.

(Then follow the names of seven Cadets granted hon. Commns. as Sec. Lieuts.)

Wing-Comdr. J. W. O. Dalgleish, O.B.E., is placed on h.p. list; Dec. 10.

The following relinquish their temp. R.A.F. commns. on return to Army duty :—Flight-Lieut. A. P. Davidson (Lieut., H.L.I.); Nov. 27. Sqdn. Ldr. H. E. Rudkin, O.B.E. (Maj., R. Irish Regt.); Dec. 1.

Capt. (actg. Maj.) H. F. Atkinson-Clark, M.V.O., O.B.E. (Capt., Scots Gds.), relinquishes his commn. on ceasing to be employed, and is permitted to retain rank of Maj.; Aug. 1.

Maj. H. F. Towler (actg. Lieut., R.N.R.) relinquishes his commn. on ceasing to be employed, and is granted rank of Lieut.-Col.; Oct. 25 (substituted for notification in *Gazette* Nov. 11).

(Two officers transfd. to Unemployed List.)

AVIATION IN PARLIAMENT

Compensation for Air Raid Damage

Capt. Martin, in the House of Commons on November 8, asked the Prime Minister whether he can offer any hope of compensation for injuries to person or property of civilians caused by air raids?

Mr. Chamberlain: The Treaty with Germany provides that compensation may be claimed from Germany in respect of damage to injured persons and to surviving dependants by personal injury to or death of civilians caused by attacks from the air, and in respect of damage to property of civilians injured or destroyed by the acts of Germany or her Allies from the air. Claims, if not already furnished to the Foreign Claims Office, should be sent to the Board of Trade. I am not, of course, in a position to say how much will be recovered from Germany in respect of them.

Sir J. Butcher: Will the person who makes the claim get paid anything if Germany does not carry out her obligations to pay?

Mr. Chamberlain: No.

Mr. Rawlinson: When is it expected Germany will make the first payment on account?

Mr. Chamberlain: I have answered practically the same question two or three times. Payment by Germany cannot be received until after the Reparation Commission has got effectively to work, and the Reparation Commission cannot get to work until after the Treaty has been ratified.

Air-Mail Service Fees

Lieut.-Com. Kenworthy asked the Postmaster-General whether he is aware that the Assistant Postmaster-General in the Government of the United States of North America has stated that by use of aeroplanes to carry mails between New York, Chicago, and Washington at 2 cents a letter, a saving will be effected of over $1,500,000 in 1920 over all other methods of transit; and, in view of this statement, will he reconsider the air-mail fee of 2*s.* 8½*d.* between England and France with a view to popularising this service and placing it on a commercial footing?

Mr. Pease: The sum of $1,500,000 referred to by the hon. member is the estimated value of the travelling post offices and other railway rolling stock and the time of post office sorters which will be rendered unnecessary by the provision of the additional aeroplanes recently ordered by the United States Post Office for its air mail services. Payment for the conveyance of mails by rail in the United States is made on a basis different from that in force in this country; but I do not gather that the sum indicated is a net saving consequent on the use of aeroplanes for the conveyance of mails. The air mail service between London and Paris is experimental, and the arrangements are of a temporary character and will be reviewed after six months' working. I hope that when permanent arrangements for the service are made it will be possible to reduce the amount of the special fee.

Anti-Aircraft Gun, Hyde Park

Sir O. Philipps asked the First Commissioner of Works whether, in view of the historic interest attaching to the anti-aircraft gun which stood in Hyde Park and assisted to protect London from the attacks of German aircraft, arrangements can be made for this gun to be re-erected in Hyde Park on the same site with a suitable inscription?

Mr. Churchill: My right hon. friend has asked me to answer this question. It is proposed to place in the War gallery of the London Museum, Lancaster House, an anti-aircraft gun which formed part of the London Anti-Aircraft Defences.

Anti-Aircraft Station, Putney Heath

Mr. Lorden, on December 9, asked the Secretary of State for War whether, seeing that it was proposed to continue the anti-aircraft station at Putney Heath until a permanent site was found, he would give instructions for the station to be put in a cleanly and satisfactory state at once and some provision made for washing motors and lorries other than the roadway; and would he state what steps, if any, had been taken to prevent contamination of the filtered water in the reservoir?

Mr. Churchill: I am informed that there is no other space for washing motors and lorries other than at the side of the road, where a special place was made for that purpose. Special precautions have been taken in order that the filtered water in the reservoir should not be contaminated, and the wash-houses and latrines have been constructed well away from the reservoir. A sanitary inspector recently inspected this station and expressed his satisfaction. The Water Board were also satisfied with the arrangements made. Instructions have been issued for the station to be kept in a cleanly and satisfactory state.

British Aeroplanes at the Paris Exhibition

Lieut.-Com. Kenworthy asked how many British aeroplane firms are showing at the Paris Exhibition; whether the number is satisfactory; and what steps are being taken to encourage and assist British firms to attend foreign exhibitions of aircraft?

Capt. Guest (Joint Parliamentary Secretary to the Treasury): I have been asked to reply to this question. The answer to the first and second parts is that six British aeroplane firms are showing at the Paris Exhibition, and that on the whole this number of exhibitors may be taken to be satisfactory. The Society of British Aircraft Constructors was unable to obtain sufficient space on the ground floor for a corporate exhibit, and, therefore, are not exhibiting. In regard to the last part of the question, offers of assistance were made to the Society of British Aircraft Constructors at a meeting held early in October.

Air Ministry Stores Deficiencies

Mr. Raper asked the Secretary of State for War how much has been written off since the Armistice as a charge against the public for stores deficiencies of air squadrons stationed in Great Britain and of the various air store depôts and parks which were at that time in existence?

Capt. Guest: This information would take some time to collect, and I am unwilling at present to throw additional work on the Air Ministry and local Air Force staffs; but if my hon. friend presses for it, I will obtain the information and send it to him.

Mr. Raper: Can the hon. and gallant gentleman give us some rough idea of the amount?

Capt. Guest: No, I cannot, and I do not think a rough idea is what the hon. member requires.

Mr. Raper: When can we have these particulars?

Capt. Guest: When the pressure on the Ministry is a little less than it is now.

Australia by Air

Sir N. Moore: Has the Secretary for War received any official information as to the arrival of Capt. Smith Ross in Australia?

Mr. Churchill: I understand he has successfully arrived, and I think I shall be doing right in sending official congratulations on this very remarkable exploit.

Navy Estimates and Aviation

In introducing the Navy Estimates in the House of Commons on December 10, Mr. Walter Long, in the course of his speech, said: "Who can say what is going to be the development of the Air Service in the future, and what is to be the effect of the Air Service? I was told today that the Royal Air Service is going to be so effective that it will destroy the battleship, which is such a big target. That is the view of one side. I go to a great airman and I say, 'I am told that our big battleships are no longer going to be of any use because they offer such big targets for bombs, which are heaven knows how many tons in weight and which are to be dropped from the clouds on to the battleships.' He said: 'Some people will tell you that, but, speaking for the air people, I can say that as fast as they are developing these attacks we are developing the counter-attack and the defence, and we shall have something to say before you abandon your big ship simply because an airship has been devised that is going to threaten you with bombs.' There are two sides to the question. I am taking neither side. We have today in His Majesty's Navy some of the most magnificent ships the world has ever seen, and to destroy these vessels because we are told that the air is going to replace the Navy would be a criminal thing for any Board of Admiralty to do.

"The suggestion has been made more than once that there ought to be a staff composed of representatives of the Admiralty, the War Office and the Air Ministry, and that they should meet in order to discuss and consider the greater problems, the world problems, which we shall have to solve in the near future. I say for the Board of Admiralty, both naval and civilian members welcome the joint arrangement by which the chiefs of the staff of each Department may meet periodically in order that our plans may be concerted. Whatever the predictions of those who believe we can do without a Navy, I believe the people of the country will continue to demand that there shall be a Navy sufficient to give us reasonable security."

Mr. George Lambert said he did not consider that the Secretary of War should be at the same time Secretary for Air. The naval services of the country could not be carried on without the Air Service, and he would put the Air Ministry under the Admiralty.

Rear-Admiral Adair charged the Admiralty with being negligent as regards the Air Service. Aviation was only a means to an end, and that end in the case of the Air Service attached to the Navy was maritime warfare. The Naval Air Service must be formed of men who were part and parcel of the Navy—naval officers; no amateurs could effectively do the work. When the Admiralty allowed the whole of this Service to be turned over to the Air Ministry they made a still greater blunder than when they started it as a separate service, though administered by the Admiralty.

Maj.-Genl. Seely said it was impossible to exaggerate the effect that developments in the air might have on the Navy. He pointed out the difficulty which would arise when the First Lord of the Admiralty went for aircraft to the Secretary of State for Air (who was also Secretary of State for War) and was told he could not have the aircraft he wanted because they were wanted for the Army. It was gambling with the safety of the State, when they had a service depending to an ever greater degree on development in the air that that air development should be subject to the probability of being thwarted by the chief competitor masquerading as the Secretary of State.

Mr. Long, replying to Col. Seely, said the First Sea Lord and the Chief of the Air Board had been in constant communication. He did not say for the moment he was satisfied with what the Air Board had done, but he had no reason to believe they had surrendered themselves to the War Office. All he could say was that if, or when, the moment arrived when he found the Navy suffered he should have to consider his position, and that he should not hold his office a moment longer than was consistent with his duties as First Lord.

The Resignation of General Seely

In the House of Lords, on December 10, Lord Montagu called attention to the resignation of Genl. Seely and called for papers. He said his first object was to inquire what were the reasons which led to the resignation of Genl. Seely; secondly, whether there should be an independent Air Force and Air Ministry, or whether there was an intention on the part of the Government to revert to the former bad system under which the Air Force was separately under the Admiralty and the War Office. While giving credit to Mr. Churchill for great energy and ability, it seemed to him to be quite impossible for any Minister to give adequate consideration to the problems of the Army and those of the Air Force at the same time. Unless the Air Force were kept entirely independent it would be neglected and other Great Powers would come abreast of us.

Lord Treowen appealed to the Government to state their policy in regard to aviation generally. Could not the elements of offence and defence in this country be represented by one great Department or something of that sort?

Lord Vernon expressed the opinion that the Navy should be allowed to have their own air force, as airships were as much a weapon of the warship as the gun. Civil flying should not be mixed up with the flying services. It should be somewhat similar to the mercantile marine and not definitely under the orders of the Admiralty.

The Lord Chancellor said that for the reasons which induced General Seely to resign they must look at the explanation which he himself made in the House of Commons. The Government took the view some two years ago, after long war experience, that it was desirable that there should be a single and independent Air Service. The arguments on one side and the other were weighed in the balance and as a result the policy of the Government was to maintain the separate and independent character of the Royal Air Force in peace and in war. The Ministry had aimed at creating a separate permanent Air Service which would afford as good opportunities of advancement to officers and men as were afforded in the Army and Navy. The Prime Minister had to decide whether the two offices should be held by one Minister, and took the view that the scale, size and cost of the Air Force in the years immediately following the war would not be sufficiently large to justify the appointment of a separate Minister of State. It might well be that in years to come the importance of the subject would grow and if circumstances altered and the necessity arose the present arrangement would lapse. Dealing with civil aviation, he said the day might come when the Board of Trade would assume control of and responsibility for civil aviation in much the same way as it had assumed control over the mercantile marine. Whether the suggestion of a kind of amalgamation of the Army, Navy and Air Force would ever be realisable he did not know; but by the present arrangement they had at least produced a system by which the best brains of the Air and the best brains of the Army could be brought to bear upon the problem in order to try all the resources both of the Air and of the Army.

The W.R.A.F. Inquiry

In the House of Lords, on December 15, the report of the W.R.A.F. Inquiry came up for consideration and Lord Stanhope made a personal statement. He desired to withdraw unreservedly his specific statement of immorality against certain people, made in the House on July 30, and to apologise to their Lordships for having made it. He desired to apologise to Col. Janson and Miss Glubb for having made any allegation against them. He had already communicated with their respective solicitors apologising for his statements, and had paid the whole of Miss Glubb's costs in connection with the inquiry.

Earl Curzon, in the course of a speech, said the result of the inquiry was that a large sum of public money had been expended, an immense amount of personal suffering had been caused and most inadequately compensated by the vindication that had been received, and a precedent had been set up which he agreed with the Committee in saying that they earnestly trusted would not form a precedent ever to be followed again.

Lord Salisbury hoped that the history of this case would not restrain their lordships from applying the remedy to abuses where they considered such abuses existed.

MODEL AEROPLANES

By F J CAMM

NOTE.—*All communications should be addressed to the Model Editor.*

Further Notes on Airscrews

THE principles of airscrews working in air is precisely the same as that of screws working in water, the only difference being in the density of the media, air being only $\frac{1}{800}$ the density of water. From the reaction of the blades on both fluids, we derive thrust, and what is known as slip is also existent in both fluids. If air were a solid the screw would advance in it a distance equal to its pitch, but its extreme elasticity, the inertia of the blades, the skin friction and drift of the latter results partly in forward movement of the screw and partly in backward movement of the air.

This amount of retrograde action or loss of forward movement is known as slip and is expressed as a percentage of the theoretical pitch. The loss due to slip with airscrews fitted to flying models depends upon the design and workmanship of the machine and the extent to which *drag* has been eliminated by streamlining the exposed portions, and it, therefore, by no means follows that a screw showing a low slip percentage on one model will show the same on another, and ingenuity should be exercised to do away with parts which at first seem necessary and unavoidable.

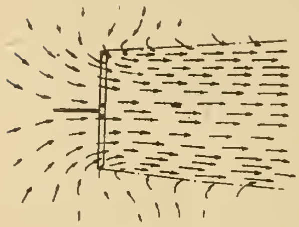
The thrust is a matter upon which model makers do not generally seem to trouble themselves; it is a measure of the mass of air moved. The mass equals the density of the air multiplied by the velocity in feet per minute, and multiplied lastly by the area of the propeller disc which is calculated from the formula $3\frac{1}{7} \times \text{radius}^2$. In model flying I have found that it is better to employ slow-running screws of large diameter, narrow blades and moderate pitch (from 1½ to 1¾ times the diameter) in preference to small screws of large blade area, high speed and long pitch. This holds true for both carved and bentwood screws, and is a generally accepted rule. Up to about 15 ins. diameter the thrust bears a direct relation to the torque at the shaft, the means of determining which were explained last week. The blades of the screws may be considered aerofoils, the pitch angles corresponding to the angle of incidence, thrust being compared with the lift and the torque at the shaft being tantamount to the force driving the foil through the air. Others prefer to consider the airscrew a portion of a double helix or screw, using the air as a nut through which it screws itself, but I consider the aerofoil theory the better of the two. The relation between the thrust and the actual weight of the model varies with different machines; it can generally be accepted that a machine flying with a low thrust has the best *lift-drag* ratio, and is the most efficient machine—I refer, of course, to comparative results with machines of the same class, the tractor type requiring a higher thrust than a "pusher" or canard of similar weight.

In some interesting experiments with screws, wherein candle smoke was used to show the direction of the air currents, (an experiment originally, I believe, introduced by Mr. E. W. Twining) it was found that when an airscrew is revolving it draws in air from all round the periphery of the circle of rotation, as well as immediately in front of it, and to a lesser extent from the rear. The air is deflected or driven back in a column which, with ordinary model airscrews, takes the form of a truncated cone (Fig. 1). The candles were arranged some distance in front of the revolving airscrews and then suddenly—and simultaneously—extinguished, the result being columns of smoke which indicated quite clearly the form of the deflected column of air.

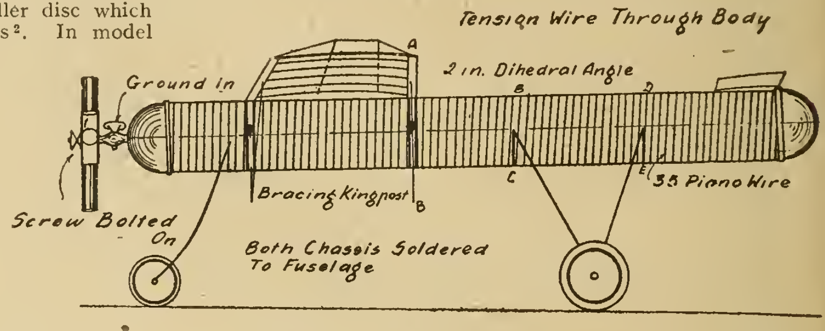
One of a pair of screws which proved to be most efficient is shown by Fig. 2.

A Compressed Air-Driven Monoplane

The side elevation, Fig. 3, shows the monoplane driven by the compressed-air plant evolved by the writer. Its weight complete was 18 ozs., best performance 37 secs. The following particulars will doubtless be of interest. The monoplane (built up of birch) is of tapering wing-plan, the leading edge being straight and 42 ins. span, whilst the trailing edge sweeps forward and is 48 ins. span. The chord is 8 ins. at the centre and 6½ ins. at the tip. The elevator is of piano wire with rack adjustment as in Fig. 4, whilst the chassis is sprung as in Fig. 5 with a central skid which was afterwards found to be necessary. The container is 2¾ ins. diameter, it taking approximately 120 lbs. pressure, and 120 strokes with a foot pump 1½ in. bore—1 lb. pressure to a pump-stroke. It was found that the model would just fly with 60 lbs. pressure; the gauge was attached to the

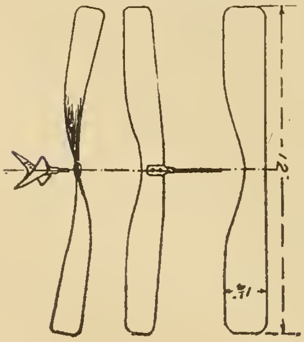


Truncated Cone
Fig. 1



Side Elevation
Fig. 3

Efficient Bentwood Fig 2



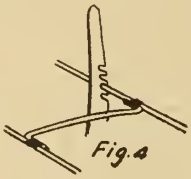
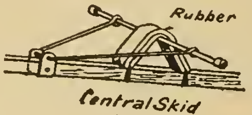
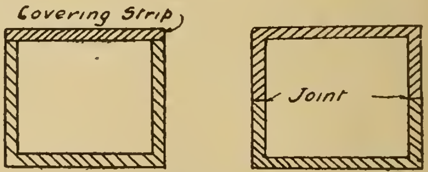


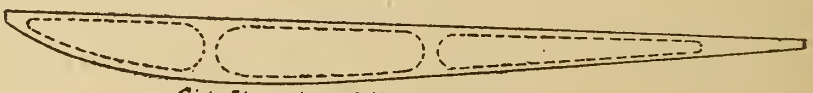
Fig. 4



Central Skid
Fig. 5



Hollow Spar Sections
Fig. 6



Side Elevation of Veneered Spar
Fig. 7

foot pump. My conclusions drawn from experiments with compressed air are: (1) that it gives much trouble owing to the high initial thrust, tending to make the machine helicoptere at first and then when thrust has dropped to appear to be under elevated, and (2) a reducing valve must be used, for preference of the plunger or piston type. I see no reason why flights equally as good as those obtainable with rubber should not be obtained with compressed air. My engine had pistons very free within their cylinders, yet this did not interfere with the efficiency, probably owing to the high speed of the engine. In any case pistons should *not* be a *ground-in* fit. The oscillating type of engine is quite useless.

I find that results almost as good can be obtained from a three-cylindered engine as a five-cylindered; the latter, apparently, requiring a container two-thirds larger than the former. The loading should be somewhere near 6 ozs. per sq. ft., and the ratio of length to span in the neighbourhood of 3 : 2.

Hollow Spars for Models

In all the flying models constructed by the writer, hollow spars are used as the mainspar or motor rod. They possess the combined advantages of great strength and lightness, and by their use bracing can be entirely eliminated, although it is advisable to use a twin-winding arrangement (to be described next week) to balance stress on the motor rod. It is usual for a spar to break, as the result of a head-on collision, at a point about one-third the length of the machine from the front, hence the spar should be of greatest cross-section at this point to reduce the possibilities of a smash. I do not consider that fancy sections or contours need be given to the spar, the plain rectangular section being the best to employ. In making them, a single U should be employed, with a covering strip glued over the open end. When the glue has thoroughly set, the spar can be trimmed up and tapered off. When two U section spars are used (Fig. 6) there always seems to be a tendency for them to twist apart. Another method of making these light tubes for mainspars is to use a wooden former of circular cross-section, wrapping cartridge paper round and gluing each convolution, withdrawing the former when a tube of required thickness is obtained. Such tubes may be employed to totally enclose the skeins, thus obviating the resistance of the vibrating skein, with a resultant improvement in stability and a reduction in the power required; but enclosed skeins, whilst possessing many advantages, are troublesome, in so far that it is impossible to see what is happening inside; a strand may have broken or slipped its anchorage, and the tube has to be partially dissected to find the cause of the trouble. My own hollow spars have usually weighed ¼ oz. per foot run—slightly under this, a spar 4 ft. ¾ in. long weighing 1 oz.; no advantage accrues by further reducing weight. I usually make the cross-section ½ in. by ⅜ in. with the greatest measurement placed vertically for strength and the covering strip on top. The width of the groove is $\frac{5}{16}$ in. and the depth ⅜ in. for a 4-ft. spar.

In my later articles, wherein I shall go fully into the methods of construction, the construction of hollow spars will be dealt with. The latest form of hollow spar has a fretted-out web with a covering strip of veneer on each side. These spars are immensely strong and can be made of pleasing proportions.

Single or Double Surfacing?

Double surfacing does not appear to be essential with model aeroplanes, but it would be interesting to hear the results of any who may have resorted to this form of covering. Theoretically, of course, the curve of the bottom section should be less than that of the top, and, as single surfacing seems to be the general rule, there would appear to be room for improvement in this direction. With small models the weight of the extra silk would more than counterbalance the advantages accruing, but with machines weighing a pound or more, this should not hold true. There is an erroneous tendency to employ cambers entirely disproportionate to the size of the plane; the maximum camber should never exceed one-twentieth of the chord, and should be situated at a point two-fifths of the chord from the leading edge. It is best to bend the ribs *after* the plane has been made, as perfect alignment of the camber of each rib is thus made possible.

(*To be continued.*)

◆ ◆ ◆ ◆

"Aeroplane Undercarriages"

Owing to the very great pressure upon our space this week, we regret that it has been necessary to hold over the second instalment of Mr. J. D. North's paper on aeroplane undercarriages.

No. 6 Wing R.N.A.S. Dinner

Members of No. 6 Wing R.N.A.S., Otranto, Italy, held their first re-union dinner on Saturday, December 13, at the Trocadero. Col. G. H. K. Edmonds, D.S.O., the first C.O. of the Wing, presided, and the visitors included Comdr. Murray Sueter, R.N., Col. A. Longmore, D.S.O., Comdr. Beuttler, R.N.R., Maj. Pulford, Maj. Mackenzie, and Maj. Leslie. Comdr. Seuter, in briefly reviewing some of the work that had been carried out by the Wing, dealt with the possibilities of torpedo-carrying machines, and their effect on future wars. It is hoped that the dinner will become an annual affair.

The Wakefield Boxing Trophy

The offer of Sir Charles C. Wakefield, Bart., to present a handsome set of trophies, cups and medals for boxing to the officers and men of the Royal Air Force has now been gratefully accepted by the Air Council, and the trials will shortly commence. It may be recalled that the design of the trophies was selected by competition, and the actual trophies are now on public view at Messrs. Skinner and Co., Ltd., 34, Bond Street, W.

Temporary Suspension of Avro Pleasure Flying

It has been decided by the directors of Messrs. A. V. Roe and Co., Ltd., that their programme of pleasure flying is to cease for the winter months. Though there are many days during the winter on which flying is very enjoyable, such days are a minority in a British winter; and it is very doubtful whether the public is yet sufficiently educated in air matters to grasp the fact that a flight on a clear frosty day, especially if a light fall of snow has taken place, is one of the most exhilarating of winter sports. This decision, however, does not mean that all Avros will be sent away from Hounslow. Arrangements will be made for flying pupils to continue their courses of instruction, and demands for special services can be met. It is only the short pleasure flights which are being discontinued.

The Double Fatality at Caterham

The first fatal accident in connection with the London–Paris service occurred on the afternoon of December 11, when an Airco machine piloted by Lieut. S. Bradley crashed at Caterham. Apparently the pilot, having run into a mist, tried to land at the Kenley aerodrome, but the machine crashed through a tree and came down near the Guards' Depôt. The passenger, Mr. George F. Rand, a banker of Buffalo, N.Y., was instantly killed, and the pilot was so seriously injured that he died on Saturday. At the inquest on Mr. Rand the Coroner certified that his death was due to an accident, brought about by the misty weather.

Madrid to London Flight

Capt. Cockerill and Capt. Browne, who arrived in London on the 9th inst. on a Vickers-Vimy-Rolls Bombing Machine, having flown from Madrid, had an exciting voyage. They left the Spanish capital on the morning of the 4th in thick mist, but flying above this and clouds, crossed the Guadarama Mountains at a height of 7,000 ft. They kept a compass course above clouds for 1½ hours, then came through and found Aranoa, while Vittoria was reached in 2 hours 40 minutes. There the aerodrome was very wet; the machine was bogged, and it took one day to get out of it. On leaving they crossed the Pyrenees above the clouds on a compass course, and came through clouds about 6 miles out to sea off Orio. On arrival at Bordeaux they found the aerodrome under water, so decided to make for Paris, but the light failing, they landed at Tours, 4 hours 60 minutes after leaving Vittoria. Next day they reached Paris, the weather still being very bad, clouds 500 ft., rain and snow the whole way, taking 2 hours.

Leaving Paris on the 8th inst. in 40 mile an hour gale, they ran into several bad storms, and were forced to land at Marquise after 3 hours 50 minutes fighting against a gale. They left for London Tuesday morning, 9th inst., in a thick mist and head wind. On reaching Chatham the mist was so bad that they could not see the ground from 300 ft., but they flew by compass and found Hendon 1½ hours from Marquise.

A Handley Page in Peking

The assembling of the first Handley Page aeroplane in Peking was completed on December 6, and during the same afternoon the machine made its preliminary flight with complete success, reports *The Times*. "As the Handley Page machine was put together by Chinese workmen unable to converse with the foreign mechanics in charge, there was some anxiety about the trial, which was speedily dispelled by the splendid style the machine took the air."

SIDE-WINDS

DURING the week ending December 10, there were 34 passengers and 1,245 lbs. of freight carried on the H.P. London–Paris service, and on nearly every day inclement weather had to be contended with. In order to protect the pilots of the Handley Page commercial aeroplanes, cowlings, containing Triplex safety glass, are being built over the cockpit to afford protection from the rain and wind-storms constantly encountered on the Continental air-ways during the winter months. On the London–Paris air service between September 2 and December 10, 1919, 613 passengers and 13,601 lbs. of goods have been carried, the total distance covered being 33,350 miles. On December 9 Sir George Noble flew to Paris (for the third time) in a Handley Page commercial aeroplane.

– – –

ON the London–Brussels service nine passengers and 434 lbs of freight were carried. On December 4, Capt. W. L. Hope and Lieut. McIntosh, flying two Handley Page commercial aeroplanes carrying passengers from Brussels, encountered a severe thunderstorm soon after reaching the English coast. The machine passed through the storm and landed safely. 244 passengers and 25,249 lbs. of freight have been carried on the London–Brussels air service during the period extending between September 26 and December 10, 1919; a distance of 18,380 miles having been covered.

– – –

FROM Messrs. North and Sons, whose name is a household word in connection with the Watford speedometer, we learn that the Rolls-Royce engines fitted to the Vickers-Vimy machine which has just accomplished the first flight to Australia, were fitted with their "Watford" magneto. It may be recalled that Sir John Alcock's machine, which crossed the Atlantic, was also fitted with Watford magnetos.

– – –

AFTER giving all due praise to the magnificent performance of pilots and mechanics in the epoch-making flight from London to Australia, a word or two should be said for the landing gear that made this performance possible, necessitating as it did halts at improvised aerodromes and landing grounds between London and Australia. "The Vickers-Vimy" was fitted with four 900 mm. by 200 mm. Palmer landing wheels, or, to put it in language better understood by the man-in-the-street, four wheels shod with Palmer cord tyres 3 ft. high, and 8 ins. cross section. All landings on this long flight were made without a single hitch, the various stages being reeled off with clock-like precision.

– – –

Hounslow to Melbourne makes a very big line on the map, and we look forward to the circumnavigation of the globe at not a very distant date by a British machine,. The Palmer Tyre, Ltd., have every confidence that Palmer landing wheels and tyres will play an equally successful part.

– – –

MESSRS. C. C. WAKEFIELD AND Co.'s organisation in connection with the England–Australia flight was completeness itself. They had supplies of Castrol "R" at every stopping place, and Capt. Ross Smith was thus enabled to replenish his tanks without delay—a very important detail. Wakefield's have every reason to feel proud of their association with the latest and greatest feat in aviation.

– – –

IT is noteworthy that the Rolls-Royce engines on the Vickers-Vimy piloted by Capt. Ross Smith, M.C., D.F.C., A.F.C., from London to Australia, were fitted with the Claudel-Hobson carburettor, which, it may be recalled, also played its part in the Transatlantic flight of Capt. Sir John Alcock. Another interesting event recently brought to a close, the 10,000-mile test of a 16 h.p. Sunbeam car running on benzole, provided proof of Claudel-Hobson efficiency and economy, an average mileage of 24 57 miles per gallon being obtained.

– – –

THAT capital road-lovers' quarterly published by Messrs. Heath-Robinson and Birch, Ltd., called "Out and Away," introduced itself to us three months ago, with so fine a first number that wiseacres said, "Humph! this is too good to last!" They were wrong. The second issue is a material improvement upon the first, and whether one most likes fine writing or fine drawing, the lore of the highway or the quaint conceits of leading humorous artists, "Out and Away" will please. It is really a splendid half-crown's-worth.

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages liii, liv, lv and lvi).

COMPANY MATTERS

Aircraft Manufacturing Co., Ltd.

PRESIDING at the general meeting of the company on December 9, Mr. G. Holt Thomas, chairman, in the course of his speech said "The attention of the directors has naturally been devoted for a long time past to the consideration of filling our large factories with "post-War products," whilst maintaining to its fullest extent the Aircraft Design and Experimental Departments, which we have created in the interests of the nation. With this object in view, a long time ago, we sent experts to America to study the mass production of motor bodies, and now our main factories at Hendon are being reorganised in order to cope with the great demand for motor bodies on standardised lines. From the orders and inquiries in hand we do not anticipate any difficulty in entirely filling our factories.

"It has now been decided to capitalise our large reserves and rearrange the capital of the company in such a way as to bring in the new working capital, which will enable the company to proceed with its post-War work, and at the same time maintain its reputation, which is world-wide, in aircraft design. The method of procedure is now having the consideration of the directors, and will probably take the form of an increase of the ordinary shares of the company, in which case the preference shareholders will be given an opportunity to participate."

After the formal passing of the accounts, which showed, after allowing for taxation, including excess profits duties, a net profit for the year of £119,652, and after declaration of the dividend, a balance of £207,680 to be carried forward to next year, the meeting terminated with a vote of thanks to the directors and staff.

▣ ▣ ▣ ▣

AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m = motors

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 18, 1919

12,791. A. H. RYAN. Rotary motors. (135,229.)
13,600. R. F. S. VALERI. Manufacture of ply-wood screw propellers. (135,231.)
17,062. E. R. CALTHROP. Parachutes. (135,245.)
18,580. BLACKBURN AEROPLANE AND MOTOR Co. and D. T. MORGAN. Rudder bars. (135,254.)
18,758. W. H. TRIPP and W. D. McLAREN. I.C. engines for aircraft. (135,263.)
18,826. W. H. HENDERSON. Automatic control of aircraft by gyroscopes. (135,267.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 11, 1919

7,306. W. D. ODDY. Propellers. (135,104.)
10,704. BLACKBURN AEROPLANE AND MOTOR Co. and R. BLACKBURN. Silencing devices for aircraft engines. (135,119.)

▣ ▣ ▣ ▣

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates:*—

UNITED KINGDOM	s.	d.	ABROAD*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under War conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 574 (No. 52, Vol. XI.) DECEMBER 25, 1919 [**Weekly. Price 6d. Post Free, 7d.**

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28*s.* 2*d.* Abroad.. .. .. 33*s.* 0*d.**

These rates are subject to any alteration found necessary under abnormal conditions

**European subscriptions must be remitted in British currency*

CONTENTS

Editorial Comment PAGE
- The Air Estimates 1637
- Civil Aviation Abroad 1638
- What Others are Doing 1638
- What are *We* Doing? 1640
- Aviation in the House of Lords 1640

Flight—and the Men: Mr. John Kenworthy 1639
The Paris Aero Show 1642
Some French Machines at the Show 1647
British Engines at the Show 1651
Some Post-War Sopwith Machines 1655
Some Gosport Flying-Boats for 1920 1656
Honours 1658
The Royal Aero Club Official Notices 1659
Airisms from the Four Winds 1660
In Parliament 1663
The Royal Air Force 1666
Personals 1667
Model Aeroplanes 1668

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Dec. 19 to... Jan. 4, 1920.	**Paris Aero Show.**
1920	
April 18 to May 2	**Seaplane Competition at Monaco**
June 1 ...	**Air Ministry Competition (Small Type Aeroplanes), Martlesham Heath**
July, 1920	**S.B.A.C. International Aero Exhibition at Olympia**
Aug. 1 ...	**Air Ministry Competition (Seaplanes) Felixstowe**
Sept. 1 ...	**Air Ministry Competition (Large Type Aeroplanes), Martlesham Heath**

EDITORIAL COMMENT

The Air Estimates

THE Air Estimates, which were presented to the House of Commons last week, call for very little in the way of comment. As we have already recorded, they show a decrease for the year of nearly twelve and a-half millions, amounting to £54,930,850, against the original forecast of £66,500. The saving has been effected by passing over to the Ministry of Munitions the cost of liquidating all contracts placed by that Department, whereby a saving of 13¼ millions has been shown. This, while it correspondingly lightens the Air Estimates, is manifestly a paper saving only, since it represents a national liability which has to be met by the Ministry of Munitions. A saving has been effected by the reduction of the programme in respect of buildings and land amounting to 1¼ millions, and the Secretary of State in his memorandum says that "a further reduction of two millions has been effected in consequence of the programme of the Controller-General of Civil Aviation and the Director-General of Supply and Research being still in process of development and not having fully matured. In addition, it has been found possible to meet the requirements of these departments from existing stocks to a greater extent than was originally anticipated."

On the other hand, certain items show an increase of four millions over the forecast, and thus leave the Estimates, as has been said, over twelve millions to the good—on paper. The point that interests us most is that, so far as is discoverable from the Estimates, the amount of money expended on the development of civil aviation is represented by the sum of £38,523 allotted to the salaries and pay of the *personnel* of the Department of Civil Aviation. It is true that other sums may have been expended under other Votes, but they are not shown, and the inference must, therefore, be drawn that the "encouragement" of this essential branch of aviation is limited to the paltry sum named. This inference is further supported by the statement of the Secretary of State relative to the saving of a round two millions on this Department, and that of Supply and Research. If this is so, it is obvious that the want of policy to which we have so often referred has an even worse effect on development than we had thought. We trust that during the debates on the next Estimates the Government will be pressed for a definite statement of that policy; of how much money is to be devoted to the encouragement of civil aviation during the ensuing financial year; and of how and why it is to be allocated. The whole industry and all who have the future of commercial flight at heart are becoming gravely disquieted at the apparent want of interest manifested by the Government in a side of the movement which their own spokesmen have admitted is vital to the future of the country and the Empire. If they have altered their outlook and no longer believe in the possibilities of flight—which is scarcely thinkable—let them say so, and leave it to private enterprise to fight its own battle. Alternatively, if it is simply a question of the evolution of a policy, then in Heaven's name let those who are responsible for its formulation get along with the work or give place to those who know their own minds.

◆ ◆ ◆

Civil Aviation Abroad

If evidence were needed that the "Dilly and Dally" policy of our own Government is holding back development, it would be supplied by the review of the progress of civil aviation abroad, issued last week as an official document by the Air Ministry. It is quite clear that we shall have to encounter the most strenuous competition from other countries in which development is being assisted by subsidies from the State. In certain Allied and enemy countries enterprising firms, with the active support of their Governments, are sparing no pains to expand their business. Missions composed of Service *personnel* have been sent abroad by France and Italy to carry out missionary work on behalf of the native aircraft industry. Aircraft and representatives have also been sent overseas by British firms, but hitherto no official foreign mission has been despatched by the British Government. The reasons assigned for this are (1) A shortage of available Service *personnel* and a reluctance to confuse Service and civil enterprise; and (2) The traditional British policy that an industry should be left to develop as far as possible on its merits.

The first of these reasons gives us to smile! Surely, there is not—or certainly was not until many months after the Armistice—such a shortage of R.A.F. *personnel* that the Air Ministry could not have made a selection of the comparative handful of competent officers to compose not one, but half-a-dozen missions. The point about the reluctance to confuse the civil and the Service enterprise we can understand, even if we fail to appreciate it. It was this reluctance, coupled with the "traditional British policy," which sent our original Expeditionary Force to France in 1914 with, in comparison with the forces available to the enemy, a mere nucleus of an aircraft force. It was this same policy which saw us enter the war with two, or at most three, tiny airships of doubtful flying capacity, while Germany, who, with all her faults, has never been blind to the interests of the State when they have been identical with those of private enterprise, possessed a powerful fleet of rigids which it took us four years of research and experiment, aided by careful copying of German designs, to equal. We have no patience at all with "traditional policy" of this kind. We had thought the war had taught us how mistaken a lot of this policy was in the past, and that we intended to avoid such errors in the future. Apparently, the fine old crusted bureaucrats who still govern us have learnt nothing and forgotten nothing. While other nations are forging ahead with their aircraft policy, we have to be content to sit still, comparatively, and as we did before the war, follow them at a distance. We do not for a moment desire to infer that our own industry is not as fully alive as the industries of France, Italy and Germany, who appear to be our most dangerous competitors. It is, and it is doing its level best in all the circumstances to maintain the lead we obtained during the war. But it is a young industry which still requires fostering through a very difficult period which lies ahead. The Government has agreed that it must be so fostered, and having agreed this it offers assistance by printing and circulating pious memoranda like the one under discussion.

◆ ◆ ◆

What Others are Doing

Contrast the policy of the French Government with that of our own. The economic position of France is certainly no better than our own. As a matter of fact, it is very much worse, as the rates of exchange demonstrate. Yet, says the memorandum, "The French are fully alive to the possibilities of aviation, and are making every endeavour both to secure foreign markets and assist internal development. They have followed their usual policy for the encouragement of new industries, and have adopted the principle of subsidies. A sum of, 18,000,000 francs, out of a total of 37,000,000 francs voted for civil aviation, has been earmarked for this purpose. The subsidies take the following form:—

(*a*) Bonuses on distances flown (including flights by machines used for purely private purposes).

(*b*) Bonuses to pilots and crew for good work.

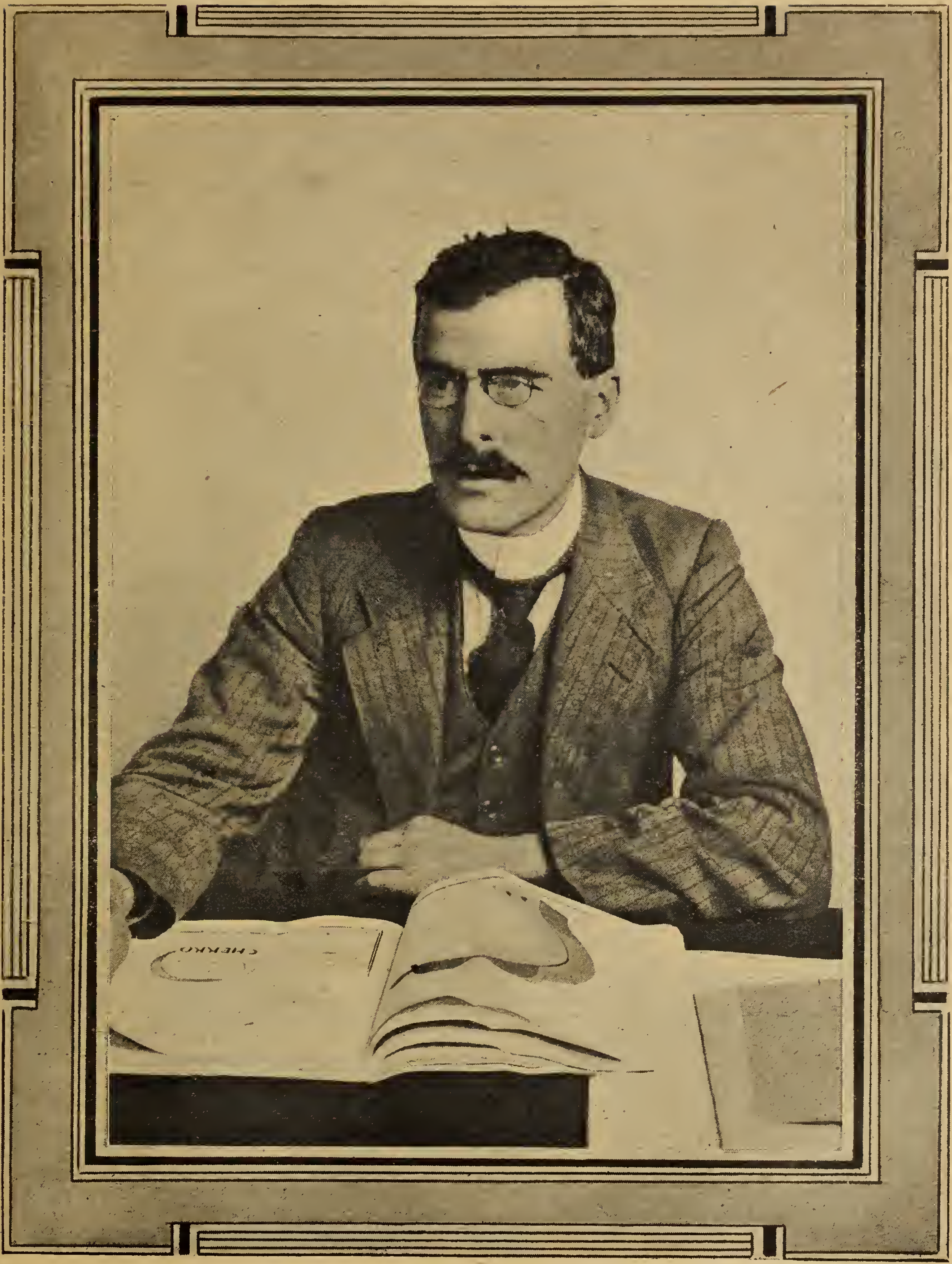
(*c*) Premium on tonnage carried.

(*d*) Special bonus up to 25 per cent. per annum of the total value of machines of military type immediately available in emergency for use by the State.

Mail-carrying contracts have been given, the principal lines being Paris-London, Paris-Lille-Brussels and Toulouse-Rabat. Other internal routes are in operation, and an ambitious programme of projected routes is being prepared. In the Near East, military machines are carrying mails between Athens and Salonika, Salonika and Constantinople, Constantinople and Bucharest, and Bucharest and Galatz and Kicheneff. Missions have been sent to the Argentine and Japan, while it is intended to despatch similar missions to China, Brazil, Finland, Greece, Peru, Poland, Roumania, Siberia, Switzerland and Turkey. It is also intended to carry out a firm airship programme, which includes the construction and operation of four rigid ships of 3,000,000 cubic feet capacity, with sheds at Paris, Marseilles and in Africa. The contemplated routes are from Paris to Marseilles, Marseilles to Africa, and later to South America *via* Dakar.

In Italy, civil aviation is going ahead apace, thanks again to the assistance of the Government. Germany, too, is making strenuous efforts to regain her footing in aviation. Partly to avoid the terms of the Peace Treaty, and partly to make an early bid for foreign markets, large numbers of machines and engines have been sold at very low prices to the Scandinavian countries, Holland and Switzerland, and there is no doubt Germany has secured a substantial footing in neighbouring countries. Germany seems to have recognised the fundamental truth that the country which is farthest advanced in the development of civil aviation will have the strongest reserve air force in time of war, and is straining every nerve to obtain the lead. Although no concrete air policy has been announced, the Government has granted certain mail contracts. Passenger services have been operated

Flight—And the Men



MR. JOHN KENWORTHY, Chief Engineer and Aeroplane Designer, the Austin Motor Co., Ltd.

more or less regularly. Airship services are carried out on alternate days between Berlin and Friedrichshafen, and it is intended to open shortly similar services between Berlin and Copenhagen and between Berlin and Stockholm. According to the Memorandum, the civil aviation policy is expected to be:—

1. That at first Government assistance in the shape of subsidies will be necessary.

2. That existing aerodromes and material will be retained, and privately-owned aerodromes acquired by the State, thus forming a strong nucleus for civil aviation under Government support and control.

3. That a combine will be formed of all firms for working purposes, each firm to standardise a type, and all types to be approved by the Government.

4. That there will be co-operation between military and civil services.

5. That propaganda will be employed especially in the State schools.

There is an aerial police in being and regular patrols are carried out. In order to keep touch with ex-Service flying men, an airmen's union has been established with branches at Baden, Mannheim, Karlsruhe, Frankfort and other centres, and a German Air Fleet Union, similar in constitution to the German Navy League, has been formed to foster the national interest in aviation.

◆ ◆ ◆

What are *We* Doing?

While all this is taking place abroad, what are *we* doing to foster the development of civil aviation? The Air Ministry seems to have its hands tied, and while there exists a Department of Civil Aviation—the first to be created—that Department appears to be powerless to formulate a policy. How far the fault lies with the Government themselves and with the Secretary of State, and how much is to be laid to the weakness of the Department, we have no means of knowing. But it is certainly a most deplorable position in which civil aviation stands, nearly fourteen months after the Armistice. Talk of encouragement there has been in plenty, but there has been nothing done by the Government to give the slightest encouragement to private enterprise. The Post Office, which might have been expected to show some imagination and insight, hangs fire in the matter of mail contracts. The one or two tentative contracts for mails which have been placed are so small and so ill-conceived that they amount to nothing. Nor is the attitude of the postal authorities even sympathetic to the idea of the carriage of mails by air. In effect, the reply of this Department to those who propose the inauguration of aerial services is: "Start your service and we will give 'sympathetic consideration' to any proposals you may have to make." In a word, the whole attitude is one of *non possumus.* We almost begin to despair of ever getting things going if we are to wait for Government encouragement. As a matter of fact, we think that private enterprise will do well to proceed along its own lines and cut out all idea of the promised encouragement. If the latter should, after all, materialise, it will be so much to the good. If it does not, the industry will not be disappointed, having made up its mind that the attitude of the Government is "Nothing Doing!"

Aviation in the House of Lords

In the House of Lords last week Lord Montagu of Beaulieu raised the question of the resignation of General Seely and asked for a statement of the policy of the Government regarding aviation in general and the R.A.F. in particular. He deprecated placing a single Minister at the head of two Departments of State, and pointed out that in France and Germany, where a great deal of attention was being paid to the subject of aviation, separate Departments had been formed; in Italy the intention, so far, was to have a separate Ministry; while in the United States a very able Commission had also reported in favour of a separate department of aviation.

The Lord Chancellor replied on behalf of the Government, but it cannot be said that he shed any fresh light on the immediate intentions of the Government. He simply repeated that the reasons for General Seely's resignation were stated at length by the ex-Under-Secretary himself and that there was nothing, therefore, to be added. He explained at some length the reasons which led to the appointment of Mr. Churchill to the dual offices he now holds, but told the House nothing that was not already known. He reiterated that there was no intention of going back to the state of things existing before the R.A.F. became a separate service and with that assurance the House had to rest content.

One thing, however, Lord Birkenhead said which had a disquieting tone. The day might come, he said, when the Board of Trade would assume control of, and responsibility for, civil aviation in the same way that it had assumed control over the mercantile marine. Anything worse than such a prospect is scarcely to be imagined. When it is properly realised what a blighting effect is exercised by the Board of Trade over the mercantile marine; how its regulations harass and hamper development and place the British shipowner at a disadvantage with his competitors, all who view the future of aviation with goodwill must pray that no such undeserved fate may overtake it. We do not want to see the interests of aviation in the hands of a Board of Trade, of which the Speaker of the Irish House of Commons and the Archbishop of Canterbury are *ex-officio* members! As we have indicated, the Lord Chancellor's reference to Board of Trade control of the mercantile marine was singularly unfortunate. We believe it is the case that not a single British shipowner or ship-master but would vote for the removal of the incubus of its control and the institution of a properly equipped Ministry of Shipping if it were put to him. It is in spite of Board of Trade control and not because of it that the British mercantile marine holds the proud position it does. Yet it is to this Department that the Government apparently visualises giving the control of aviation. Why, when we have an Air Ministry with its own Department of Civil Aviation? We do not know—nor do we understand the position at all. In one breath the country is assured that it is not the intention to make any change from the present manner of administration. In the next a complete change of policy is foreshadowed, and we really forget where we were yesterday. We are more than ever convinced that so far as concerns the aviation policy of the present Government it may be described as a paradox—it hasn't any.

ANOTHER MACHINE WRITTEN OFF! "Where on earth did I leave that bantam 'bus of mine?"

The Paris Aero Show 1919

BY OUR SPECIAL COMMISSIONER. (BY AIR MAIL EXPRESS)

Grand Palais, Champs Elysees,
December 18, 1919.

All is bustle and—apparently—confusion. The chug-chug of lorry engines and the honking of horns resound within the Grand Palais, which is to open its doors at 10 o'clock tomorrow morning on the first Aero Exhibition, held here since 1913. Packing-cases are being opened and lorries constantly deliver new supplies containing wings, *fuselages*, engines and air-screws. At the moment of writing there are, practically speaking, only two stands which have any resemblance to being in order or nearly so. These are the Bleriot-Spad and the Handley Page, which are situated next to one another. After a brief chat with Mr. Cogni, *charge d'affaires H.P.*, we saunter along, trying to get an impression of what tomorrow's finished exhibition will look like. We pause before the Nieuport stand on which three very racy-looking machines are exhibited, one of which is said to be the record-breaker on which, a few days ago, M. Sadi Lecointe did a speed of about 192 m.p.h. over a measured course. M. Lecointe, it might be mentioned, has now transferred his affections to the Nieuport firm, and it was on a Nieuport that he put up this extraordinary performance. Just as we are inspecting this record-breaking machine, M. Lecointe himself comes along, and we congratulate him on his achievement. With a typically French gesture, he indicates that it is nothing to speak about, that the piloting is a simple matter, and that the whole credit rests with the machine. However, there is not at present time for any lengthy discussion, and other exhibits are claiming attention.

While making our way around empty packing-cases and over the half-completed floors of unfinished stands, we run into—almost literally—Col. Meares, who has sad news to tell about the fate of the Westland Limousines. It appears that these are fog-bound at Lympne in Kent, and there is now little chance of them arriving at the Grand Palais in time for the opening of the show. Two machines are expected, one of which is to be exhibited while the other is to be flying at Le Bourget aerodrome. Capt. Keep is in charge and will make the crossing if it be humanly possible. We try to cheer up Col. Meares with a quite innocent "Keep smiling," and he retaliates by accusing us of making horrible puns, with intent to commit a joke. Protesting our innocence, we leave Col. Meares to his own thoughts and wend our way to the Boulton & Paul stand, where we find Mr. J. D. North busy with paint pot and brush putting a few finishing touches on the all-metal Boulton & Paul P. 10. However, we persuade him to put down the brush and explain something about the construction of this extraordinarily interesting machine. This he agrees to do, and as the designer of the machine he does it with authority. The Boulton & Paul P. 10—although designed and built in a very short time—is the result of very long experience in rolling sheet steel into special sections, and it represents years of painstaking experiments and research work. It may be said without fear of offending anyone that the P. 10 probably marks the greatest step forward in aeroplane construction of any machine at the Show, and the few French attempts at metal construction are at least two years behind it.

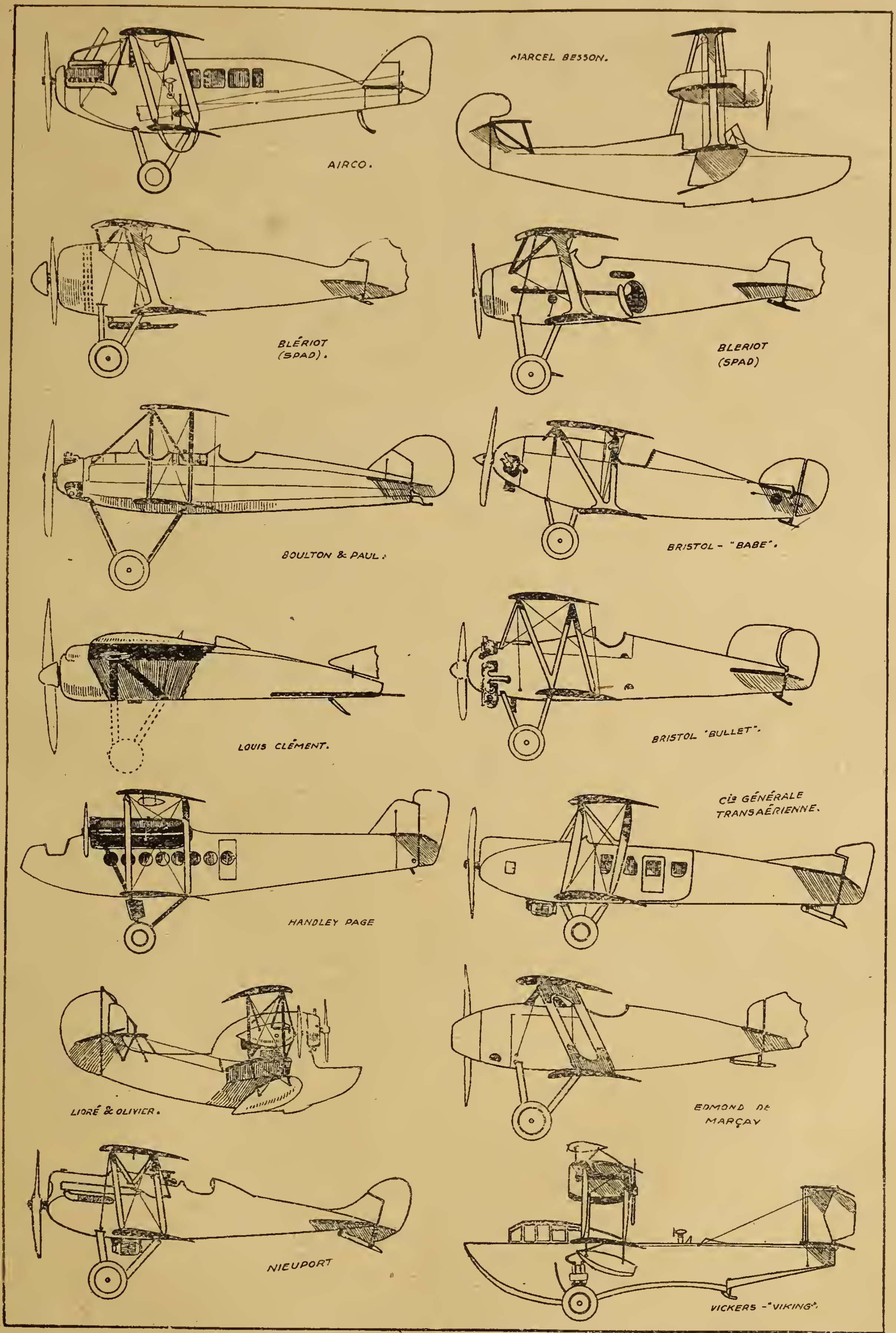
In the middle of our enthusiastic examination of the P. 10 we suddenly remember that at home thousands of Flight readers are looking to us to provide them with at least a brief *résumé* of the main exhibits in next week's issue of Flight, and that as we go to press two days earlier on account of Christmas there is no time to spare if we are to make the necessary round of the stands to enable us to do this. We, therefore, reluctantly tear ourselves away and look in at the Vickers stand.

Here the main exhibit which has arrived so far is the saloon of a Vickers-Vimy Commercial. Otherwise it is much the same tale as that of the Westland machines, except that the Vickers is at Brooklands, waiting for the fog to lift. Some clear photographs on the stand give, however, an excellent idea of the machine—a Vickers Viking. She—one uses the feminine appellation instinctively from force of habit in spite of the name—is a two-stepped flying boat and carries her retractable land undercarriage about with her so as to be able to alight on either element. Excellent as this feature is, it does not enable her to brave the fog, and hence the actual machine will probably not be at the show when it opens tomorrow morning.

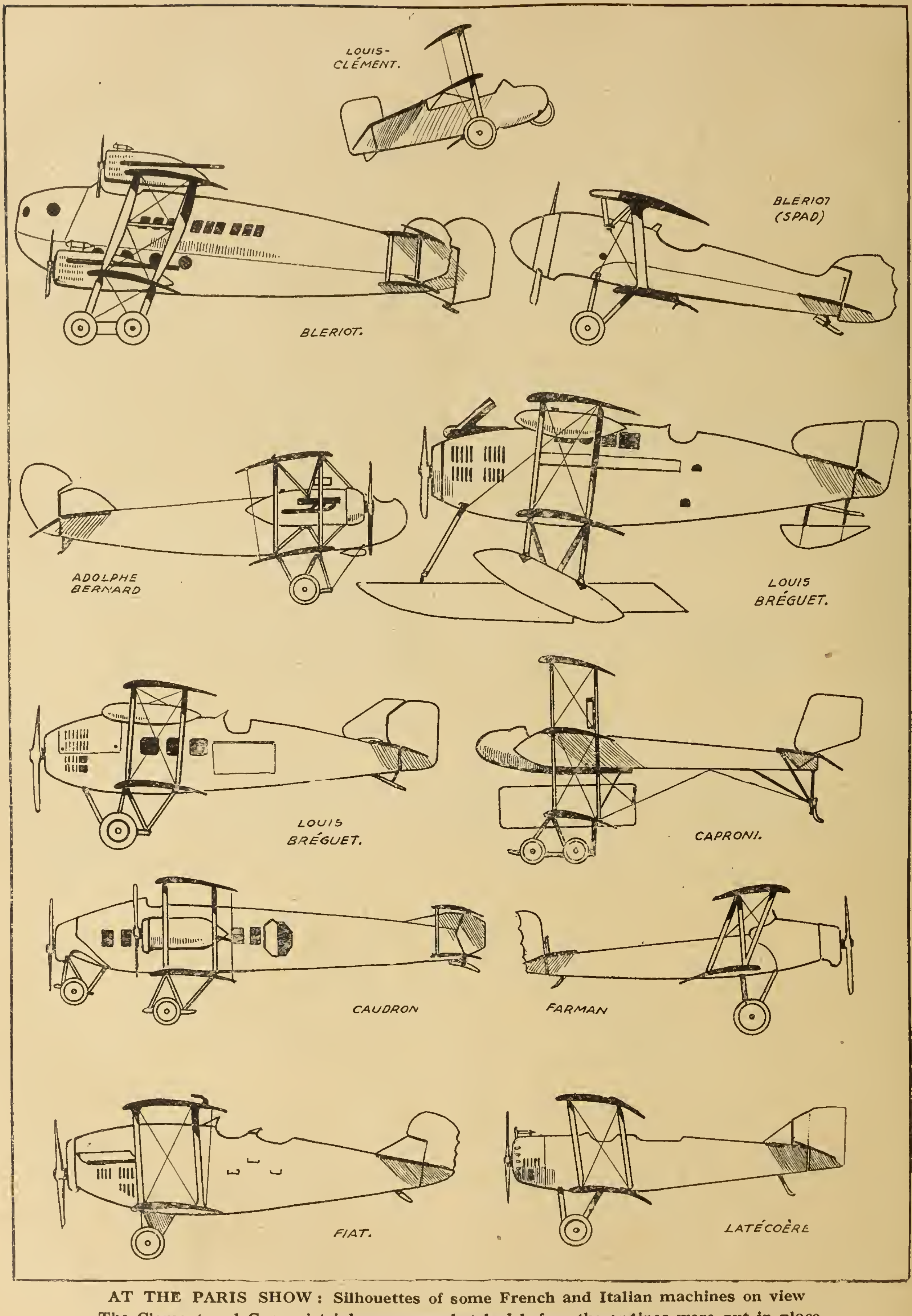
On leaving this stand we catch sight of Capt. Barnwell, who informs us that he has just had a sad disappointment. He had fondly imagined that the Bristol "Babe" would be the smallest machine at the Show, and has now discovered that one of the machines on the de Marçay stand is considerably smaller. We are able to offer him a certain amount of consolation by pointing out that whereas the "Babe" has flown—and flown very well—rumour has it that the little de Marçay only did straights, and appeared to have a ceiling of about 6 ft. (six). This may be—like the death of Mark Twain—greatly exaggerated, but certainly the machine looks as if it could do with a little more wing surface.

A hurried glance at the Airco stand shows the beautiful white *fuselage* of the new Airco 16, with Napier Lion engine just arriving. One cannot quite judge of the machine without the wings, but it promises to look extremely graceful when erected.

From the Airco stand we proceed to complete the circuit, and in another half-hours' time we have gathered sufficient material to be able to compile some sort of an index of the main exhibits. As our round has been a hurried one we do not claim absolute completeness, but we feel that readers will prefer a brief and possibly somewhat incomplete *résumé* of the exhibits generally to a complete reference to the machines on a few stands. In subsequent issues we trust



AT THE PARIS SHOW: Silhouettes of some of the British and French machines on view.



AT THE PARIS SHOW: Silhouettes of some French and Italian machines on view
The Clement and Caproni triplanes were sketched before the engines were put in place.

to be able to deal with individual machines in considerable detail :—

Aircraft Manufacturing Co. (Airco).—Main exhibit is the Airco 16, which was briefly described in last week's issue of FLIGHT.

Ansaldo.—This stand is empty at present, owing, it is said, to the machines being fog-bound somewhere in Italy or the South of France.

Bleriot and Spad.—So far the only Bleriot machine is the large 4-engined biplane which has already been illustrated in these columns. Aerodynamically one does not like it at all, with its engines spread about as they are. The machine is—in some respects—very reminiscent of the ill-fated Tarrant.

Sheltering more or less under the wings of the large Bleriot are three small Spad machines, particulars of which will be found elsewhere in this issue.

Boulton and Paul.—The main feature of this stand—and from a constructional point of view of the show—is the all-metal P 10.

Bristol.—At the time of writing the Bristol Bullet and the Bristol Babe are ready on the stand. The Tourer has not yet arrived but is expected at any moment.

Louis Bréguet.—Three machines ready. One is a military type XVII C 2, the second is a tractor seaplane with enclosed cabin, while the third is the "Berline" referred to elsewhere in this issue.

Adolphe Bernard is showing a large twin-engined tractor biplane. One somehow imagines there is more to come, but up to the present this machine is in sole possession.

Caproni.—This Italian constructor is showing one of his huge three-engine triplanes of the twin-*fuselage* type, with two tractor engines in the *fuselages* and one pusher in the central *nacelle*.

Caudron.—The Caudron exhibits are referred to elsewhere At the time of writing two machines are erected on the stand ; one is the huge three-engined cabin machine, the C 25. This machine has two engines on the wings and a third in the nose of the *fuselage*. There is a large cabin in the *fuselage* The wing bracing is in the form of piano wire, which looks somewhat out of place in a modern machine, especially of such dimensions. Of the school machine there are no signs at present.

Louis Clement.—At the time of writing the only thing on this stand at all resembling an aeroplane is a little triplane with a two-wheeled undercarriage and a third wheel in the nose of the *fuselage*.

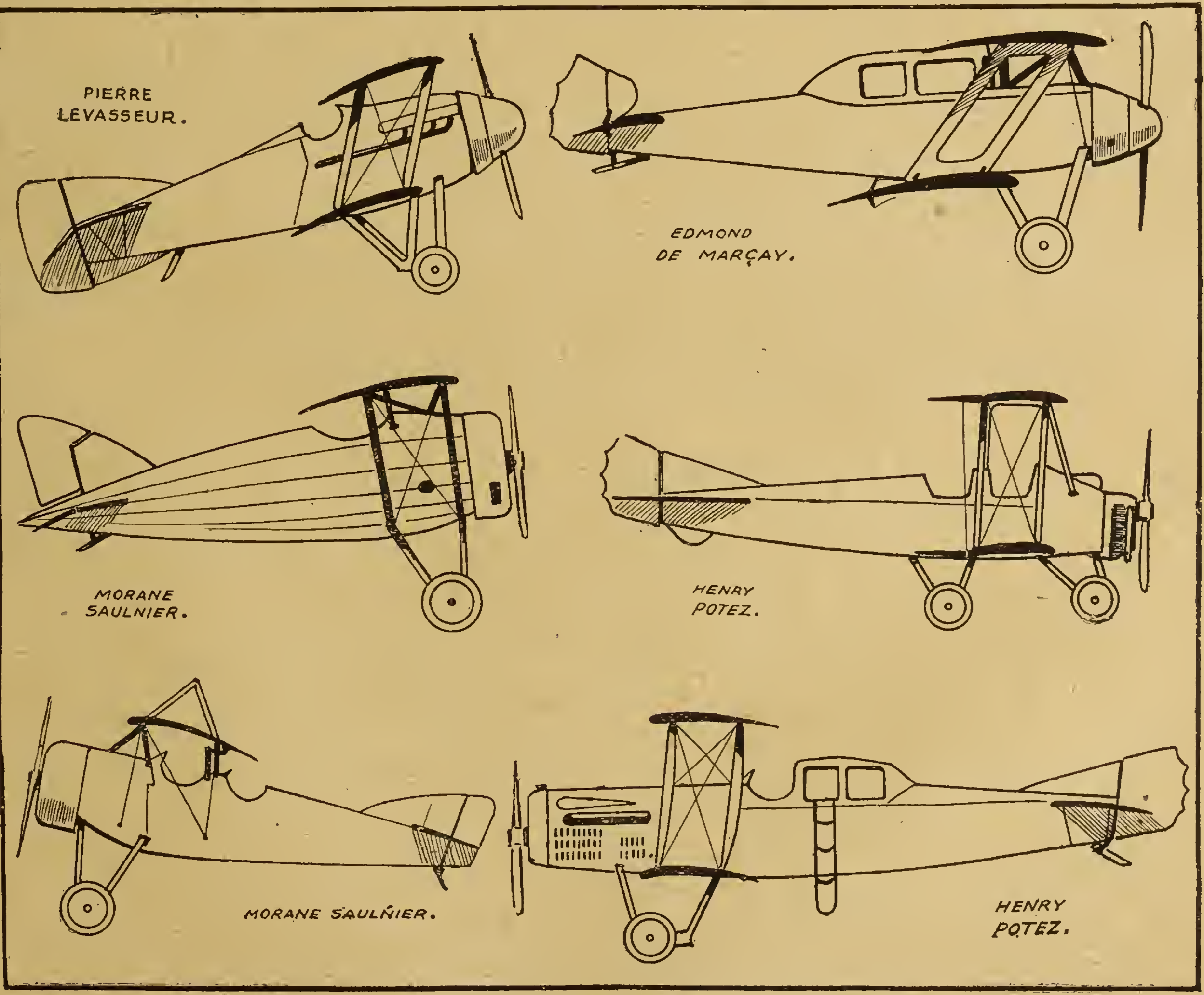
Louis Clement is also showing an extraordinary monoplane, whose wings are of the cantilever type. There is a break in the wings, the roots having a large dihedral and then straightening out. A horizontal cross-tube to the body forms the bracing. The Vees of the undercarriage can be swung outwards, and the wheels then disappear into the wings. The machine looks a freak, pure and simple.

Farman.—Elsewhere in this issue will be found a brief reference to the Farman exhibits, which consist of three machines, all ready-erected. In point of size the large "Goliath" takes first place, but it is probable that the small sporting machine sitting under the wings of the giant will prove more interesting in many ways. The third machine is a school 'bus, which looks rather odd nowadays ; one has quite got unused to seeing "pushers."

Fiat is represented by a large tractor biplane, type "ARF" two-seater. This machine has a very deep and wide body, probably mainly in order to accommodate the large tanks, as the crew consists of the pilot and one passenger. The machine has *aileron* balances of the type consisting of small auxiliary planes mounted on brackets above and slightly ahead of the *aileron* proper.

Latécoère.—On this stand there is one single-engined two-seater biplane which, according to the legend painted on the side of the *fuselage*, is designed for mail carrying. The machine does not, on casual inspection, appear to offer any features of particular interest.

Lioré and Olivier.—This firm has a very striking exhibit



AT THE PARIS SALON : Some more silhouettes of the machines on view in the form of a large three-engined flying boat, with the hull forming an enclosed cabin. The wing bracing is in the form of slanting struts forming a triangulated structure in conjunction with the wing spars. The whole machine gives a very businesslike impression. On this stand there is also an armoured *fuselage*, with rear portion built up of duralumin tubes, much after the fashion of the German Junkers

Pierre Levasseur.—In addition to a number of propellers, including a huge one of about 40 ft. diameter, is showing a large single-engine tractor biplane, the chief feature of which appears to be a profuse use of aluminium for cowling, spinner, etc.

Edmond de Marçay has a very striking exhibit, consisting of three very pretty biplanes, all very small. The smallest of them is, perhaps, the smallest biplane ever built, and, as we have already mentioned, looks as if another 20 sq. ft. of wing surface would not do it any harm. The second machine is an extremely neat-looking single-seater with monocoque *fuselage* and rotary engine with a spinner over the propeller boss. The third machine, although the largest of the three, is also quite small, and is a limousine in as far as the upper third of the passenger occupies a cabin-like superstructure added to the top of the *fuselage*. The lower two-thirds of the passenger, or his better half, travels *en fuselage ordinaire*.

Morane-Saulnier.—This firm is making rather a speciality of "parasol" monoplanes this year, no less than three machines of this type being exhibited. In addition they are showing the body of a military type biplane. One of the monoplanes has the ordinary wire bracing to its wings, the top bracing going to a single central king-post. The other, which is very similar to it, is a two-seater, also with rotary engine. The third monoplane has its wings braced by slanting tubes, and there is consequently no top bracing, the tubular struts working in compression under anti-lift loads. All the Morane-Saulnier machines are finished in a dull khaki colour.

Nieuport.—Three complete machines are shown on this stand, and in the background, so to speak, is the *fuselage* of a fourth. One of the Nieuports is a single-seater chaser with its complement of machine guns, telescopic sights, etc. The second machine is a little single-seater biplane with rotary engine, while the third is the racer on which M. Sadi Lecointe attained a speed of 192 m.p.h. recently. The *fuselage* of this machine is of the monocoque type, very carefully streamlined. There is a tiny square radiator in the nose of the *fuselage*, looking wholly inadequate for its work, and, as an after-thought, a second radiator—of the "lobster pot" type with which the Schneider Cup machine was fitted—is mounted on the port undercarriage strut. The machine is mounted so as to give the appearance of being on a banked turn, and looks very neat.

Handley Page.—Painted in white enamel, the new H.P. W 8 looks extremely well, and will undoubtedly prove a great centre of attraction when the exhibition is opened. The machine was flown across from England, and it was one of the first to be ready, erected on the stand. The cabin is very comfortable indeed, and quite a good view is obtained through the port holes in the sides of the *fuselage*. Purely regarded as an aeroplane, the W 8 is also, we think, a great improvement on the older types, and it is certainly of much more pleasing appearance.

Henry Potez.—Of the two machines shown by this constructor one is a limousine, with the pilot in front of the cabin. The second is a little two-seater with 50 h.p. Potez engine and four-wheeled undercarriage. The engine is a four-cylindered air-cooled, with the cylinders in line, but the engine is placed with its crankshaft vertical, and drives the airscrew through a bevel reduction gear.

Vickers.—At the time of writing, the Vickers Viking is fog-bound at Brooklands, and the only exhibits on this stand are a Vickers Vimy-Commercial cabin, a number of B.L.I.C. magnetos and a series of scale models of Vickers aeroplanes and airships.

Westland.—A Westland limousine is to be exhibited, but at the time of writing it had not arrived.

The French Government Exhibits

CERTAINLY not the least interesting and instructive section of the French Salon is the display of the French Naval and Military Aviation Department under the *Coupole* d'Antin. It comprises eight pre-war machines, a 1908 Voisin-Delagrange, a 1909 Santos Dumont, a 1910 Nieuport, a 1912 Henry Farman, a 1913 G. B. Deperdussin, a Bleriot two-seater, a R.E.P. two-seater and a Caudron G. 3. There is also a collection of 1/10 scale models of such historic land machines as the Antoinette, Borel, Nieuport, Tellier, Deperdussin, Astra, Zodiac, Bleriot, Caudron, Rep, Spad, Farman, Hanriot, Bregnet, and among the water planes are Fabre, Borel, Hanriot, Tellier, etc. There are also models of the Charles Renard machine of 1872 and the Victor Tatin of 1879. In the airship division there are a number of cars as well as models of the 1884 Renard and Krebs *La France*, the 1906 Santos-Dumont No. 6, as well as several of the more recent vessels built for the French Government. There is also a fine display of balloons, parachutes, etc.

In another gallery are arranged some 32 motors, 20 of them showing the development of the aeroplane engine from the 50 h.p. Antoinette of 1907 to the 250 h.p. Salmson of 1917, while the other dozen are airship motors starting with the one used by Col. Renard in 1893.

Maps, instruments and apparatus used by the meterological photographic and medical branches of the aviation services also find a place in this most comprehensive display.

The Show Opened

THE Show was formally opened on December 19, by President Poincare, who was accompanied by Marshals Foch and Pétain; Generals Berdoulat and Mordacq and many other notabilities. The President made the customary tour of the stands, and before leaving congratulated M. Alfred Leblanc, President of the organising committee.

THE DEATH OF SIR JOHN ALCOCK

IT is with most profound regret that we have to record the fatal accident to Sir John Alcock, which occurred on the afternoon of December 18, while he was engaged in taking a new Vickers machine to Paris in connection with the Salon. It appears that the machine when nearing Rouen had great difficulty in negotiating a strong wind. A farmer at Côte d'Evrard, about 25 miles north of Rouen, saw the machine come out of the fog, commence to fly unsteadily, and—it was then about 1 o'clock—it suddenly crashed to the ground. Sir John Alcock was taken from the wreck, but unfortunately there was considerable delay in getting medical assistance as the farmhouse near where the crash occurred is out of the way. As soon as the accident was reported, doctors rushed from No. 6 British General Hospital, Rouen, but they were too late. It is probable that an enquiry will be held by the French authorities, at which the Air Ministry and Messrs. Vickers will be represented. Arrangements are being made for the conveyance of the body of Sir John Alcock to England for burial in Manchester, his native city.

The death of Sir John Alcock is an irreparable loss to aviation. His great flight across the Atlantic is too fresh in the mind of readers of FLIGHT for further reference to be made to it here, while his previous work is recorded in the pages of past volumes of this paper.

A New Michelin Prize

JUST previous to the opening of the Paris Salon, M. M. Michelin announced the offer of a new prize of 500,000 francs for aviation. The conditions briefly are that starting from a point within a radius of 10 kiloms. of the Palace of Versailles, the aviator must fly to and round the cathedral at Rheims and back to his starting point in 1 hr. 15 min., having averaged a speed of at least 200 kiloms. per hour. Then from this point, but without landing, the machine, at an altitude of not more than 100 metres, must take at least one hour to cover 10 kiloms. over a triangular course, each side of which is 3·6 kiloms. long, the turns being effected inside the angles of the triangle. Throughout this test the machine must be kept in a normal flying attitude. Finally, the machine must be kept in the normal position of flight and it must completely stop without serious damage to the structure not more than five metres from the point at which it first touches the ground. The contest will be held under the auspices of the Aero Club of France and will be open until October 1, 1930. Only French aviators are eligible.

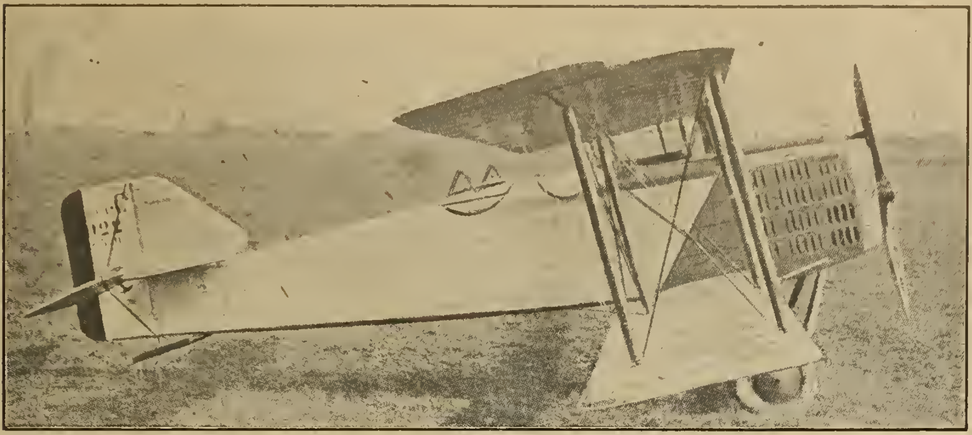
New Speed Record

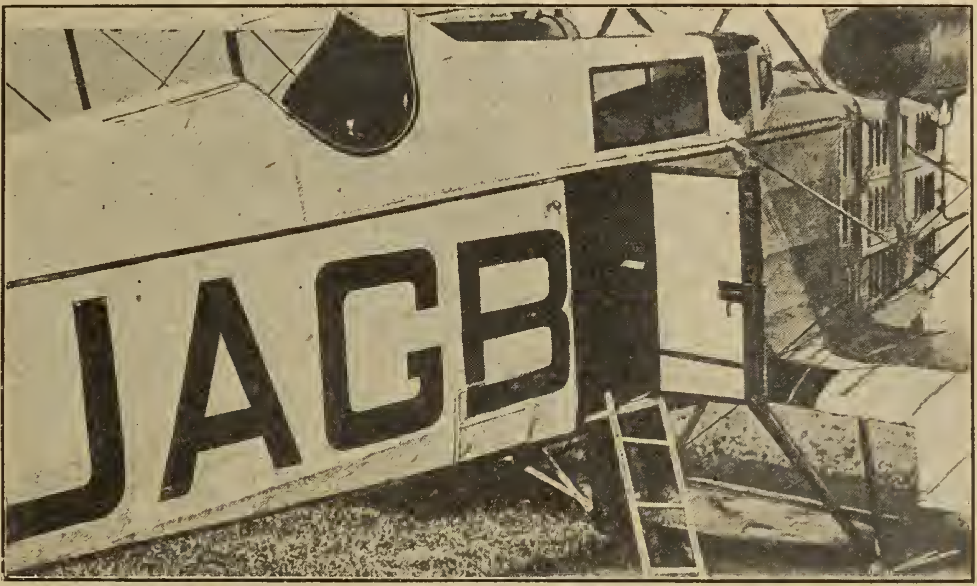
A NEW speed record is claimed by M. Sadi-Lecointe, who is now with the Nieuport firm. Timed, officially, over a measured kilometre at Villacoublay on December 15 his average speed is given as 307·225 kiloms. an hour (190¾ m.p.h.). It is stated that at one time he was flying at a speed of 364·555 kiloms. an hour—over 226 miles an hour.

SOME FRENCH MACHINES AT THE SHOW

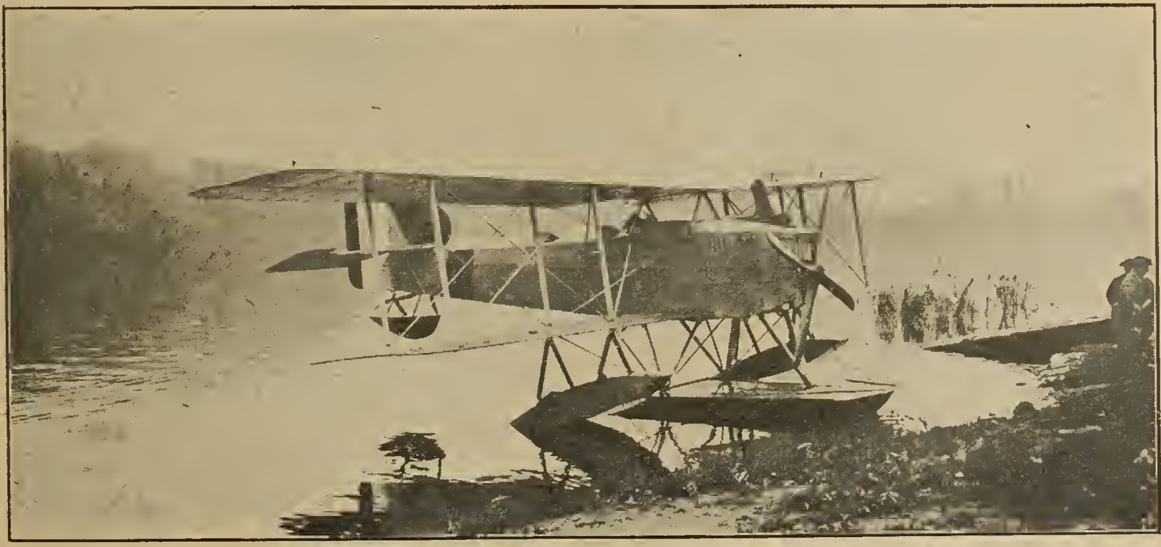
Société Louis Bréguet

THIS firm is showing three complete machines and one very interesting power unit. One machine is a military two-seater fighter of the famous C 2 XVII type. A seaplane of the A 2 XIV type is also shown, as well as a transport machine of the "Berline" type, XVIII T. This machine, which is a development of the Bréguet night bomber, carries six passengers, in addition to the pilot. The engine is a 450 h.p.


The Bréguet C 2, type XVII, 450 h.p. Renault engine



The cabin of the Bréguet limousine


The Bréguet seaplane

Renault, with which the machine is capable of a speed, at low altitudes, of 160 kilometres per hour (99 m.p.h.), and a climb of 10,000 ft. in 40 mins. The range is four hours at full throttle, or about 400 miles.

The power unit to which reference has already been made, consists of a novel transmission gear, by means of which the power of four engines of 200 h.p. each is transmitted to a single shaft on which is mounted the airscrew.

Aéroplanes Caudron

René Caudron is exhibiting three complete machines. One of these is the well-known type, G 3, on which so many of the French pilots have been trained. It was, it may be remembered, on a similar machine that the late Jules Vedrines landed on the roof of the Lafayette building. The machine is already so well known as to need no detailed description here.

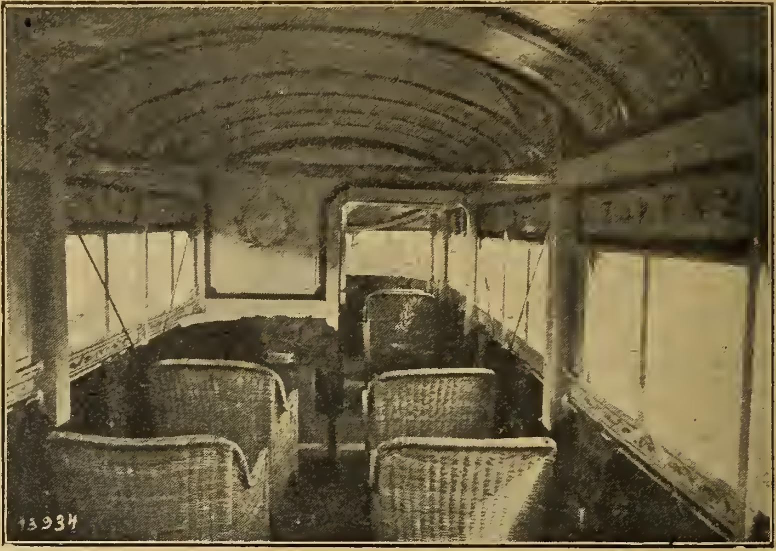
The second machine is a twin-engine biplane, type C 33. It is fitted with two 80 h.p. Le Rhone engines. In addition to the pilot the machine carries three passengers, of whom two are inside the body. This machine has a length over all of 30 ft. 10 ins. and a span of 51 ft. 2 ins. It carries sufficient fuel for a flight of six hours' duration, and has a maximum speed of 150 kilometres per hour (93 m.p.h.).

The third machine exhibited by Caudron is also a new design, the C 25. This is a large three-engined biplane designed for passenger-carrying. In addition to two pilots, it has accommodation for 16 passengers in a comfortable cabin. Like the C 33 it has a duration of six hours, and its maximum speed is 102 m.p.h. The overall length is 62 ft. 8 ins., and its span 82 ft. 6 ins. The three engines are 250 h.p. Canton-Unnés.

Farman Frères

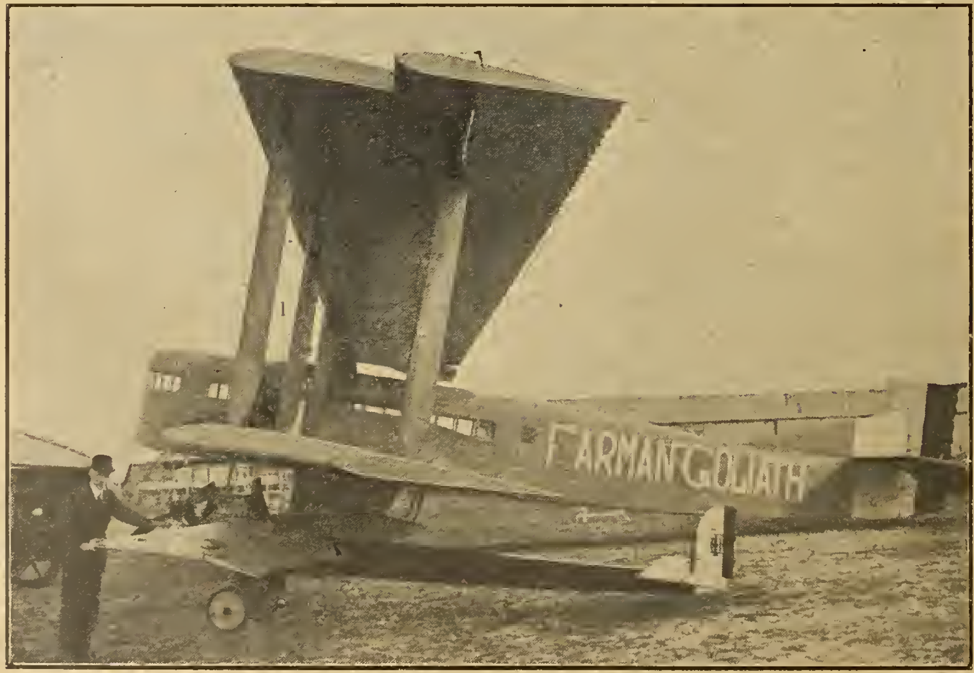
The Farman brothers are showing three complete machines. One of these, at least, will be known to our readers, as it has been flying for some considerable time and has made several notable flights. This is the Farman "Goliath," or, to give it its proper series number, the F 60. As is, of course, well known, it is a twin-engined machine, with a long enclosed *fuselage* accommodating the passengers. The machine has already been described in FLIGHT; suffice it therefore to add that the Goliath is listed at 170,000 francs (about £4,250 at the present rate of exchange). The machine claims several records, such as 20,800 ft. in 1 hour 5 mins. with four passengers, 20,500 ft. in 1 hour 5 mins. with 14 passengers, and 16,850 ft. in 1 hour 15 mins. with 25 passengers.

The second machine exhibited by Farmans is a school biplane, similar in a general way to the pre-War pusher Farmans. It has a short *nacelle*, in the stern of which is installed the engine. Dual controls are fitted, as in the majority of school machines, and it is claimed that it is almost impossible to turn the machine over on the ground, since not only is the wheel track very wide, but also the skids are provided with wheels in front, thus assisting materially in preventing a turn-over. One of our photographs shows the *nacelle* and front wheels.



THE FARMAN GOLIATH: View inside the cabin

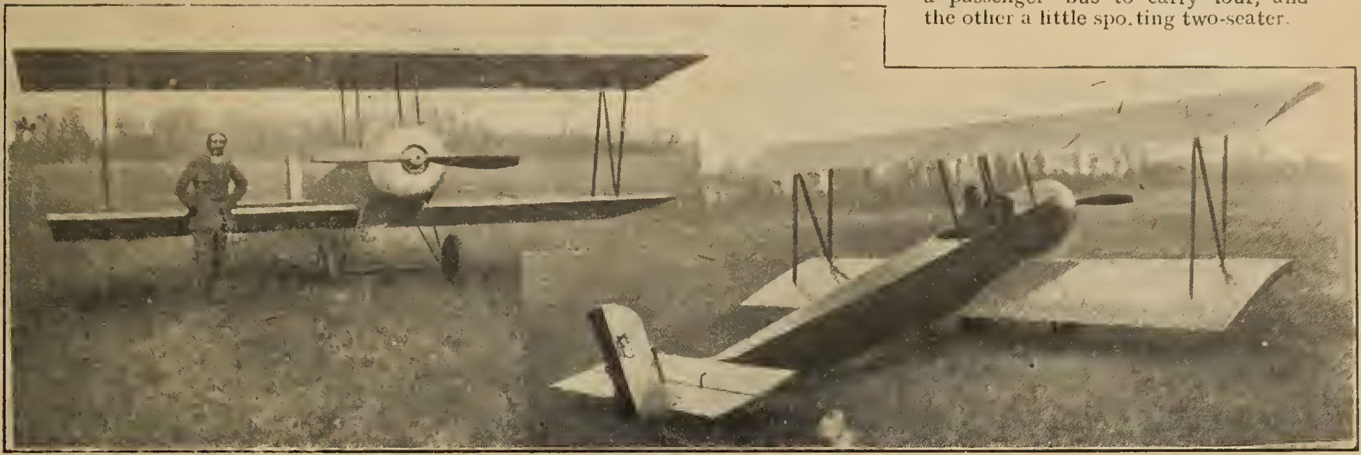
Last, but by no means least, there is on view on the Farman stand the little sporting biplane about which so much has been heard of late. This machine—a small biplane—has been designed to provide a two-seater of low initial price and ditto upkeep. The sporting machine is said to be capable of looping with two up, and owing to its very light weight (about 880 lbs. "all up") it lands very easily and slowly (at about 28 miles an hour it is claimed, although this does certainly appear a little optimistic). With its 30 h.p. engine it is said to have quite a good speed, and the makers estimate the running cost at something like 13 centimes per kilometre.



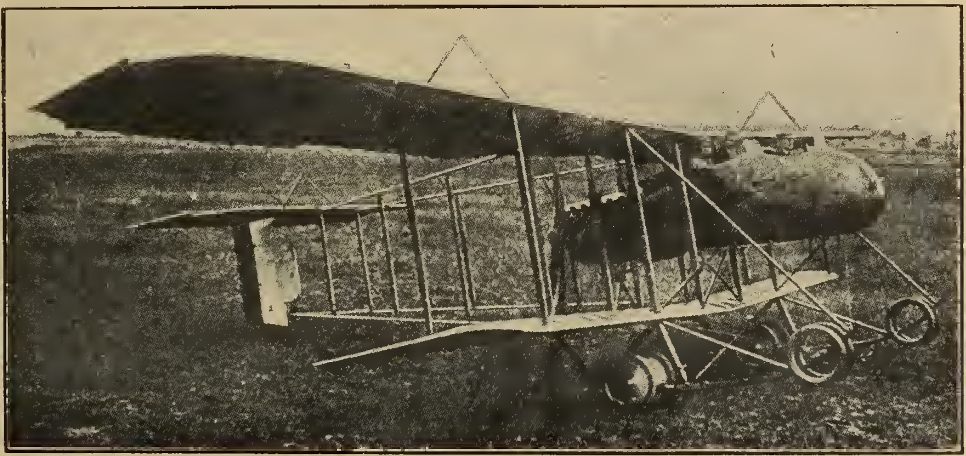
The Farman Goliath: Side view

Aéroplanes Henry Potez

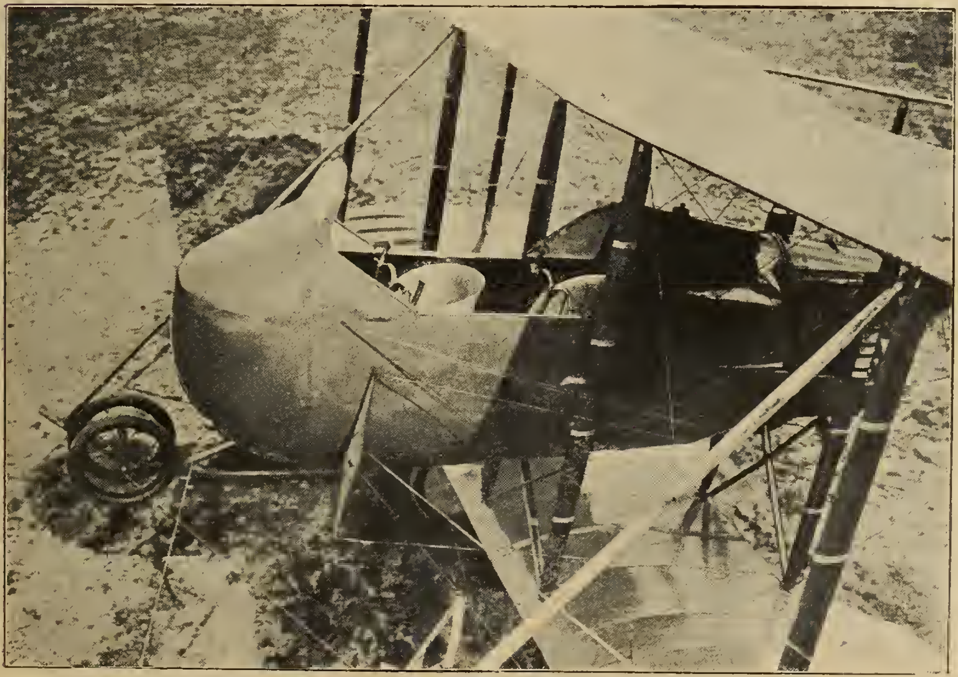
This firm is a newcomer into the aviation industry, as far as pre-War aviation is concerned. It is one of the firms which had not turned their attention to aeroplane construction until the War demand arose. It will, therefore, be of some interest to watch the future of the firm. At the Paris Show they are exhibiting two machines, one a passenger 'bus to carry four, and the other a little sporting two-seater.



THE FARMAN SPORTING BIPLANE : Three-quarter front and three-quarter rear views

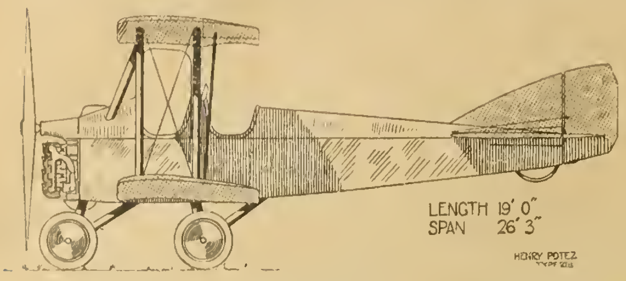


The Farman "School" type biplane, which is also suitable as a three-passenger "Tourabout"



The Farman School Machine : View of the *nacelle*

The former—type S.E.A. VII it is called—is an enclosed biplane with seating accommodation for two or three passengers in addition to the pilot. The engine is a Lorraine-Dietrich, with which the machine attains a speed of in the neighbourhood of 200 kilometres (124 miles) per hour. The weight of the machine, all on, is 3,630 lbs. The overall length is 30 ft. 5 ins., and the span 46 ft. 2 ins.



THE HENRY POTEZ, TYPE VIII : This machine has a 50 h.p. Potez engine

THE HENRY POTEZ, TYPE S.E.A. IV P.M. : Three-quarter front view

The sporting biplane is a small machine of 26 ft. 3 ins. span and 19 ft. overall length. It is designed as a two-seater, and is built to a large extent of Duralumin. Owing to the peculiar arrangement of the engine (see accompanying silhouette) the *fuselage* has been placed very low, giving a sturdy undercarriage structure which with its four wheels, in conjunction with a low landing speed, practically precludes the possibility of damage except during an extremely bad landing. The landing speed is stated to be below 25 m.p.h., but, as in the case of the Farman sporting machine, this sounds a little optimistic, in view of the fact that the wing loading is about 4·5 lbs./sq. ft. Probably the landing speed is nearer 35 m.p.h. The undercarriage is provided with a sprag operated from the pilot's seat, by means of which the machine may be pulled up quickly after touching the ground.

Not the least interesting feature of this machine is its engine—a Henry Potez type A 4—of 50 h.p. It is placed vertically in the machine, with the cylinder heads pointing forward so as to ensure even cooling. (The engine is air-cooled.) At the upper end of the vertical crankshaft is a bevel gear which serves the double purpose of transmitting the power to the horizontal propeller-shaft and of giving a 2 to 1 gear reduction. The weight of the engine is somewhat great for its power, compared with modern aero engines, but it is stated by the makers that reliability has been their first consideration, and that they consider this of greater importance than low weight. The engine weighs 220 lbs., or slightly over 4 lbs./h.p., but it is claimed to be as reliable as a car engine, and to require very little attention. The bore is 100 mm. and the stroke 120 mm., and the full power of 50 h.p. is developed at a speed of 2,200 r.p.m., which give an airscrew speed of 1,100 r.p.m.

Blériot and Spad

The Blériot exhibit consists of one of the new four-engined passenger machines, with four Hispano-Suiza engines. As will be seen from our photograph, the engines are placed far apart, and one does not quite trust to the trim being maintained in case of an engine cutting out. Otherwise the machine is of very nice design, and its cabin will no doubt, be greatly admired by visitors to the exhibition.

THE SPAD-HERBEMONT, TYPE S. 27, THREE-SEATER MONOCOQUE LIMOUSINE : It is fitted with a 300 h.p. Hispano-Suiza, and has a span of 32 ft., an overall length of 24 ft., and weighs, fully loaded, 2,772 lbs. It has a speed range of 65-143 m.p.h.

Three very interesting Spad machines are exhibited, interesting because, while retaining the characteristics of the Spads built during the War, they are, as regards two of them, designed for sporting purposes, having low-powered engines and consequently reasonable cost and upkeep. The third machine is a three-seater, with the two passengers seated inside an enclosed cabin.

The Spad *monocoque* type S 30 is small single-seater, with 45 h.p. Anzani engine. The wings are so arranged as to give the pilot a good view, and, while not very large, they are of sufficient area to ensure a low landing speed. The speed range is also very good, the maximum speed being in the neighbourhood of 87 m.p.h., and the landing speed about 37 m.p.h. The overall length is 19 ft. 6 ins., and the span 23 ft. 6 ins. The weight of the machine empty is 570 lbs., and in flying trim—with pilot and fuel for three hours—the weight is 880 lbs. The 45 h.p. Anzani engine is provided with a silencer which adds greatly to the comfort of the pilot. Strength has been especially studied, the machine having a factor of safety of 15.

The Spad *monocoque* type S 29 is a small two-seater, fitted with an 80 h.p. Le Rhone engine. The occupants are placed tandem fashion in the *monocoque fuselage*. The maximum speed is 102 m.p.h., and the landing speed just under 50 m.p.h. The length of the machine is 19 ft. 7 ins., and the span 25 ft. 5 ins. Empty the machine weighs 790 lbs., and fully loaded—with pilot and passenger and three hours' fuel—1,230 lbs.

The third Spad—the three-seater limousine—is a development of the military type S 20, and carries the series number S 27. Like the other two machines shown, it has the general Spad characteristics, although the enclosed body alters its appearance somewhat. The pilot is placed in front, while the two passengers are seated side by side inside the cabin, looking out on the country over which the machine is flying through windows in the sides of the *fuselage*. The engine fitted is a 300 h.p. Hispano-Suiza, which gives the machine a maximum speed of 143 m.p.h. The landing speed is about 65 m.p.h. The machine has an overall length of 24 ft., and a span of 32 ft. The weight of the Type S 27 is 1,870 lbs. empty and 2,770 lbs. fully loaded (pilot, two passengers and three hours' fuel).

G. Voisin

The ancient house of Voisin is not showing any new machines, as the contention of M. Gabriel Voisin is that the production of a new machine designed for peace-time flying is a matter of long and painstaking work and experimentation, requiring months or even years before an absolutely satisfactory machine can be created. The only full-size machine shown on this stand is, therefore, a War type—the Voisin X—which was in use at the time of signing the Armistice. It is a pusher fitted with a Renault engine, and provided with guns and bomb-gear. A scale model of the four-engined triplane of 1915 is also shown, as well as a small model of a patent Voisin hangar.

BRITISH ENGINES AT THE PARIS SHOW

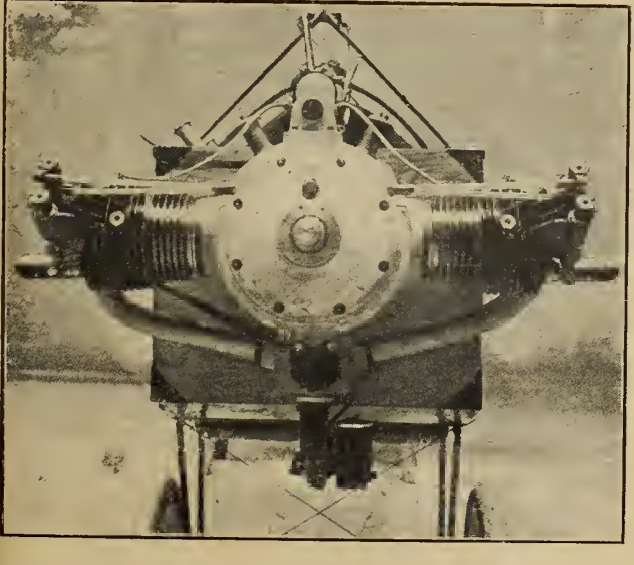
The 40 h.p. Armstrong Siddeley

An interesting aero engine of comparatively small power is to be seen in the two-cylindered Armstrong Siddeley fitted in the Bristol "Babe."

This engine, which has been designed for use in small single-seater machines, has two horizontally opposed cylinders, 5 in. bore by 5 in. stroke, the offset between their axes being 1½ ins. only. This is made possible by the use of extremely narrow roller bearing big ends to the connecting rods, with the result that the out-of-balance couple, present in all engines of this type in which the cylinders are not exactly opposed, is reduced to a very small amount. The valves are situated in the cylinder heads and are operated by push rods from a camshaft contained in the crankcase.

The construction of the cylinders is that of an aluminium alloy head into which is screwed a steel liner, thus forming the complete cylinder. This design is the outcome of a long series of experiments and as much as 30 h.p. per cylinder has been obtained and a m.e.p. of 127 lbs. per sq. in. has been reached with a petrol consumption less than ·6 pints per brake horse-power hour.

The liner is screwed into the aluminium head under heat treatment thus allowing, when cool, for the aluminium alloy to shrink and make a satisfactory joint. The valve seatings are of bronze and are expanded into the cylinder head, after which they are machined in position.



The 40 h.p. Armstrong-Siddeley two-cylindered opposed aero engine

Each cylinder is fitted with two valves, manufactured from the very best quality steel, operated, as stated previously, by external push rods operating through horizontally placed rocker shafts. The cylinders are mounted by a special device on to an aluminium crankcase, which is constructed in one unit with a front cover through which the crankshaft protrudes to carry the propeller boss. The crankcase is neat in external appearance, and is mounted on to the front of the aeroplane by four bolts which are accessible from the outside.

The lubricating oil is contained in the base of the crankcase and is fed to the working parts of the engine by an oil pump. There is a special adjustment to allow the correct amount of oil being supplied from the pump so that at no time is more oil going to the working parts of the engine than is sufficient for the working.

The engine is provided with one ignition only, that is, a two-cylinder magneto of British manufacture. It is not considered necessary or desirable to fit a dual ignition to an engine of this nature, as was necessary on larger engines used during the War. The incoming gases pass through an exhaust-heated jacket mounted on the underside of the crankcase. Roller or ball bearings are used throughout the engine.

The Cosmos Engineering Co., Ltd.

Two types of engines manufactured by the above firm are to be seen at the Show, the 100 h.p. "Lucifer" fitted to the Boulton and Paul P.10, and the 450 h.p. "Jupiter," fitted to the Bristol "Bullet."

The "Lucifer" engine has been specially designed to meet the requirements of the small-powered, reasonably-priced, aeroplane power unit, reliability and long life, and low cost and ease of production beng primarily aimed at. With these ends in view, the three-cylindered inverted "Y" type radial engine has been adopted. No attempt has been made to cut weight or obtain maximum performance, and although it is rated at 80 h.p., the makers guarantee 100 h.p. at 1,600 r.p.m. with a moderate m.e.p.

The three cylinders, which have a bore and stroke of 5¾ ins. by 6¼ ins. respectively, are air cooled, and form a combination of aluminium and steel construction embodying the firm's patent aluminium head. Overhead valves are employed, operated by push rods arranged on the front side of the cylinders, and an extremely simple plain reducing gear is used to run at half engine speed. The crankcase is a simple circular aluminium casting, the attachment to the *fuselage* being by means of a circular flange situated at the back of the case. The air screw runs at engine speed (1,600 r.p.m.), the propeller shaft being integral with the crankshaft. The propeller hub is the standard Air Board design, and is attached to the shaft by means of serrations and taper.

The pistons are of the modified slipper type, with three rings at the top and a scraper ring at the bottom.

The crankshaft is a one-piece solid forging, and the connecting rods are of H-section. The big end and bearings are white metal lined, being run direct in to the big end of the rod.

Dual ignition is provided, the generator and distributors being suitably driven off the back end of the engine; the distributors placed in an accessible position.

Two oil pums are provided, one scavenging and one suction, oil being fed, under pressure, to the crank-shaft.

The filters are so arranged that they can be withdrawn for cleaning purposes from the front end of the engine; an adjustable oil relief valve is provided.

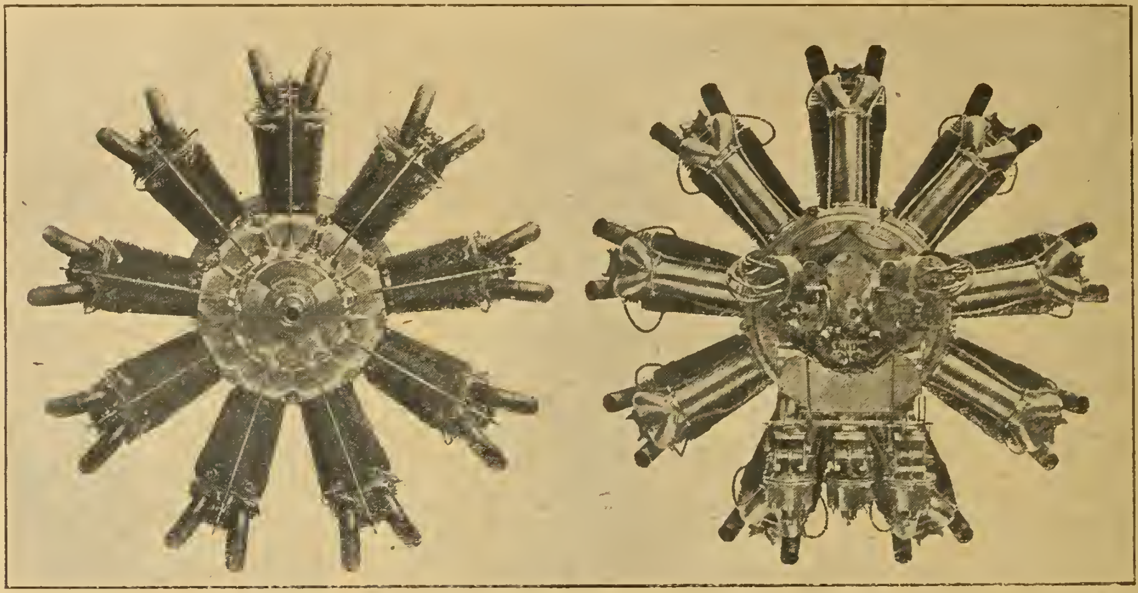
A circular induction system is fitted to the three cylinders, the branch pipe from the carburettor to the circular induction ring being provided with an exhaust heater. A starting handle, which may be operated from the pilot's cockpit, is provided.

The total weight of the engine, all on, is 280 lbs.—2·8 lbs. per horse-power.

The designs for the "Jupiter" engine were accepted by the British Government in July, 1918, and the first experimental engine was completed before the end of October the same year. It was fitted to a Bristol "Badger" and gave excellent results on test, as the following figures will show. The total weight of the machine, "all on," was 2,800 lbs., the revolutons per minute on ground were 1,550 and when climbing at 80 m.p.h. and flying level at 7,000 ft. at 125 m.p.h., 1,600 and 1,850 respectively. These figures shown on the air speed indicator after correcting for density give 137 m.p.h. at 7,000 ft.

Several improvements have been made to this engine in the meanwhile, and its performance is now considerably improved. The "Jupiter" is a nine-cylindered air-cooled engine, with the cylinders arranged radially in a single row. It is made in two types—ungeared, and with an epicyclic reduction gear. In the former model the normal horse-power is 400 at 1,650 r.p.m., the maximum horse-power being 450 at 1,850 r.p.m. With the reduction gear the horse-power is 450 at 1,850 engine speed and 1,200 propeller speed. The bore and stroke of the cylinders are 5¾ ins. by 7½ ins. respectively. The maximum diameter of the engine is 52½ ins., and the total weight, including carburettors, magnetos, etc., is 636 lbs. (ungeared) and 757 lbs. (geared).

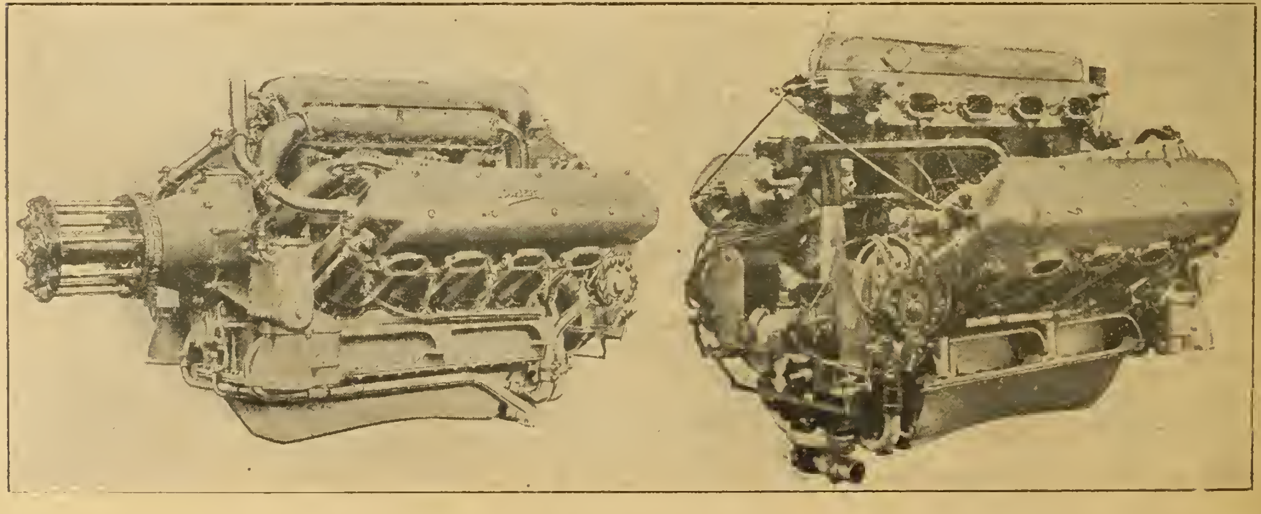
One of the special features of this engine is its accessibility. Reference to the accompanying illustration showing the rear view illustrates the ease with which such units as magneto, carburettor, oil pump, oil relief valve and starter may be dismantled.



THE 500 H.P. COSMOS "JUPITER" AERO ENGINE: Front and rear views

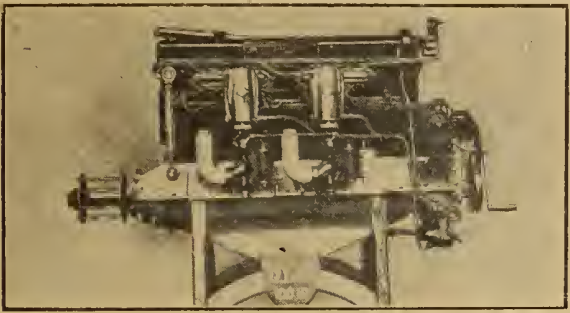
Napier

The famous 450 h.p. Napier "Lion" is to be seen fitted to the machines exhibited on the Airco and Handley Page stands, and representatives of the company will be in attendance at the Show. The Napier "Lion" which, in conjunction with the Airco 9R biplane, recently put up 18 British records



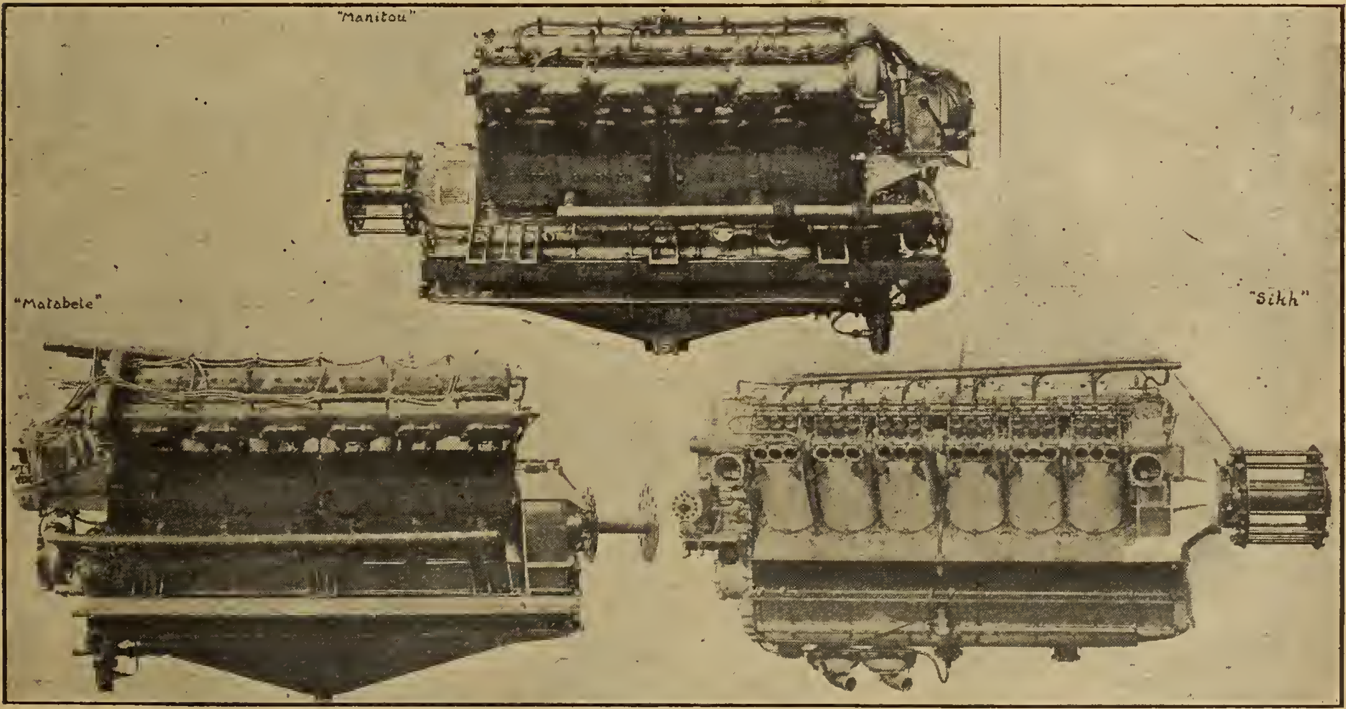
THE 450 H.P. NAPIER "LION" AERO ENGINE: Two views showing the front and rear ends

for speed, is a twelve-cylindered water-cooled engine, with the cylinders arranged, " broad-arrow " fashion in three blocks of four— one vertical and two at 60°. The cylinders, which have a bore and stroke of 5½ ins. by 5⅛ ins. respectively, are steel forgings machined all over, with steel water jackets and detachable aluminium cylinder heads containing inlet and exhaust passages, valves and valve actuating mechanism. The pistons are of aluminium alloy fitted with two gas and two scraper rings. There are two inlet and two exhaust valves to each cylinder, fitted with coil springs and operated direct by two overhead camshafts, driven through bevel gearing by vertical shafts from the crankshaft. The whole of the valve mechanism is enclosed within a detachable oil-tight aluminium case.



The 100 h.p. six-cylindered Sunbeam "Dyak" aero engine

The connecting rods are machined from special high-grade steel, the master rod, which is coupled to the pistons of the vertical block of cylinders, is formed with lugs on either side to which are attached the short auxiliary rods for the pistons of the other blocks of cylinders. The big ends are white metal lined. The crankshaft is machined from a solid steel forging, all four throws being in one plane. All journal bearing and crank pins are of large diameter, and bored out. The crankshaft is carried on five large roller bearings and one large plain bearing at the forward end. The propeller shaft, which is carried on two roller bearings and fitted with a double-thrust ball bearing, is driven at a reduction ratio of 1 to 1·52 to crankshaft through wide high-grade alloy steel spur gears. The crankcase is of aluminium, suitably stiffened, and the front end encloses the reduction gear for the propeller shaft, which can be easily withdrawn. Oil and water pumps, and drive for the camshaft, magnetos, and pumps, are located in a case bolted at the rear. The water pump is of the centrifugal type running at half crankshaft speed, and water is delivered through a separate outlet to each of the three cylinder blocks. There are three oil pumps, two suction and one pressure type, driven at half crankshaft speed. The suction pumps are connected to the sump, and the pressure pump draws oil, through a filter, from the supply tank.



A TRIO OF SUNBEAM AERO ENGINES: The 300 h.p. "Manitou," the 420 h.p. "Matabele," and the 800 h.p. "Sikh"—all twelve-cylindered "V" type

Lubrication is by pressure throughout to big ends, gudgeon pins, camshaft bearings and the forward bearing of crankshaft. The reduction gears are lubricated by oil squirted on to the teeth from a pipe connected to the crankshaft lubricating system. Valve tappets and cams are lubricated by the oil that escapes from the camshaft bearings. All oil which drains into the sump is delivered to the supply tank by the suction pumps. An adjustable pressure relief valve, and a pressure gauge are incorporated in the system.

Two twelve-cylindered ignition magnetos are fitted, giving two sparks in each cylinder, and special distributor rotors are provided to facilitate starting by hand. One twin and one single carburettor, Napier system, are fitted. These are water-jacketed, as are the steel induction pipes. Altitude control cocks are fitted, and an arrangement is provided whereby an equal distribution of the gas to the three cylinder blocks is secured.

The Napier patent air-petrol starter is fitted, by means of which an explosive mixture is pumped into the cylinders, and ignited by means of a hand-starting magneto, operated through the special distributor rotors of the main magnetos previously mentioned.

The weight of the engine dry, complete with propeller boss, carburettors, induction pipes, etc., is 850 lbs., and the gross weight in running order, with fuel for six hours, but without water, is 2,671 lbs., giving a weight per horse-power of 1·89 lbs. The overall length, to centre of propeller, is 4 ft. 8 ins., and the overall width and height, 3 ft. 6 ins. and 3 ft. respectively. The fuel consumption (full load) is ·48 lbs. per b.h.p., and the oil consumption, ·02 lbs. per b.h.p.

Sunbeam-Coatalen

The four engines to be exhibited by the Sunbeam Co. at the Paris Show have many similar characteristics, but differ in important details other than those of size and power. To take first of all those points in which the engines are similar will perhaps be the best plan. The four engines in question bear the usual tribal names of Sunbeam-Coatalen aircraft engines and are of the following range of horse-power :—"Dyak," six-cylinder vertical, 100 h.p.; "Manitou," twelve-cylinder "V," 300 h.p.; "Matabele," 420 h.p.; "Sikh," 800 h.p.

All these engines are composed of similar materials for similar parts, with one exception which will be noted later. The crankshafts are of nickel chrome steel, the pistons being of aluminium. The valves are of high chrome steel, of a special form and designed to withstand heat and prevent distortion, and the valve gearing is of self-hardened nickel chrome steel. The cylinder blocks, with the exception of the "Sikh" engine, are of aluminium casting with very large water circulation spaces and inspection covers. The cylinders are fitted with steel liners and the valve seats are of bronze. In the case of the "Sikh" engine, however, the cylinders are composed of steel throughout, and are welded together with their jackets.

The crankcases are in each case of aluminium casting and are of a patent form, designed to give greater strength and to allow the bearing caps to take a large share of the side load imposed on the crankshaft under the usual working stresses. All these engines are of the water-cooled type, the circulation being in each case by centrifugal pump designed to give a specially large output. Lubrication in all types is by gear wheel pumps, three of these being employed: (*a*) A scavenger pump which draws the oil from the sump and returns it to the oil tank; (*b*) the main force pump which forces oil through the drilled crankshafts and ducts in the crankwebs to the main bearings, drawing direct from the oil tank; (*c*) the auxiliary oil circuit pump which forms a portion of the main force pump and is arranged to deliver the necessary quantity of oil at a very low pressure to the camshaft bearings and all auxiliary bearings.

Carburation is effected by Claudel Hobson carburettors of diffuser type working under a head or pressure of 4 lbs. per sq. in.

Ignition is by high tension magnetos, and particulars as to the number of these are given in the details of each engine. The magneto drive is by a coupling formed of laminated spring blades giving great flexibility and ensuring a long life for the magneto.

The "Dyak" "Manitou" and "Matabele" engines are each fitted with two sparking plugs per cylinder, the "Sikh" engine being fitted with four plugs per cylinder.

Having considered the general characteristics of all the engines, we may now pass to the details more particularly applying to the individual engines.

In the case of the "Dyak" 100 h.p. this engine is of the vertical type, the six cylinders being cast *en bloc* in aluminium, this casting being made in the Sunbeam Company's own foundry and being one of the largest, if not the largest, yet made in this material. There are two valves to each cylinder, operated by one overhead camshaft which is driven direct by bevel gearing to the crankshaft. This is carried on seven die-cast white-metal bearings, and drives the propeller directly; the thrust bearing being mounted on an extension of the crankcase. The carburettor is of the B.Z.S. 38 type, and is arranged for gravity feed. The starting of this engine is effected by hand. The chief dimensions are as follow :—

Bore	120 mm.
Stroke	130 mm.
Total stroke volume of cylinders	8,820·5 c.c.
Normal speed of engine	1,200 r.p.m.
Fuel consumption	·54 pint per b.h.p. hour.
Weight of engine "dry"	399 lbs.

The "Manitou" 300 h.p. is a twelve-cylindered engine, the cylinders being cast in blocks of three and disposed on the crankcase in two rows of six each, the angle of inclination being 60°. There are two inlet and two exhaust valves actuated by overhead camshafts, these being driven by trains of gears from the crankshaft. The connecting rods are of the usual "H" section and of the articulated pattern. The hollow crankshaft is carried on eight die-cast white-metal bearings, and the propeller is driven indirectly by gearing to the propeller shaft which, with the thrust bearing, is mounted on an extension of the crankcase cast on the engine.

Carburation is by two Claudel Hobson H.C. 7 carburettors arranged for gravity feed and set in the centre of the "Vee." The magnetos employed are two of the B.T.H. A.V.12 type, and these are driven from the trains of gears at one and a half times engine speed. Both electric and hand starters are fitted to this engine. The chief dimensions are as follow :—

Bore	110 mm.
Stroke	135 mm.
Total stroke volume	15,395 c.c.
Normal speed of engine	2,000 r.p.m.
Fuel consumption	·54 pint per b.h.p. hour.
Ratio of reduction	1·57 to 1.
Weight of engine "dry"	845 lbs.

The "Matabele" 400 h.p. engine is similar to the "Manitou" with regard to the general layout, the cylinders being similarly cast and disposed on the crankcase. The valves are likewise four in number (two inlet and two exhaust) and the valve gearing is exactly similar to that of the above-mentioned engine.

The propeller drive is likewise indirect, the gear reduction ratio being in this case 1·63 to 1. Carburation is by means of two Claudel Hobson H.C. 7 (twin type) carburettors arranged for gravity feed, and ignition is effected by means of four P.M. magnetos driven from the trains of gears. In this engine the starting is either by compressed air or by the hand starter. The chief dimensions are as follow :—

Bore	122 mm.
Stroke	160 mm.
Total stroke volume	22,429 cc.
Normal revolutions	2,000 r.p.m.
Fuel consumption	·54 pint per b.h.p. hour.
Weight of engine "dry"	1,000 lbs.

The "Sikh" engine as mentioned before, considerably differs from the other three. It has twelve separate steel cylinders machined all over, and welded together with their jackets, the disposition on the crankcase being the same as in the smaller twelve-cylindered type. There are three inlet and three exhaust valves to each cylinder, the method of valve gearing being by push rods and rockers actuated by a single central camshaft driven as usual from the trains of gears. Eight die-cast white-metal bearings carry the hollow crankshaft, and the propeller shaft is driven indirectly by spur gear, the thrust being mounted on an extension of the crankcase cast on the engine.

Carburation is effected by means of four Sunbeam Claudel carburettors of special form, two being situated at each end of the engine. Ignition is by four twelve-cylindered magnetos driven by skew gear and fitted with Vernier type coupling to allow of fine adjustment. Both hand and electric starters are fitted to this engine. The chief dimensions are as follows :—

Bore	180 mm.
Stroke	210 mm.
Total stroke volume	64,113·6 c.c.
Normal speed of engine	1,400 r.p.m.
Fuel consumption	·51 pint per b.h.p. hour.
Ratio of reduction	1·526 to 1.
Weight of engine "dry"	1,952 lbs.

◆ ◆ ◆ ◆

Knighthoods for Australian Flyers

Just as we go to Press we learn from the Air Ministry that H.M. the King has conferred the honour of Knighthood of the Order of the British Empire (Civil Division), upon Capt. Ross Smith, M.C., D.F.C., A.F.C., and his brother, Lieut. Keith Macpherson Smith, late R.A.F., in recognition of the valuable services rendered to aviation by their successful flight in the Vickers-Vimy-Rolls from England to Australia. The King has also approved of the award of a bar to their Air Force Medals to the two mechanics Sergt. W. H. Shiers, A.F.M., and Sergt. J. M. Bennett, A.F.M.

General Seely's Successor

Major G. C. Tryon, M.P., has been appointed Under-Secretary for Air in succession to Major-General the Right Hon. J. E. B. Seely, C.B., D.S.O., M.P., resigned.

Air Mail Service to Paris

The Postmaster-General announces that no air mail will be despatched from London to Paris on December 25, 26 and 27.

A Handley-Page at Warsaw

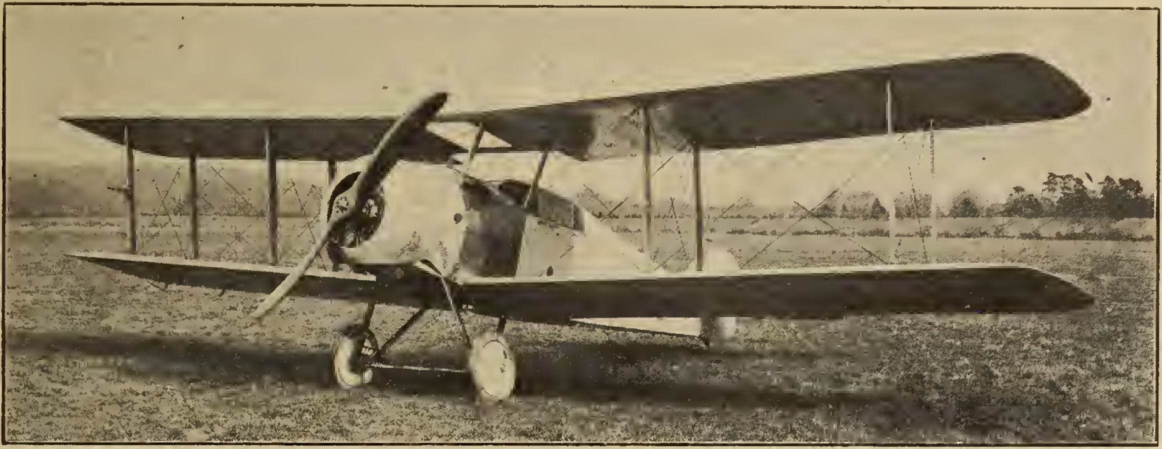
The Handley Page which Capt. E. D. C. Herne and Capt. Davis flew from London, safely reached Warsaw on December 20.

The Caterham Fatality

At the inquest on Lieut. S. B. Bradley, the pilot of the machine which crashed at Caterham, the opinion was expressed that he was flying along the base of a cloud which pinched him lower and lower until he struck the tree on the top of a hill while trying to reach Kenley aerodrome. A verdict of accidental death was returned.

SOME POST-WAR SOPWITH MACHINES

The Sopwith Aviation and Engineering Co. is by no means disposed to rest upon its laurels, and testimony to this effect is furnished by the origination of the three new peace types: the "Dove," the "Gnu" and the "Transport." Further, the company's design and experimental department is being maintained at its full strength and is as busy as ever. Some interesting developments are likely to be heard of in the near future. With the single exception of lighter-than-air craft their experience as that of pioneer designer-constructors covers all types of aircraft, flying boats, sea planes and "land" machines. Furthermore they have built, and had standardised, everything from bombers and torpedo-carriers to high-speed scouts, and in every type they have attained eminence. No better proof of this could be asked than the way in which their type names have become household words.



The Sopwith "Gnu" three-seater limousine, 200 h.p. B.A. 2

The "Transport" can be adapted for use either as a cargo machine or for the purpose of conveying passengers. In the former case, accommodation is provided for one pilot and passenger with 1,500 lbs. of cargo, and in the latter, arrangements are made for carrying five passengers and one pilot, four passengers being carried in the centre of the machine and one in the pilot's cock-pit behind the wings.

Petrol is carried for six hours at a cruising speed of 90 miles per hour in the case of the passenger carrier, and, when adapted for use as a cargo machine, fuel is provided for 8 hours at a cruising speed of 90 miles per hour.

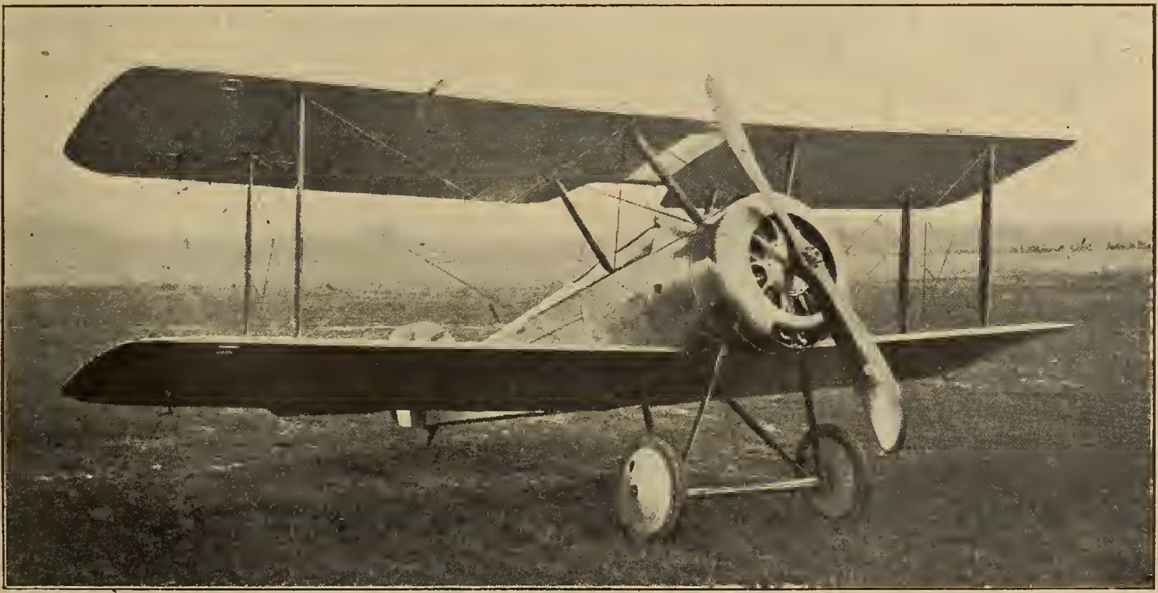
The construction of this machine is on normal lines.

It is of interest to note that the "Transport" is practically identical with the machine upon which the Atlantic flight was attempted last May, and is also very similar to the "Wallaby" upon which Capt. Matthews flew to Australia, which was described in Flight for October 16 last.

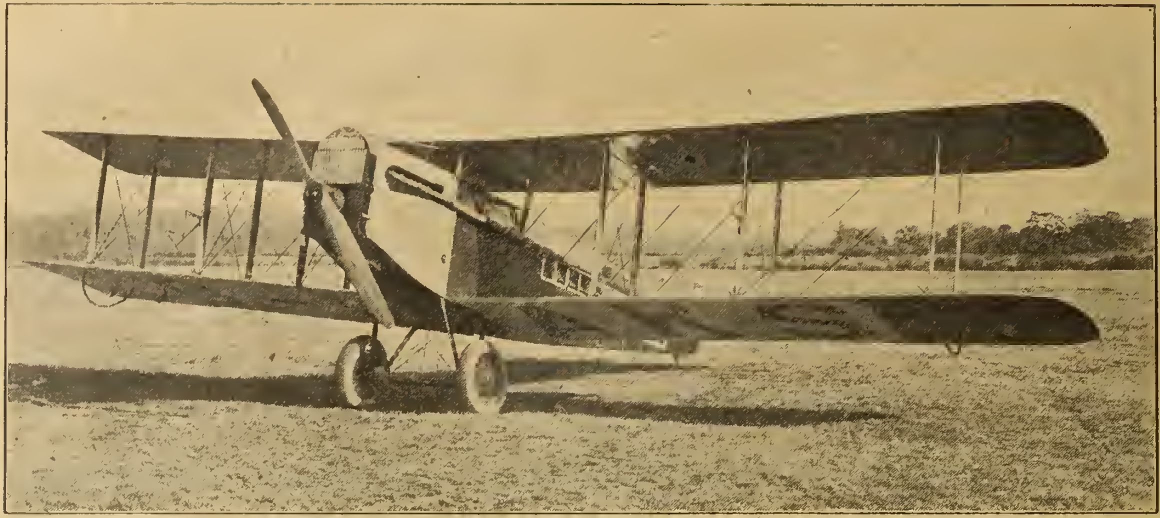
It is fitted with an "Eagle 8" Rolls-Royce engine, and has a factor of safety of 6·5. An adjustable tail plane is fitted. The following are the principal characteristics of both the passenger and cargo types.:—

Span, 46 ft. 6 ins.; chord, 6 ft. 3 ins.; stagger, 3 ins.; dihedral, 2½°; overall length, 28 ft.; height, 12 ft.; area of main planes, 547 sq. ft.; weight of machine fully loaded, 5,500 lbs.; speed, 115 m.p.h.

The "Gnu" is a light high-performance three-seater passenger or goods machine of the single-engined tractor type, having an enclosed cabin for the passengers or goods at the rear of the main planes. There are two models of the "Gnu," but these differ only as regards the engine fitted, and, consequently, in the performance. In one model a 110 h.p. Le Rhone is fitted, and in the other a 200-h.p. Bentley rotary, the latter giving an extra 17 m.p.h. in the speed and a slight increase in range and climb. The general construction conforms with usual practice and the factor of safety is 6. The following characteristics apply to both models. Span, 38 ft.; chord, 5 ft.; gap, 5 ft.; stagger, 11 ins.; dihedral, 2½°; overall length, 25 ft. 6 ins.; height, 10 ft.;



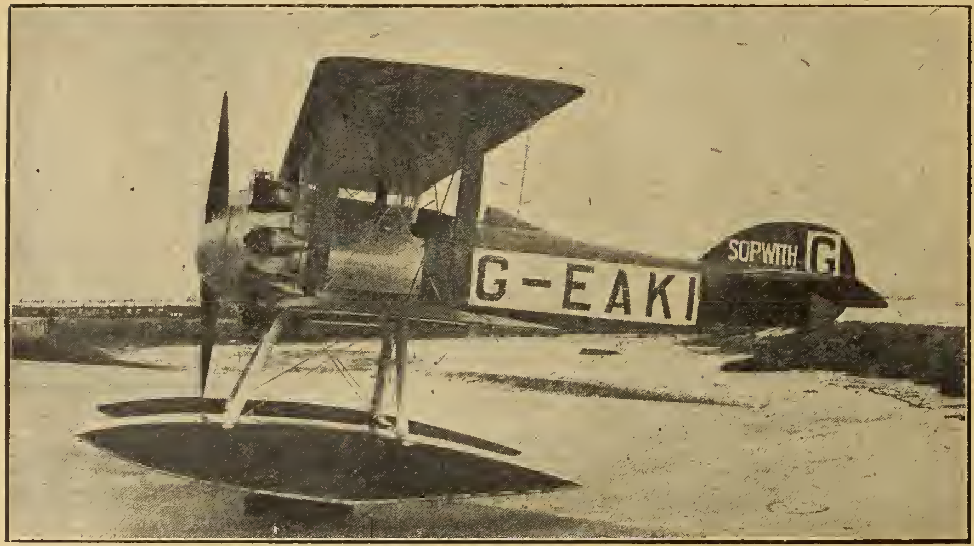
The Sopwith "Dove" sporting two-seater, 80 h.p. Le Rhone



THE SOPWITH " TRANSPORT " PASSENGER OR GOODS MACHINE, 375 h.p. ROLLS-ROYCE : This machine is similar to the " Atlantic " and Australian (" Wallaby ") machines

area of main planes, 350 sq. ft. ; weight fully loaded, 2,160 lbs. (Le Rhone), 2,400 lbs. (Bentley) ; maximum safe load 1,202 lbs. (Le Rhone), 820 lbs. (Bentley) ; loading per sq. ft. 6·1 lbs. (Le Rhone), 6·85 lbs. (Bentley) ; speed range, 53-93 m.p.h. (Le Rhone), 65-110 m.p.h. (Bentley) ; climb, 5,000 ft. in 7¾ mins. (Le Rhone), 5,000 ft. in 5½ mins. (Bentley) ; range, 220-300 miles (Le Rhone), 200-250 miles (Bentley).

The " Dove " is a sporting two-seater machine fitted with a Le Rhone 80 h.p. somewhat on the lines of the famous " Camel," etc., fighters. Its chief characteristics are as follows :—Span, 25 ft. ; chord, 5 ft. 1½ ins. ; gap, 4 ft. 6 ins. ; stagger, 1 ft. 4 ins. ; dihedral, 3° ; overall length, 19 ft. 6 ins. ; height, 9 ft. 6 ins. ; area of main planes, 213 sq. ft. ; weight fully loaded, 1,430 lbs. ; maximum safe load, 665 lbs. ; loading per sq. ft., 6·7 lbs. ; speed range, 60-100 m.p.h. ; climb, 5,000 ft. in 7½ mins. ; range, 200-250 miles.



The Sopwith "Schneider Cup" racing seaplane, 450 h.p. Cosmos " Jupiter "

The " Schneider Cup " seaplane was described in FLIGHT for September 4 last, so that a further description is unnecessary here, and the following brief characteristics should suffice. Span, 24 ft. ; chord, 5 ft. 1½ ins. ; gap, 4 ft. 6 ins. ; stagger (back), 2½ ins. ; overall length, 22 ft. ; weight, 2,200 lbs. ; speed (as land machine), 170-175 m.p.h. The engine is a 450 h.p. Cosmos " Mercury."

◇ ◇ ◇ ◇

Australia-Tasmania Air Mail

AN air mail between Melbourne and Tasmania was started on December 15, when Lieut. Long flew an Alliance machine across the Bass Straits from Hobart. A Sopwith also flew in the reverse direction from Melbourne.

Brazil and Aviation

Two Brazilian aviators, Alzir Rodrigues and Bento Ribeiro, have been selected by the Government to proceed to England and the United States to visit aviation works.

Thirty aeroplanes have been bought for the Brazilian Army, in France.

Air Transport in Czecho-Slovakia

A MESSAGE from Prague states that an agreement has been concluded between the authorities in the Czecho-Slovakia capital and the Airco concern for the establishment of air transport lines having Prague as their centre.

An Italian Government Competition

WORD comes from Rome that the Italian Government proposes to organise a competition for prizes aggregating 2,000,000 lire (£79,000 at pre-War value) for aeroplanes intended for post and commercial work.

Zeppelin Raid Memorial Church

IT is proposed to build a Memorial and Thanksgiving Church at Billericay, Essex, where, in the Zeppelin raid on September 23, 1916, one of the enemy machines was brought down by Maj. F. Sowrey, D.S.O. The present church is inadequate, and there is no vicarage. A site has been presented and a fund started, contributions to which may be sent to Messrs. Barclay and Co., Billericay, Essex.

SOME GOSPORT FLYING BOATS FOR 1920

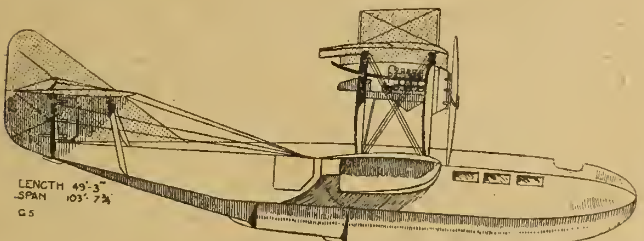
The flying boat programme of the Gosport Aircraft Co. for the year 1920 was arranged in conjunction with the late Col. J. C. Porte, C.M.G., who joined the staff early in August, 1919. Several new designs were produced, and the types which had proved so successful during the late War were considerably improved and modified to suit commercial requirements.

In this way four types were involved, consisting of a large, a medium, and two smaller flying boats.

It is unnecessary to describe in detail each type, as the general features are similar in all models. It is proposed, therefore, to describe briefly the medium-sized flying boat known as the "G. 5," and then to indicate any particular features or departures in the other types.

G 5.

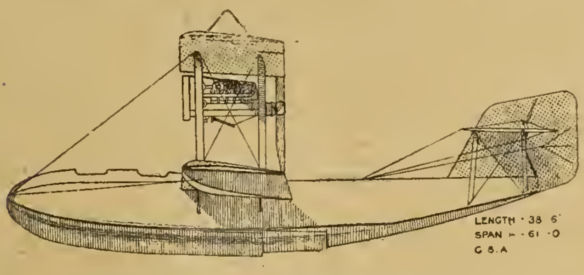
This flying boat was designed to fulfil the requirements of two quite distinct specifications in which moderately high speed was common to both. Owing to the roomy hull it will be realised that the same boat may be used for a variety of purposes provided the same aerodynamic qualities are retained throughout. Such being the case this flying boat was designed either as a carrier of passengers, mail and cargo, or either alone, or alternately as a machine to operate in Canada or in United States of America for the purpose of locating forest fires and carrying personnel and fire-fighting appliances to the conflagration in the shortest possible time.



The Gosport G 5 flying-boat, for passenger or goods

The utility of a flying boat in a country which is densely wooded but where there are numerous lakes and fairly broad rivers is easily understood.

From one of the accompanying sketches it will be seen that the G 5 or G 5A is a twin-engined biplane, generally fitted with two 365 h.p. Rolls-Royce "Eagle VIII" engines, but either 450 h.p. Napier "Lion" or 500 h.p. Cosmos "Jupiter" may be fitted.



The Gosport G 8a type flying-boat, of which the G 8 is a slightly larger model

The top plane, which is of larger span than the lower plane, is built up in five parts—a centre section, inner planes, and extensions.

The lower plane consists of two portions—a port and a starboard plane, attached to the hull at the wing roots. To the lower plane are fixed the wing tip floats, which are of boat type construction, double diagonal planking on the bottom and Saunders' consuta plywood on sides.

The whole wing structure is secured to the hull transverse bracing unit, which is continuous from port to starboard and integral with the main fore and aft hull structure. This is a feature of all these type hulls, and possesses great advantages over any other type so far built.

In one model the wing sections immediately above the engines are removable without disturbing the main structure thus greatly facilitating removal of the engines for overhauling, etc.

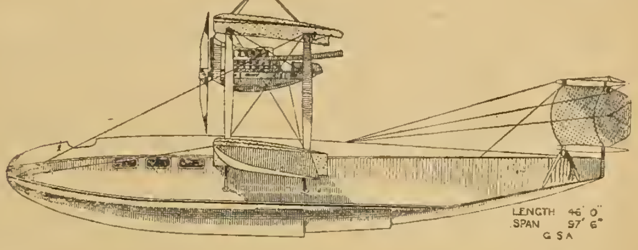
The tail unit may either be of monoplane or biplane type if the latter, the elevators on the top plane are operated by the control column in the usual way, while the lower elevators, which are not connected to the upper ones, are operated by a lever on a quadrant situated at the side of the pilot and parallel to the control column. This arrangement has been found to be very satisfactory, the lower elevators being used for trimming in the same manner as an adjustable tail.

All flight controls, which are of the usual type, are balanced, with the exception of elevators. The use of serve motors has been found unnecessary.

The engines are mounted on spruce bearers capped with ash, which in turn are supported by V-struts between top and bottom plane spars.

The radiators are situated in front of engines and supported by the same bearers. They are fitted with shutters and thermometers, both connected up to the engineer's cockpit.

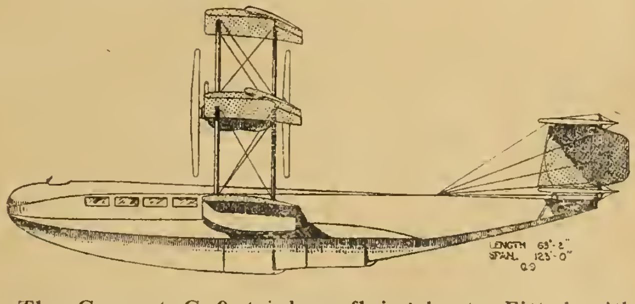
Inside the hull is carried a reserve water tank of 10 gallons capacity, from which make up water is circulated to each radiator separately by means of a small hand rotary pump. The overflow from the radiators is led by a pipe therefrom to an open funnel leading to the above tank. This renders the amount of overflow clearly visible to the engineer. A 10-gallon oil tank is fitted behind each engine.



The Gosport G 5a, which is a slightly smaller modification of the G 5

The petrol system is positive feed from main tanks by means of two centrifugal pumps to gravity tank situated in the top plane, thence by gravity to engines. In the event of failure of this system, petrol may be fed direct to engines from main tanks.

A hand pump of the semi-rotary type is fitted as a standby. The tanks are filled from a connection on the outside of the boat, thus keeping hull free from petrol.



The Gosport G 9 triplane flying-boat. Fitted with three engines, it is intended for long-distance cargo work

The pumps, which are situated about 2 ft. from bottom of tanks, are driven by a wind propeller through two sets of bevel gearing, thus doing away with a large suction head on the pump and so minimising risk of air leakage into the suction side of the system. A pipe leads from the bottom of each tank to a combined pump and distributor box, thence through non-return valves to the pumps via filters.

The hull, which is of the latest "Porte" type construction, forms perhaps the most important feature of these flying-boats. Before describing in detail the construction, it may not be out of place to say a few words about them generally.

They were evolved as the result of extensive full-scale experiments carried out during the past five years. As a proof of their sea and air-worthiness it may be remarked that during a deriod of eighteen months' operation of these boats from one seaplane station, a total of 198,600 sea-miles were flown without loss of one life. It may be described as rigid compared with the usual more or less flexible construction which follows high-speed motor boat lines.

The sides are formed by two braced girders running from bow to stern, similar to the ordinary braced *fuselage*. The top is also braced in the same way, and is covered with fabric laid on formers to give a good streamline form. A deep built-up keelson and a continuous keel run from bow to stern in the usual manner. Built-up floors connect up the keel to the two bottom *longerons*.

Timbers spaced about 9 in. apart run without a break from top *longeron* on one side, over keel to top *longeron* on the other side. The planking, which is double diagonal, runs from keel to top *longeron* on either side and is continuous round the fin chine, thus eliminating two joints which are always troublesome to keep water-tight. The steps, two in number, are detachable without interfering with hull planking, and are supported on fore and aft ash bearers. At the wing roots there is a complete transverse bracing unit under each spar connecting up port and starboard lower planes.

Two great advantages result from this construction. Firstly, all flight loads are directly coupled up in one complete structure, thus ensuring the machine keeping in truth—this applies especially to the angle between tail plane and main planes. Secondly, the resultant weight of the complete boat passes through the keel, thus avoiding distortion and local stresses when on the trolley.

"G 8".

The "G 8" was produced to meet the demand for a small, handy, reliable flying-boat, in which high top speed was not essential. It has a very low landing and getting-off speed, and owing to the fairly large hull is dry and seaworthy.

It may be used for a variety of purposes, such as carrying small quantities of mails and cargo, and for police and patrol duties. It also makes an ideal training machine. It is a pusher biplane fitted with one 270 h.p. Rolls-Royce "Falcon" engine. The hull construction and lines are similar to the "G 5" already described. The superstructure calls for no particular comment, apart from the centre section.

As with the "G 5" the top centre plane is quickly removable without disturbing the main planes, thus rendering the engine very accessible.

The machine is of very robust construction, and has a factor of loading of six throughout.

"G 8A".

The "G 8A." with exception of superstructure and engine is identical to the "G 8". It was produced to fulfil the demand for a small, fast flying-boat.

It may be fitted with either a 360 h.p. Rolls-Royce "Eagle 8" engine, or a Napier "Lion," or a Cosmos "Jupiter."

"G 9".

This flying-boat was designed primarily to carry mails and valuable cargo long distances over the sea.

It is a triplane, and fitted with three 600 h.p. Rolls-Royce "Condor" engines, or two 1,000 h.p. Cosmos "Hercules" engines.

The general design is similar to the "G 5," and is designed to a factor of loading of four throughout.

Type.	Span.		Chord.		Gap.		Area main planes.	Weight full load.	Useful load.	Speed range.	Crew.	Pass.
	ft.	in.	ft.	in.	ft.	in	sq. ft.	lbs.	lbs.	knots		
G 5 ..	103	0	8	0	8	6	1,410	12,500	4,980	45–87	2	6
	74	0										
G 5A	97	6	9	0	8	6	1,440	12,500	5,030	45 88	2	6
	65	0										
G 8 ..	79	0	7	3	8	6	910	4,850	1,390	36–74	1	3
	51	0										
G 8A	61	0	7	3	8	6	700	5,250	1,650	45–87	1	3
	40	0										
G 9 ..	113	0	10	0	8	6	1,380	28,800	9,340	45–95	3	10

* * *

HONOURS

It was announced in a supplement to the *London Gazette*, on December 16, that the King has been pleased to approve of recognition being accorded, as indicated below, to Officers and other ranks of the Royal Air Force, for gallantry while Prisoners of War in escaping, or attempting to escape, from captivity, or for valuable services rendered in the Prison Camps of the Enemy:—

Bar to the D.S.O.

Wing-Com. E. F. Briggs, D.S.O., O.B.E.; Wing-Com. C. E. H. Rathhorne, D.S.O.

Mentions.

The following have been mentioned in reports for valuable services while in captivity, and noted accordingly in the Official Records of the Air Ministry:—

Lieut. A. T. Adams (Wilts R.); Flying-Offr. G. C. Atkins; Lieut. A. N. Barlow; Flying-Offr. C. B. Bird, M.C.; Lieut. N. A. Birks; Lieut. C. W. Blain, A.F.C. (deceased); Capt. G. K. Blandy; Flight-Lieut. B. J. W. Brady, D.S.M.; Lieut. Sir A. W. Brown, K.B.E. (Manc. R.); Flying-Offr. R. S. Capon (L'pool R.); Flying-Offr. G. L. Carter; Lieut. H. K. Cassels; Flying-Offr. A. C. Collier; Flight-Lieut. E. J. Cooper, D.S.C.; Lieut. A. H. M. Copeland; Lieut. H. Cotton (Quebec R.); Lieut. A. Couston (Aus. F.C.); Sec. Lieut. V. Dougall (Can. Flying Corps); Lieut. A. T. Easom; Pilot Offr. H. Edwards; Lieut. W. B. Ellis (A.S.C., T.F.); Wing-Com. P. F. M. Fellowes, D.S.O.; Flying-Offr. J. J. Fitzgerald (R. Innis. Fus.); Lieut. R. J. Fitzgerald (12th Glouc. R.) (deceased); Capt. G. C. Formilli (R.G.A.); Lieut. C. E. French (6th Can.); Flying-Offr. E. J. Fulton (Ind. Army); Lieut. E. P. Fulton; Flying-Offr. E. H. Garland (N.Z.F.C.); Sec. Lieut. A. C. Geen; Lieut. R. S. Gilhert; Sqn. Ldr. (A./W.C.) R. Grey, D.S.O. (Gren. Gds.); Lieut. D. Grinnell-Milne (R. Fus.); Flight-Lieut. J. O. Groves; Capt. W. L. Haight (R.F.A.); Lieut. H. D. Hamilton (N.Z.F.C.); Lieut. P. F. Heppell (R.A., T.F.); Flying-Offr. H. E. Hervey, M.C.; Lieut. A. B. Hill; Capt. T. G. Holley (13th Can. R.); Flying-Offr. F. N. Hudson, M.C. (E. Kent); Lieut. E. P. Hyde (6th Ches. R.); Flying-Offr. H. Ibhotson; Lieut. W. C. Jameson (R.N.V.R.) (deceased); Lieut. M. M. Kaye; Flying Offr. H. Kirby; Flying-Offr. F. R. Knapp; Flying-Offr. W. E. Knowlden (Bord. R.); Flight-Lieut. C. Laurence; Capt. D. Leeson (7th Can. R.); Flight-Lieut. J. M. D'A. Levy; Lieut. V. O. Lonsdale (R.F.A.); Lieut. H. O. Macdonald; Flight-Lieut. L. D. McKean; Lieut. R. R. Macintosh; Lieut. G. D. McLeod; Flight-Lieut. T. G. Mappleheck (L'pool R.); Capt. F. W. Mardock; Flying-Offr. M. J. J. G. Mare-Montemhault, M.C. (Yeo.); Lieut. L. Marsh; Sec. Lieut. N. H. Marshall; Lieut. H. W. Medlicott (deceased); Lieut. H. B. O. Mitchell, M.C. (R. Innis. Fus.); Lieut. L. A. Newhold (Essex R.); Maj. R. W. Nichol; Flying-Offr. L. G. Nixon; Capt. J. C. F. Owen, M.C. (Can. A.S.C.); Lieut. J. K. Parker (R. Sco. Fus.); Lieut. (A./Capt.) R. O. Purry; Capt. Sir R. J. Paul, Bt. (Egyptian C.S.); Flying Offr. L. J. Pearson (R.E.); Flight-Lieut. S. L. Pettit (R. Fus.); Flying-Offr. A. W. Phillips; Capt. K. Rawson-Shaw (R.F.A.); Flying-Offr. C. Reece (4/Ches. R.); Flying-Offr. W. A. Reeves (E. Surr. R.); Flight-Lieut. G. H. Reid, D.F.C.; Flying-Offr. A. R. M. Rickards; Lieut. J. G. Robertson (Can. M.R.); Flying-Offr. J. B. Rohinson; Capt. W. L. Robinson, V.C. (Worc.) (deceased); Lieut. N. C. Saward (R.A., T.F.); Lieut. A. T. K. Shipwright; Lieut. W. C. Short; Sec. Lieut. A. S. Sinclair; Flying-Offr. A. H. Skinner; Lieut. S. Smith, D.C.M.; Lieut. C. Smythe, M.C. (Can. Fd. Art.); Flying-Offr. (Hon. Flight-Lieut.) E. J. Strover (3rd Brahmans); Lieut. W. Taylor (R.F.A.); Lieut. C. D. Thompson (Hon. A. Co.); Capt. R. J. Tipton (3/W.L. Bde., R.F.A.) (deceased); Flight-Lieut. H. C. Vereker; Lieut. (Hon. Capt.) E. G. S. Walker; Flying-Offr. A. A. Ward (R.A); Flying-Offr. R. Watts; Flying-Offr. (Hon. Flight-Lieut.) T. R. Wells, M.C. (33rd Punjahis); Capt. T. W. White, D.F.C. (Aus. F.C.); Sec. Lieut. B. O. Wilkin (D.C.L.I.); Lieut. W. O. B. Winkler (R.G.A.); Lieut. D. B. Woolley; Capt. F. C. C. Yeats-Brown, D.F.C. (Ind. A.).

No. 200449 Sergt.-Obsr. H. Brooks; No. 46448 Actg.-Corp. O. W. A. Grant; No. 208940 Air-Mech. W. W. Higby; No. 201866 Ldg.-Mech. D. Kennedy; No. 207252 Sergt. E. E. Smith.

Foreign Decorations.

The King has granted unrestricted permission for the wearing of the undermentioned decorations, conferred upon the Officers and other ranks indicated for valuable services rendered in connection with the War:—

CONFERRED BY THE PRESIDENT OF THE UNITED STATES.

Distinguished Service Medal.

Air Vice-Marshal Sir G. M. Paine, K.C.B., M.V.O.; Air-Commodore A. V. Vyvyan, C.B., D.S.O.; Air-Commodore C. L. Lamhe, C.B., C.M.G., D.S.O.; Air-Commodore R. M. Groves, C.B., D.S.O., A.C.F.; Group-Capt. (A./Air-Commodore) E. M. Maitland, C.M.G., D.S.O., A.F.C.; Lieut.-Col. J. C. Porte, C.M.G. (deceased); Maj. G. C. Neilson.

Navy Cross.

Maj. W. C. Grant.

CONFERRED BY THE PRESIDENT OF THE FRENCH REPUBLIC.

Croix de Guerre, with Bronze Star.

Flight-Lieut. R. Whitaker, M.B.E. (Rfl. Bde.).

Croix de Guerre, with Palme.

Flying-Offr. C. R. Keary, late 43rd Sqdn.; Ohsr.-Offr. E. B. C. Betts, D.S.C., D.F.C.

CONFERRED BY THE KING OF ITALY.

Cavalier, Order of the Crown.

Capt. E. Newman (formerly R.A.O.C.).

Bronze Medal for Military Valour.

No. 3203 Sergt. G. A. Prowse, 17th Sqdn.

CONFERRED BY THE KING OF THE HELLENES.

Greek Medal of Military Merit, 2nd Class (with Silver Palm).

Wing-Com. C. R. J. Randall, C.B.E.

Greek Military Cross, Class 3.

Mar. W. S. Scott, M.C., A.F.C.

CONFERRED BY THE SULTAN OF EGYPT.

The Order of the Nile, 4th Class.

Pilot-Offr. W. Pightling.

Corrections.

Actg. Matron-in-Chief Miss J. M. Cruickshank, R.A.F. Nursing Service (formerly attd. Q.A.M.N.S.I.), awarded the Royal Red Cross, 1st Class, in *Gazette* of October 10, 1919, is now correctly described.

Flying-Offr. C. A. Bouchier, D.F.C., awarded the Distinguished Flying Cross in *Gazette* of November 18, 1919, is now correctly described.

No. 214290 Signalman W. H. C. Hazlewood, A.F.M. (subsequently Cadet No. 181167), awarded the Air Force Medal in *Gazette* of September 21, 1918, is now correctly described.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE FLYING SERVICES FUND COMMITTEE.

A Meeting of the Flying Services Fund Committee was held on Monday, December 15, 1919, when there were present :—Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., in the Chair, Mr. Chester Fox, Squadron-Leader T. O'B. Hubbard, M.C., R.A.F., and the Secretary.

Applications for Assistance.—Twenty-seven applications for assistance were considered, and Grants and Allowances were voted amounting to £290.

HOUSE COMMITTEE.

A Meeting of the House Committee was held on Tuesday, December 16, 1919, when there were present :—Mr. Ernest C. Bucknall, in the Chair, Mr. Henry Knox, Mr. J. Stewart Mallam and the Secretary.

SPECIAL COMMITTEE MEETING.

A Special Meeting of the Committee was held on Wednesday, December 17, 1919, when there were present :—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Lieut.-Col. Spenser, D. A. Grey, D.S.O., Squadron-Leader T. O'B. Hubbard, M.C., R.A.F., Lieut.-Col. Mervyn O'Gorman, C.B., Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., and the Secretary.

Election of Members.—The following New Members were elected :—

Percy Arthur Brooksbank.
Flight-Lieut. Leonard Herbert Cockey, R.A.F.
Capt. Alexander Paul Davidson, R.A.F. and H.L.I.
Flight-Lieut. Joseph Stewart Temple Fall, D.S.C., R.A.F.
Maj. Frederick Whittington Gamwell, R.A.F.
Capt. John Osborn Groves (late R.A.F.).
Capt. Geoffrey Herbert Hooper (late R.A.F.).
Flight-Lieut. Gerald Edward Livock, R.A.F.
Hon. Sec.-Lieut. Douglas Marsh Mackay (King's Liverpool Regiment).
Flight-Lieut. Thomas Henry Newton, R.A.F.
Lieut. Cuthbert Hanson Oliver (S.R.).
Charles Osenton.

Temporary Honorary Membership.—Lieut. W. Coppens, Belgian Air Attaché.
Capt. Gilbert de la Ferriere, Asst. French Air Attaché.

Flying Services Fund.—The report of the Meeting of the Flying Services Fund Committee, held on December 15, 1919, was received and adopted.

House Committee.—The reports of the Meetings of the House Committee, held on December 2 and 16, 1919, were received and adopted.

Fédération Aéronautique Internationale.—The following were appointed to represent the Club at the Meeting of the Bureau of the Fédération Aéronautique International to be held in Paris on Tuesday, January 6, 1920, at 10 a.m. :—
Lieut.-Col. Mervyn O'Gorman, C.B.
Mr. Harold E. Perrin (Secretary).

British Records.—On the motion of the Chairman it was unanimously resolved that the following British Records be granted :—

Pilot : Capt. G. W. Gathergood.
Machine : Airco 9 R. (Aircraft Manufacting Co., Ltd.).
Motor : 450 h.p. Napier " Lion " (D. Napier & Son, Ltd.).
Date : December 6, 1919.

Distance in a Given Time : Closed Circuit.

Aviator and 1 Passenger.

Time.	Distance.		k.p.h.	m.p.h.
¼ hr.	57·29 kilom.	35·60 miles	229·16	142·40
½ hr.	115·60 kilom.	71·83 miles	231·20	143·66

Speed : Closed Circuit without Alighting.

Aviator and 1 Passenger.

Distance	Time.		k.p.h.	m.p.h.
Kiloms.	Mins.	Secs.		
50	13	7	228·72	142·12
100	26	1	230·62	143·30
150	38	47	232·05	144·19

Great Britain—Australia Flight.—The following cablegram to the Prime Minister of Australia was confirmed :—

> " Subject to verification of machine, Capt. Ross Smith has fulfilled the conditions laid down by Australian Government for £10,000 prize for flight from Great Britain to Australia. The Royal Aero Club, under whose Competition Rules and auspices the flight was made, will award prize to Capt. Ross Smith. Royal Aero Club tenders its heartiest congratulations to the Prime Minister and all Australians on the successful accomplishment of this epoch-making flight."

The following message from Rear-Admiral H. S. Knapp United States Navy, dated December 11, 1919, was read :—

> " Permit me to congratulate you upon the successful completion of the England to Australia Fight. The indomitable pluck and perseverance of Capt. Smith and his crew is typical of the spirit of British airmen, and their accomplishmedt adds another glorious page to the history of aviation achievements."

" Daily Express " £10,000 Prize.—The regulations for this prize were approved.

Facilities for Touring.—Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., and Lieut.-Col. Spenser D. A. Grey, D.S.O., were appoiued a Sub-Committee to consider what steps the Club should take regarding the publication of aerial routes and maps for touring.

THE FLYING SERVICES FUND

(*Registered under the War Charities Act*, 1916)

Administered by the Royal Aero Club

For the benefit of *Officers, Non-Commissioned Officers and Men* of the Royal Air Force who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

Honorary Treasurer :

The Right Hon. Lord Kinnaird.

Committee :

H.R.H. Prince Albert, K.G. (*Chairman*).
Mr. Chester Fox.
Squad. Leader T. O'B. Hubbard, M.C., R.A.F.
Squad. Leader C. E. Maude, R.A.F.
Group Capt. C. R. Samson, C.M.G., D.S.O., R.A.F.

Secretary :

H. E. Perrin.

Bankers :

Messrs. Barclays Bank, Ltd., 4, Pall Mall East, London, S.W. 1.

Subscriptions :	£	*s.*	*d.*
Total subscriptions received to December 1, 1919	16,796	15	7
W. M. Lester	5	5	0
J. E. Rosen	1	1	0
Mrs. H. G. E. W. P. Consett ..	2	0	0
Anonymous	2	0	0
Capt. Leonard Miller. (Being instalment of the profits from the " Chronicles of 55 Squadron, R.F.C. and R.A.F.")	4	0	0
The Rt. Hon. the Earl of Moray ..	20	0	0
Rolls-Royce, Ltd.	105	0	0
Mrs. V. C. Johnson	26	5	0
Total, December 20, 1919	16,962	6	7

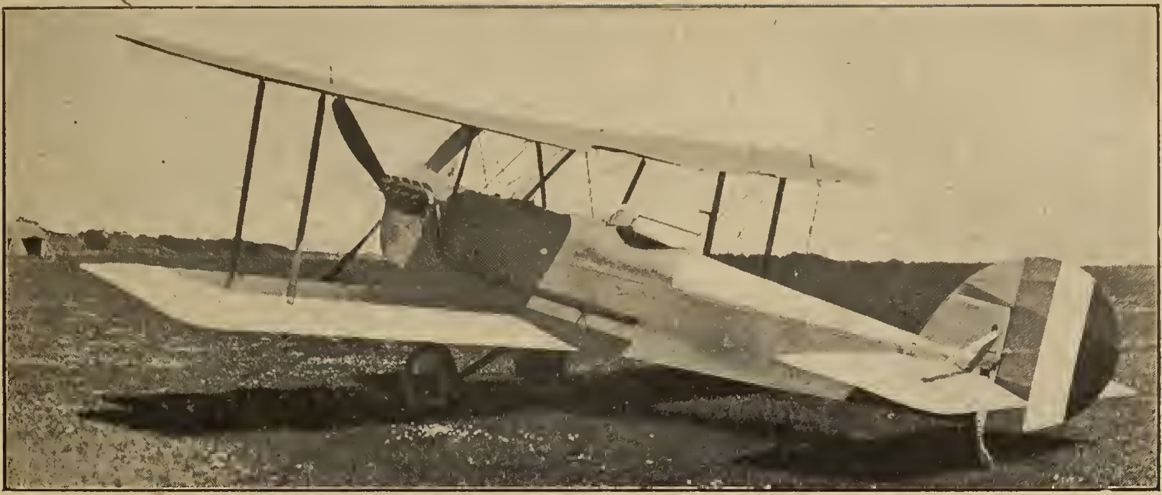
Offices : THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

AIRISMS FROM THE FOUR WINDS

What with Lord Rosebery's extremely straight and logical talks with Sir Howard Frank, representing the M.O.M., over the Turnhouse aerodrome Dora ramp; Mrs. Strickland Constable's complaints upon the same lines in regard to her property, Hornsea Mere, used by the R.A.F. during the War; Mrs. Tilke Macadam's action for £150,000 in the Scottish Courts against the W.O. for taking possession of her property of Craigengillan (including a portion of Loch Doon) and constructing railways and other works thereon, which proceedings she avers "were unwarranted and illegal"; Mr. J. Proctor's objection to the annexation, compulsorily, of his land at Manston Park, near Margate, besides several other claims upon the same basis throughout the country, the R.A.F. (as the passive medium) is figuring rather prominently just now with unenviable notoriety in the public eye.

But it's the bureaucratic Jacks-in-office—Lord Rosebery dubs them by very different names—who should be blamed, not the R.A.F. The flying units, like the fiddler, have done their best, but all the same they are the ones to be shot at, so far as the nominal responsibility applies. It is to be hoped that the action now being taken by some of these prominent champions of the people's rights may bring to light that a *little* justice in regard to *meum* and *tuum*, as between "the Crown," as represented by bureaucracy, and citizens, still exists. In Flight we have been for years up against this iniquitous ignoring of private rights at the expense and to the undoing of the individual, when the community *qua* community, should carry the burden of community obligations. Therefore, do we most heartily say "ditto" to all the views of Lord Rosebery and the other victims of the Dora "By Grace" ramp.

MOST ANNOYING: V.—After two years' active service with a fighting squadron in France, to be "wiped out" in England by a mail-bag dropped from above by a careless Handley Page pilot



THE BOULTON AND PAUL "P 9"

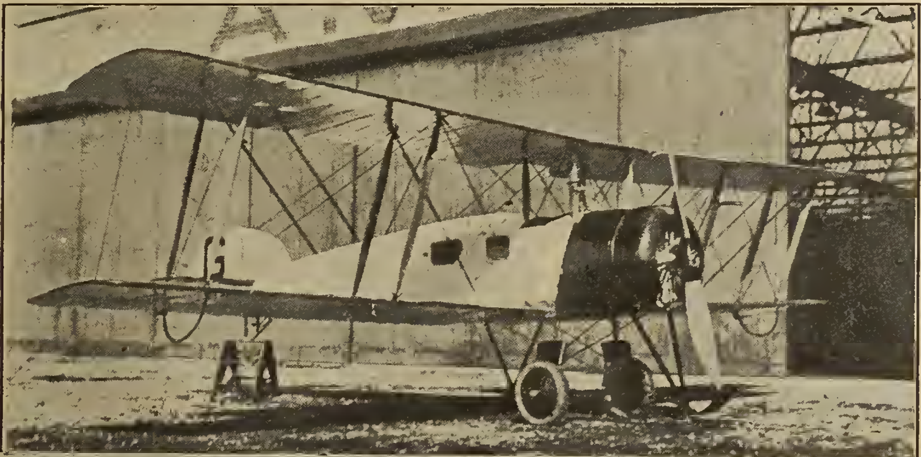
ABOUT half a column of type is being used in some of the lay press describing a "wingless flying machine" with "floating power in the air"; comparable with a "dirigible parachute," the "support" of which is "at the top of the structure" and so on. Why not cut it short and get down to business by referring to progress developments on the helicoptere principle?

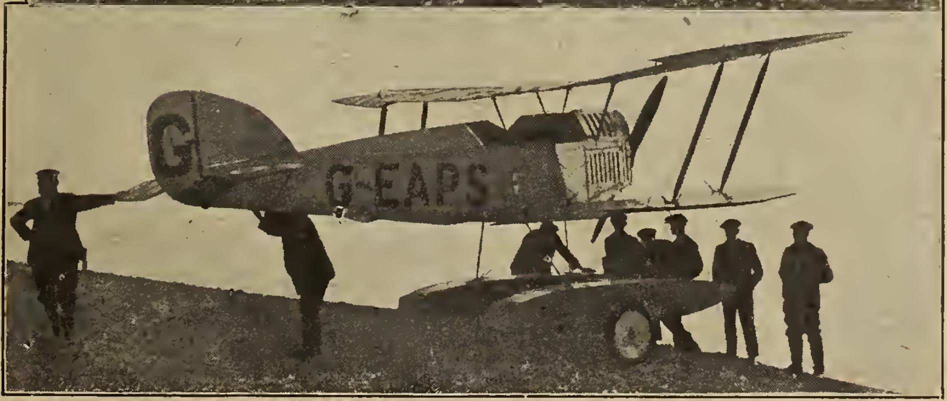
- - -

Is it to be the new Knight of the Garter, Lord Londonderry?

- - -

SIR HUGH TRENCHARD's scheme for the permanent organisation of the R.A.F. is as straight a statement of a case as one could wish to peruse. Sir Hugh, as throughout the War, has his whole heart and soul in the Force, and we are glad to see him coming a little more into the light with his views. An opportunity to emphasise the strong opinions he holds as to what the R.A.F. ought to develop into in the not far off future was offered him last week at the annual function of the Chartered Accountants' Students' Society, when Sir William Plender presided. In replying for "The Imperial Forces," Air-Marshal Sir Hugh Trenchard said the Army and the Navy were long established, and all recognised that each had a glorious record and great traditions, of which the Empire was justly proud, and during the Great War they had added honour and glory to those traditions. But the Air Force, with which he was connected, although it was a new branch of the Imperial Forces, had the air spirit just as much as the great naval spirit and the great military spirit. That spirit was shown in the War when, on one occasion, 12 machines went out to bomb Mannheim, but only one came back. Then a whole squadron went out without orders, and turned what looked like a defeat into a victory. That was the air spirit. One heard a good deal of the necessity of economy, which they were urged to enforce in their various walks of life, but he felt that aerial supremacy was as necessary as economy, and was as necessary as naval supremacy. As the importance of the air became greater, it must be the aim of all to keep that aerial supremacy which had been won by the young men in the Air Service. He hoped that





Two recent types of Avro biplanes: On the top is seen the "Limousine," which provides comfortable accommodation for three passengers, and has a speed range of 40-90 m.p.h. Below is the "Water Baby," an amphibious edition of the Aerial Derby-famed "Baby" those who helped to build it up would continue to offer their service.

– – –

A NOBLE champion in a noble cause. The tide *looks* like turning.

– – –

THE Medici Fountain in the Luxembourg Gardens, Paris, may well be deemed lucky, as a "dud" Hun bomb, apparently dropped by a Gotha upon one of their visits to the city, was found in the basin, which had been emptied for cleaning.

– – –

SANTA CLAUS, NEVER LAND. Addressed to "Mr. Santa Claus, Never Land," a post-card posted at Hampton-on-Thames, bore the message penned in childish letters: "Please send me a scooter at Christmas.—(Signed) Ailsa." (*Daily Paper*).

Deuced awkward for Ailsa, though, if Mr. Claus selects the Air as his route for delivery.

– – –

FOLLOWING the discoveries, by means of aeroplanes, of buried cities in Mesopotamia and Mexico, owing to the contours thus brought into prominence, a further use, upon similar lines, has been suggested by Mr. D. Gill Jenkins, of Camborne. He says:—

"My experience on the Dharwar Gold Field, India, taught me that lodes, old workings on lodes, dykes, and other similar formations are more plainly visible to the eye at a distance than at close quarters. This is due to a slight distinction in the vegetation on and off the formations. This difference would probably be accentuated by looking down at the country from an aeroplane.

"I therefore suggested to the Non-Ferrous Metal Trades Committee that it might be worth while Government experimenting on these lines in Cornwall, where I am confident there are hundreds of rich tin lodes yet undiscovered."

– – –

LIEUT.-COLONEL J. T. C. MOORE-BRABAZON has, in *The Times* this week, taken a hand in the question of a separate Air Force. He makes an excellent point in regard to the attacks which are the vogue amongst Army and Navy malcontents. He points out that: "Attacks on the continuation of a separate Air Force are at present fashionable, both from the Army and from the Navy, for it must be remembered that anybody who was really interested in air in either of those Services left those Services to join the Royal Air Force, and consequently at no time was the Air more friendless in the old Services than at present. The attacks delivered now are, indeed, extremely mischievous, for at present more than at any other time, it is necessary to weld the Royal Air Force into a homogeneous whole with an *esprit de corps*. Most of its officers are old Regulars from the Army and the Navy. They are already creating an Air Force tradition, but it must be remembered that, having made the profession of arms their lifework, and in that many of the acts they have to perform and policies they have to push may be against the desire of the older Services, it is difficult for them to continue acting wholeheartedly for the Air Force if there is this mischievous agitation to spread the belief that, sooner or later, they will be returned to their original Service."

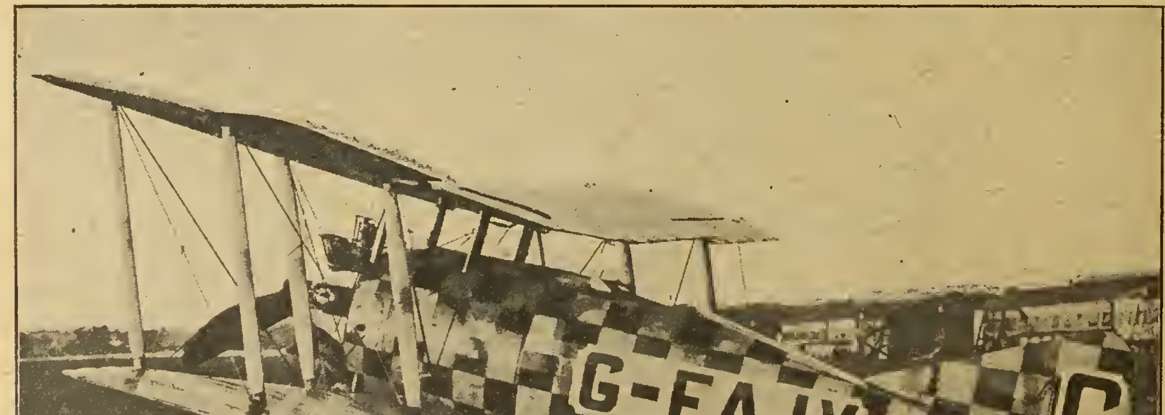
– – –

AMID the alleged crash of old institutions—none so great as people believe, for they have merely skidded awhile from a bad post-War landing—it is good to see the continued survival of that curious *revue*, the Westminster Latin play; none the less curious that it is not invariably Latin as meant, though unquestionably as spoken. As might have been expected, flight events have not been forgotten in its allusions, for which one understands the brothers Barrington-Ward—both past Captains of the School—are responsible. One does not presently remember the Latin author whose style included such mannerisms as "audistin" and "secretumst," but Ctesipho, "the controller of everything," means it well doubtless, as "Don't you hear?" for the beginning of an air-raid. Admiral of the Fleet Demea, however, having a telescope, will not commit himself so far, but merely says he sees nothing. Here, however, the Roman boy-scout rushes in, crying "Tecta petenda Omnibus," or "All take cover," in its freest translation; only to re-enter later with the news that it was a false alarm that came from our own pilots. Meanwhile Admiral Demea has evidently imagined himself back at the docks, sampling the coarser vintages of Tusculum, to which only could the phrase "Omnia clara" apply, for "All clear." One rather suggests "pertuta" or "exita" as the truer subjective participle.

Enter next—lest worse grammar befall—Aeschinus, the Transatlantic airman, replying to the boy-scout's "Hullo, what did you do in the great war, daddy?" "I came, conquered—and perished"; and to Admiral Demea's question "From what neutral coasts have you come?" answers "From America, in failing wings," and wearily, "that is so, and the machine is all broken up" "et in medi mea cauda defluit oceano" for "My tail dropped off in mid-ocean"; brightening up nevertheless with "But I earned the prize."

– – –

BETTER still, however, is his later squabble with Admiral Demea as to who won the War. the old man claiming that Ctesipho should really praise him rather than Aeschinus. For to the latter's scornful "What have you done?" the Roman Jacky Fisher replies that "We"—the Admiralty—built a huge and mysterious submersible vessel, which shall be nameless, and that "we" acted as advisers. Whereupon Aeschinus asks "Of what kind?" only to be told that it is a secret, among others which "are included in his book of memoirs." So with scorn he rejoins, "Oh you wicked old man, you work for the Times;" but Demea, not to be outdone, says, "And how much public money has been spent on you?" and "How many cars have you got?" After thinking, Aeschinus is forced to admit he has six. And so ends the tale with a further claim by Controller Ctesipho that "he invented that wonderful machine the tank."



A VERY SPORTY NIEUPORT SINGLE-SEATER: This machine is practically a modification of the "Night-hawk." It is said to possess a remarkable turn of speed

AVIATION IN PARLIAMENT

THE AIR ESTIMATES.

IN the House of Commons on December 15 the 1919–20 Air Estimates were considered in Committee to enable general questions to be raised.

Maj-Gen. Seely, in moving to reduce the vote for pay by £100, said the point which seemed to make these Estimates bad Estimates was that the man who was responsible for the expenditure of £40,000,000 to £50,000,000 now and would be responsible for the expenditure of 14 to 15 millions in future in a matter which more vitally affects our national defences, and, therefore, our national life, than almost any other, could not give more than one-tenth of his time to the business. There really was not time for a man who was Secretary for War to do all the workthat falls upon him, and to ask that man of all others to undertake the work of looking after estimates of this size, involving such important considerations, seemed a proceeding so extraordinary that he asked the Committee to say they would have no more of it. The arrangement was bad because it was contrary to the decision of Parliament, which had unanimously passed a Bill setting up a separate Ministry. It was also unfair to the Admiralty. If the advances made in connection with the dropping of torpedoes from aircraft continued, it was probably true that the whole of our conception of naval warfare and strategy would be completely altered.

He pointed out that the arrangement could not be justified on the score of economy, for the £2,500 saved on the Minister's salary would be more than absorbed by the liaison officers rendered necessary. It might be argued it was a step towards a Ministry of Defence, but it was really a step away from it.

Mr. Bonar Law: The right hon. gentleman took a line of argument which I think is entirely wrong. He laid before the Committee the vast work which this new force has got to do, and he seemed to assume that the man to do all this exploring and all this examination as to the future possibility of the air was the political head of the Department. I think that is entirely wrong. I should like to say this to my right hon. friend, that there is no part of our fighting forces in which I take personally so great an interest, and if I believed for a moment that the effect of this arrangement was to destroy the future usefulness of this service, I would be one of those most strongly opposed to it. But I do not think that is so, and I have looked at this matter entirely from the point of view, not of theory but of how it was working in the circumstances in which we are placed today, and I confess, without wishing to enter into the details, I really am at a loss to understand the position of my right hon. friend in this matter. It is idle to say that this arrangement is going back on statements made, amongst others by myself, that we were to have an ndependent Air Force.

Maj.-Gen. Seely: The Air Ministry.

Mr. Bonar Law: That does not depend on who is the particular individual who is political head of that Ministry. How could it? Over and over again in our political history one Minister has filled more than one post, and my right hon. friend has no more right to say that the Air Force is being sacrificed to the Army than those in favour of the Army would have the right to say that the Army was being sacrificed to the Air Force—absolutely no right. Therefore, in my judgment, the one question which the Committee has a right to know, and on which to ask for an answer, is whether or not it is true that it is impossible for one man to fill adequately the duties of the two posts. That is really the one question. There is one argument which has been suggested, and I admit at once it will be a vital argument, if sound. That argument is that, because the Secretary of State for Air is also Secretary of State for War, that therefore the Navy is being sacrificed to the War Office. If that were true, we could not have a worse arrangement. I have taken, so far as I could, some trouble personally to find out not whether this is a good plan in theory, but how it was working. I have consulted the heads of the Air Department, and I have spoken also to those who represent the Navy.

Maj.-Gen. Seely: The First Lord?

Mr. Bonar Law: Yes. Of course it is true that in any rearrangement of Services there must be great difficulties between the Admiralty and the Air Ministry. There must be, but those difficulties will only be great if he takes the point of view of the Army and not of Air in these questions. Difficulties will not arise in any other way. I have made it clear there are difficulties, but I can say with absolute confidence, after discussing it with the First Lord, that there is no reason whatever to suppose that the difficulties have been or will be greater because my right hon. friend happens to be Secretary of State for War than if he were dealing with them solely as Secretary of State for Air.

I think that is nearly all I have to say on this subject; but there is another aspect of it that is worth considering. We do not put this forward because we save £5,000 a year in salary. That would be childish, but I do ask the Committee to bear this in mind. If the Air Force is to be properly developed, and if you are to make the best of it, that does not mean that before you have a proper examination, and before the experts have gone into every aspect, that you have to continue a great expenditure of money. That is not really developing the Air Force. The Committee must bear in mind that there is an immense difference between a force which was spending close on £400,000,000 a year and a force which as far as we can see at present will spend £15,000,000 per year, or the equivalent of £6,000,000 pre-War money. There is something more than expense and efficiency involved in this matter. You may think that that Service is more likely to have its end kept up by a man of the distinction, if I may say so, of my right hon. friend, who has taken at least as much interest all through in the Air as any other Minister, than by somebody else who obviously could not be one of the most important members of the Cabinet. The two most important qoestions at the moment are demobilisation and the arrangement of the Air in relation to the Army.

Maj.-Gen. Seely indicated dissent.

Mr. Bonar Law: I am surprised my right hon. friend doubts that, if he does. Perhaps I am wrong, but I do not think so. Demobilisation and the Air Force go closely together. Assuming that my right hon. friend has not a bias in favour of the Army as against the Navy, if he has not, I think it is a distinct advantage that the same man should have both problems before his mind at the time he is working on them. But there is far more than that. In deciding the extent of the Air Force which we are to keep, we have got to go down to the other problem. "Very well," you say, "you need such-and-such squadrons in the East. Tell us how much infantry and how much artillery you are going to do away with in consequence of receiving these additional airmen." I am sure my right hon. friend opposite must see that these two problems, the question of the size of the Air Force and the size of the armed force, go closely together, and it is an advantage to have the same man looking at both from the same point of view—the view, namely, of getting the most efficient force, and at the same time the least expensive force, which the country can have. I am not going to say anything more. I do not suggest that this is a permanent arrangement, nor do I suggest that my right hon friend was made Secretary of State for Air merely because he was Secretary of State for War. That is not so; it was discussed between the Prime Minister and myself at the time the appointment was made, but the ground on which it was recommended was not that he was filling the position of Secretary of State for War, but that he was competent to fill the position of Secretary of State for Air and to do the War Office work as well. That is all.

Lieut.-Col. Moore-Brabazon: We have got to look at this thing from the point of view of what has happened, and I maintain that the publication of what I call the Trenchard Memorandum proves that the Government was perfectly sincere in what it said in saying that it was going to keep the two Services absolutely apart. I want to deal with the Trenchard Memorandum, which is undoubtedly the most interesting aeronautical document that we have ever had put before us, because we see in it a Service actually being born, and I hope that Labour will take a great interest in this, because now is the time to get that Service thoroughly democratic from top to bottom, with great possibilities for everybody to join early. It should be the great democratic force of the future. It was a great reform to get a single united Air Service. I see one or two lines in this Report which disturb me, and if I may I will read them:

> "In addition, there will be a small part of it (the Air Force) specially trained for work with the Navy and a small part specially trained for work with the Army, these two small portions probably becoming in the future an arm of the older Service."

Does that foreshadow a return to a small Royal Flying Corps and a small Royal Naval Air Service over and above a separate Air Force?

Mr. Churchill: No.

Lieut.-Col. Moore-Brabazon: I am glad to hear that. If the separate arm foreshadowed in that Memorandum ever comes about, could the Secretary of State tell us whether the cost of machines for those two separate Services will be borne on the Votes of the other Service and not on the Air Vote?

Mr. Churchill: They will be borne on the Air Force Vote.

Lieut.-Col. Moore-Brabazon: I want to make it clear that the position with regard to the Navy has changed fundamentally in this country because of the advent of aircraft. The Navy has lost for ever its claim to be able to defend us against attack, and we have got to remember that. There is no defence against aircraft to-day. The possibility of directing aircraft in a fog to a place hundreds of miles away and there dropping bombs without ever being seen is something there is no answer to today. The only answer is to have a bigger Air Force so as to have the potential power of hitting back. The first object of attack in any future campaign will be undoubtedly, not the military arm of the State, but the industrial arm of the State, and if a foreign Power were to endeavour to hit England, the first place she would try and hit us today would be in our industrial heart, in a place like Birmingham or Glasgow. Could the Army or the Navy possibly defend it? There is only one Force that could defend it, and that is the new Air Force.

Now I want to say a word on civil aviation. I hope Labour will take an interest in this question, because we see starting now a new power, a new industry, and, if we do not look out, new vested interests. What was at the back of the minds of the Advisory Committee was how to avoid building up a goodwill against the State, and to arrange some scheme whereby the State at some time could take control of all aviation throughout the world without having to pay for vested interests. The recommendation was that all aerodromes should be State-owned. The expenditure for that is not a very big item, and I should very much like to hear from the right hon. gentleman the Secretary of State for War whether the Government intend making good the recommendations of that Committee. I hope we shall hear from the Secretary of State for Air to-night that no policy of destruction in any particular will prevail on the Government that may spoil or impair the proud position this country holds today in aviation.

Mr. Lambert: The Leader of the House, in his speech defending the present arrangement under which by administration, and not by Act of Parliament, the Air Force has been placed under the Secretary of State for War, did not tell us whether it was to be a permanent arrangement or not. Supposing that a less brilliant man than the present Secretary of State for War were at the War Office, would the Air Ministry still be placed under his charge? It is no use talking of "co-operation with the Navy." It is the Navy's business to protect surface ships. If it is not the Navy's business, then I cannot understand whose business it is. We must not talk of co-operation. The protection of surface ships must be absolutely under the control of the Admiralty. I am going to argue that it is wholly wrong to put the Air Ministry under the War Office, and that it should be put under the Admiralty. The entry of officers into the Air Force, as I understand it, is to be through a cadet college. Anyone who thought about naval affairs felt the Navy was built up for ten years before the War upon the assumption that it was to meet the German menace, hence the colleges for the entry of cadets into the Navy were gradually expanded under the control of the First Lord at Osborne and Dartmouth. Are these two naval colleges required today? Are they to be filled up with naval cadets, as before the War? The Air Ministry propose to build a new college in Lincolnshire. Why build a new college when you have two colleges at Osborne and Dartmouth? After all, economy must have some weight with the Government. It certainly will have some weight with the country. Is it necessary to build a new Air College?

Again, let me take the boys. Sir Hugh Trenchard rightly says that the training is the most difficult problem in the formation of this Force; he advocates that the men should be brought in young. The Admiralty have got buildings for this purpose at Shotley and Harwich. Then there are the establishments, the *Vernon* and the *Impregnable* at Devonport. The boys are trained there. The Navy of the future will not be so big as was required in the past. Therefore, why cannot you utilise the Admiralty establishments for the training of the officers and men of the Air Force?

Mr. Mosley: I believe we are living in a period which is seeing what I may call the passing of the super-man or the "twilight of the gods." I do not for one moment say that if any man could fulfil this dual function my right hon. friend the Secretary for War and Air would not be capable of performing it. Surely, when we read that Memorandum and all the far-reaching proposals contained therein, we are impressed by the fact that it will take one man more than his full time to grapple with these problems. The contention of the Leader of the House, it seems to me, is that one man should make himself responsible for all these great innovations which we are now witnessing. In all the great ramifications of modern organisation the political head of the Department cannot go into every dettail. We all admit that. At the same time he ought to go into every detail he possibly can in a full-time job. If it had been argued that it would be better to set up a Minister who could exercise a joint supervision over the three Departments—Army, Air and Navy—delegating almost absolute power in matters of detail to three Under-Secretaries, that is a contention which we could have understood. At the present time, however, we have a most anomalous arrangement. There is no logical difference between three completely independent services with chiefs and a Ministry of Defence with three services co-ordinated by him under his control. The Leader of the House left us in the dark as to what was the future intention of the Government.

Maj. Glyn: I want to say a word or two with regard to the relation between the civilian side of aviation and its military aspect. In this breach we are dependent upon the extension of the civil side for numbers. If we had an independent Minister and air force we should not confuse it with the immediate requirements of the Army or the Navy. There is such interdependence between these forces that we should regard an aeroplane as a military weapon adaptible to civil conditions and able to be readapted to war purposes, and unless you have a Minister who will assist civil aviation we shall be hard put to it in time of stress to find the requisite number of machines. Just as declarations of war are becoming less and less formal in spite of the League of Nations, we must not overlook the possible use of the most modern means of any nation to gain its ends. What is to prevent a nation with plenty of aeroplanes making a sudden raid on a country not prepared for defence.

The pushing of the civil side of this problem necessitates the maintenance at least of an Under-Secretary, if not of a Minister, and when the time comes for the formation of a joint Imperial Staff the constitution of each of the Services should be considered equal.

Chemical science has developed very quickly, and just before the Armistice gas-bombs were improved and we had produced a gas so effective that if 5 per cent. of it was mixed with 100 per cent. of the atmosphere it proved fatal. We have to realise that you can now go to Cologne in an aeroplane in 3½ hours, and it would take that time to walk to Woolwich. What would be the feeling of our people if an enemy bombed Woolwich? There would be a tremendous outcry, and a demand that our defences should be made adequate. I think we should treat this subject of dealing with air warfare as a separate force. I think the greatest point of all is that in maintaining the Air Force you are maintaining a great prestige.

I think it is equally important to realise the state of affairs with regard to aeroplanes at the time of the Armistice. Germany on November 11 had 4,000 machines on the Western Front, and in reserve and in depôts and at schools she had 14,000 machines, and the output in Germany was estimated at 1,000 machines per month. Marshal Foch's terms were that Germany should surrender 2,000 machines. Of course, the French took their quota, but that leaves 8,000 machines unaccounted for. I think we should have demanded more aeroplanes and prevented the Germans from doing what the latest evidence shows they are doing. They have now 7,000 miles of aerial routes with alighting arrangements and definite transport services. This has been done to foster the power of striking in the air, and they are at the same time assisting their commercial industries.

What are the definite arrangements that have been made to encourage those who serve in the Air Force to be ready to man these machines which we hope the Government will keep in being, either by a direct subsidy or otherwise?

Rear-Admiral Adair: The Naval Air Force, I claim, is distinct and should be part and parcel of the Navy itself, and should never be dissociated from it as it was even in the R.N.A.S. We want it manned primarily by naval officers and seamen.

There must be an absolutely independent force. The whole atmosphere of the air is open to it, but it has nothing to do with the Navy. It seems to me that the Chief of the Staff thoroughly understands the situation. He advocates, just as I do myself, three forces, and I cannot help thinking that he is absolutely right. An Air Force today is an absolutely essential constituent part of the Navy. We cannot do without it at the present time. We have heard a great deal about the Navy of the future. Some people want to destroy it offhand, and others are a little more modest. There are those who say that it can no longer exist on the surface or as surface-borne ships. There is that very well-known officer who has been quoted several times who states that presently we shall have aerial armed battleships. It is quite possible that we may have all sorts of aircraft, but there is this about every type of aircraft, that nine-tenths of its time is spent either on the land or on the sea. Therefore, any Naval aircraft, whether it be a battleship or something else, should be manned by seamen, manned by men who are seamen first and aviators secondly.

I am not recommending the building of battleships at the present time. We must wait and see what are the possibilities of the future. I believe that in a very short time there will be craft, perhaps as big as a destroyer, normally floating on the sea, and steaming at a high speed, perhaps getting up to 70 miles per hour, as I mentioned just now, but when the occasion arises spreading her wings and travelling 150 miles per hour through the air. I foresee that, though I admit it may not be in my lifetime, but I do not foresee a battleship aircraft.

Who could possibly evolve such craft other than naval constructors, and, seeing that nine-tenths of their time they must be on the sea, who is going to man them except seamen, and, if they are to be evolved by naval constructors and manned by seamen, who can administer them other than the Admiralty? It would be really ridiculous to leave it to the Air Ministry, constituted as it is at present, to evolve such craft or to administer the personnel of them. My object has been to bring home to the Committee the fact that the Air Ministry are not competent to deal with the naval side of the question. The Chief of the Staff foresees that it will be a separate arm. It is a separate arm already, and its development as such must start at once under the auspices and direction of the Admiralty alone.

Capt. Wedgwood Benn: If such a misfortune were to happen as that we were to hand over to the Admiralty a part of the Flying Corps, that force would be amputated in a way which would produce atrophy and even death.

Were the hon. and gallant Admiral's suggestions to be accepted it would mean this, that you would get a type of pilot acquainted with a certain kind of machine only. At one air station they are all in favour of the F.3A. boat, while at another they say you cannot beat the Sopwith seaplane. It is one of the dangers in designing types of aeroplanes to give way to pilots' prejudices, for the pilot is not always a very safe guide as to the best type of machine to take the air.

I understand the plan of the Air Ministry to be to select boys who have passed through public schools. I believe they have rejected the plan of taking boys at 13—the Osborne or Selborne scheme—and have put that aside in favour of taking boys from public schools, because they say that public school education gives a boy a certain amount of "savvy," or self-confidence, which is so requisite for the handling of machines in the air. That may be true. I do not know whether it is so or not. But the difficulty is this: If you restrict your boys to boys who come from public schools you limit the choice to boys of a certain social class.

Mr. Churchill: There will be promotion from the ranks—from the mechanics, and so on.

Capt. Benn: Personally, I do not think promotion from the ranks meets the case. My experience is that people promoted from the ranks never have the status of the officers who have entered direct.

There is one other point that I want to emphasise. I think there is too much tendency in the Air Force to exalt the pilot at the expense of the science—I am using the words in the broadest sense. The man who is a stunt flyer and can perform in the air is apt, especially among the community, to get a predominance which is not altogether good for the Service. What is required is more the man who corresponds to the engineer in the Navy, the man who takes an interest in the scientific side of his work.

I suggest to the right hon. gentleman that the real course to pursue is not to standardise. It is quite obvious that, with the money at his disposal, he cannot possibly carry out the whole of the work of defence and the design of machines. I suggest, therefore, that his real course would be not to standardise a type which is already obsolescent—every type is obsolescent the moment it gets into the air—but rather to devote less money to that, and more to the encouragement of the civilian inventor

Mr. Churchill: First of all, I would like to refer to the financial aspect. In March, Air Estimates were presented of approximately £66,500,000, and the present Estimate is for £54,000,000, so that there is an apparent reduction of £12,500,000. I say "apparent" advisedly, because £11,250,000 out of those £12,500,000 are transferred bodily from the charges of the Air Ministry to those of the Ministry of Munitions, and the actual net saving to the public on the new Estimates over the old is only £1,250,000. I am very anxious that the House should clearly understand exactly what the position is, and should not think that we are in any way trying to mislead them as to the actual financial position. This £150,000,000 would have been greater by £2,000,000 if the airships had remained on the Admiralty Vote. We have had put on our charge £2,000,000 for airships which otherwise would have figured on the Admiralty Vote. Therefore the total net actual saving on the Air Estimates as now presented is £3,250,000. To this may be added a further almost certain saving on the Ministry of Munitions Vote through not going on with contracts instead of taking delivery of machines. That is to say that owing to the reduction in the demand we are wiping out contracts by compensation instead of by taking delivery, as was done the first few months after the Armistice. It is probable that the reduction will at least amount to £3,000,000, and it may be more; so that the total benefit to the Exchequer is in the neighbourhood of £6,250,000, to which may be added the £400,000 which my right hon. Friend was able to secure by his judicious sale of one of our airships to the United States, and possibly by other sales which are in contemplation and which were not foreseen when the Estimates were originally introduced. Therefore the saving is not £12,500,000, but the public may consider it is better off by the changes which have taken place by something between £6,000,000 and £7,000,000.

These Estimates which are now laid for the Army and for the Air Force are not the Estimates for next year. They are the Estimates for last year, which ought to have been presented in March. It was not possible to prepare them, and I promised that both Estimates should be laid before the end of the year. I am doing this in fulfilment of my pledge. But, of course, we are only separated by a few months from the time when the new Estimates will be introduced. By the end of February or the beginning of March whoever represents these Departments will lay the new Estimates before the House, and there will be a long series of opportunities of debate and discussion on all matters connected with Air and Army policy. I shall reserve till then the task of making a full statement on the Army.

I think it desirable to have published a full outline of the new scheme for the permanent post-War Air Force which has already been laid before the House. The post-War Air Force is much further advanced in shape than either the Army or the post-War Navy. This scheme has been worked during the year in considerable elaboration. The Estimates of 1918–19 for the Air aggregated £370,000,000, including the Vote for the Ministry of Munitions for aircraft. In 1919–20 they have fallen to £54,000,000, and the limit which the Cabinet has approved for the framing of the Air Force Estimate next year is approximately £15,000,000, so that whatever else may be said, a very great reduction is being effected in the scale of our expenditure. Discount it as you will, criticise it as you may, the fact remains that the whole standing of the Air Force has been in the currency of the present year reduced from its great War level of expenditure at more than £1,000,000 a day to an expenditure which will not exceed, in 1920–21, £15,000,000. These financial considerations are very necessary to bear in mind.

I hope the Committee will not underrate the very considerable merit of the achievement accomplished in elaborating this scheme. During the present year the Air Force has had to be reduced from an enormous war organisation, rapidly expanded in every direction, down to almost nothing, and a modest, compact, permanent peace-time Air Force is being erected out of and upon its ruins. Whereas the Army and the Navy both had permanent pre-War structures to fall back upon and reduce down to, and were strongly organised and established on that basis, the Air Force had nothing at all except its emergency War organisation. At the same time a double element of uncertainty was playing over the whole field, namely, uncertainty as to the rate at which the German and Turkish situations would allow demobilisation to be carried out, and, secondly, uncertainty as to how much money would be allocated for the permanent post-War Air Force. It was inevitable during this period of arrest, of dissolution, of uncertainty, and of reconstruction, that everyone should feel disquieted and uncomfortable. The Air Ministry had not only to work out plans for the future in all their detailed complexity, but they had to have two or three sets of alternative plans carried forward simultaneously through all their variations and complications, so as to be ready to come forward with a complete scheme at an early date, in accordance with whatever scale of Air Force was ultimately sanctioned by the Cabinet I confided this task to Air-Marshal Trenchard, and with his staff he has been engaged during the last three or four months on its execution. Early in October the Cabinet definitely approved a permanent organisation for the Royal Air Force on a scale of approximately £15,000,000 a year, of which the India charges will be borne by India. This organisation has now been elaborated in full detail, and every move in demobilisation, the transfer of stores, surrender of aerodromes, etc., has for some time past been made in direct relation thereto. The full organisation will, of course, be laid before the House when the Air Estimates for next year are produced. Meanwhile, we claim the fullest liberty within the ambit of the scheme now presented to make such variations, refinements and improvements as further experience and study may suggest. But the central principle which has always been followed throughout this year has been the maintenance of the independent status and identity of the Royal Air Force, and, secondly, the gathering to the Royal Air Force of all those elements necessary for its permanent integral existence. Every step, in fact, has been taken on the basis of there being three separate independent Services for sea, land, and air, respectively, capable of forming part of a higher organisation of Imperial defence as a whole, and no step inconsistent with this ideal has been allowed. Differences of uniform, decorations, etc., have been preserved by the Royal Air Force. A new set of ranks and titles, specially devised because they were distinct, as far as ingenuity could make them, from those in current use in the Army and Navy, have been brought into force.

Everything possible has been done to strengthen the Air Ministry and lend body to the Air Force. The Technical Department of the Ministry of Munitions has been transferred from the Ministry of Munitions to the Royal Air Force. Anyone who knows what is involved in that will realise how vitally important it was for the future independent organisation of the Air Service that this Technical Department should so be transferred. The meteorological research has been assigned definitely to the Air Ministry Civil aviation has been rescued from the ambitions of the Ministry of Transport or the Board of Trade and definitely assigned to the Air Ministry. All the course of the present year has, in fact, been occupied in building up by every means a separate independent Royal Air Force and in making an organisation which will effectively prevent any future combining up of the Air Service between the Army and the Navy. My hon. and gallant friend asked for a special assurance on that point, and I am glad to give it him so far as I and the Government are concerned, who are now responsible for the direction of affairs. We are moving forward with the scheme outlined by Sir Hugh Trenchard in his Memorandum in such a way as to make it extraordinarily difficult at a later stage to make any of those disruptive decisions which would bring the Air Force into two separate, subsidiary branches of the Army and the Navy, which would be fatal to the development of the air spirit and of the Air Force as a great new army. We are rapidly reaching a position which will make it almost impossible to arrive at such a change without the greatest amount of waste and expense should it be decided upon. It will take approximately, five years to bring the permanent post-War Air Force into the same kind of running order as were the pre-War Army and Navy. I do not mean that the scheme will not be carried out and brought into action very rapidly, but before you can have an Air Force running in a smooth, regular way as a permanent and long-established Service, in my opinion three, four, or five years will be required of continuous work in pursuit of a definite line of advance. Estimates have, accordingly, been worked out not for one year only, but for five years, subject, of course to such modifications as may be found desirable.

The R.A.F. is in want of practically every permanent institution of a disciplined service. No service has ever approached it in complexity. Nearly every trade and every science finds its part in aerial warfare. Even the complexities of the modern battleship, with all its technical departments grouped together in its vast machinery, falls far short in number and in delicacy of the subsidiary services which are essential to an efficient air force. Therefore, at the outset schools, colleges, training centres, experimental establishments of many different kinds have to be called into being and organised. Mr. Lambert thinks that because the Navy will not be training for the next two years so many officers as it was before the War, there will be a certain number of beds vacant at Dartmouth and Osborne, and he thinks that these extra places in the class rooms and the vacant beds in the dormitories may be made the birthplace, the cradle of this great new Air Force of the future. I do not think my right hon. friend's suggestion is practicable. The Air Force must have establishments of its own. I do not think you will ever build up a proper Air Force if you are to occupy any spare accommodation which may be found from time to time available in buildings at Dartmouth or elsewhere.

I am quite certain that the contraction in the Navy, while it may leave unoccupied some portion of some wing or annexe of these colleges at the time, just as the contraction at Sandhurst will leave some portion of the building not fully occupied, that contraction will not enable us to get there the schools or the class rooms required for the Air Force. We have to have these establishments for the Air Force. If it is to be a real living thing, it has to have its proper plant and accommodation in which it can settle down. The cadets have to be trained to be officers, and the officers have to be trained in the different specialised branches of their profession, and those branches involve the studying of the special needs of the Army, the Navy, and the Independent Service. The very list of schools and training centres, which is attached to the paper which has been published, which have to be created will show in a comprehensive and impressive way the complexity of the tasks which Sir Hugh Trenchard has had placed upon him. Officers have, further, to be trained to become air staff officers, to understand not only air warfare as such, but air warfare in combination both with the special and general requirements of the Army and the Navy. Mechanics have to be trained from boys upwards in all the different trades, some highly scientific trades, on whose trustworthiness the Air Service depends for its efficiency and the flying men for their lives. Fortunately, there is at the present time no lack of centres where new establishments can be set up. There are many enormous war plants which were called into being all over the country, and the task has been to select according to some concerted plan the best and most convenient centres for the R.A.F. At Cranwell we shall have the Air Force Sandhurst. At Halton there will be the Air Force staff. At Halton also there will be the main training establishments for mechanics and artificers, similar to those which the Navy had before the War on board certain ships. The photographic establishments will be at Farnborough, and the main wireless schools at Flowerdown. The gunnery school will be at Eastchurch. There will also be a navigation school. There will be three store depôts and two aircraft repairing depôts, one at Kidbrook, and the other at Donnibristle. All these establishments exist at the present time. The land is there and the roads are there, and an enormous amount of work has been done. The buildings are there, but although the centres are available the buildings are in nearly every case either lacking in completeness, or of the most flimsy wartime character.

It is quite impossible to maintain a permanent service in healthy discipline without that reasonable degree of comfort which can only be afforded by permanent habitation. During the next three years we have, therefore, to spend a considerable proportion of our limited funds available for maintaining the Air Force on bricks and mortar. That is to say, we have to replace the temporary buildings which can be used at the present time by permanent structures which will be satisfactory to the health and comfort of the personnel. However, during these same years, it happens fortunately that practically no new construction of aircraft is required except for experimental purposes. We shall continue repeatedly to experiment in type, each type an improvement upon the other, but we do not require any bulk production in the next two or three years in aircraft. We have left over from the War an enormous accumulation of stores and aircraft. The great accumulation in stores and aircraft enable reductions to be effected in both these votes. When you look at the Air Force's financial position on the basis of five years, and not on the basis of a single year, the convenience of that method of treating the subject becomes apparent, because it has been found possible to aim at balancing the initial expenditure on housing the R.A.F., by the initial saving in regard to stores and equipment arising from our special circumstances. Within that five years the estimates on the building programme is a constantly dwindling charge, while the technical equipment expenditure rises step by step to maintain on the whole a uniform level of estimate.

The £15,000,000, which is the approximate figure, includes £2,000,000 for research and civil aviation. That amount will be provided for in next year's Estimate. We are allocating £500,000 in the present year, and we have spent £329,000 on civil aviation in the present year. That is due largely because plans which had been formed did not fully mature within the compass of this year. Of course nothing would be worse than to try to spend money without obtaining full value for all the money that is spent, and without having a very judicious control over the expenditure.

Out of the £15,000,000 we are providing £2,000,000 for research and civil aviation. Here let me deal with those people who say, "It ought to be the other way round. You ought to provide £13,000,000 for research and civil aviation and the other £2,000,000 should be good enough to manage your military affairs." It is not a fair argument to say that the first charge ought to be civil aviation, and that the military needs should be provided for at a later stage. I must remind hon. members that we have still an Empre to defend. Odd as it may seem on the morrow of unheard victories, we have all those dependencies and possessions in our hands which existed before the War, and in addition we have large promises of new responsibilities to be placed upon us. The first duty of the R.A.F. is to garrison the British Empire. Out of the 24½ fighting squadrons which the Trenchard memorandum contemplates forming at once, no fewer than 19 are abroad, or will be stationed abroad. Eight will be in India, seven in Egypt, three in Mesopotamia and one is to be split up between the various naval bases. The maintenance of all these forces permanently abroad, the training of officers and men, the regular circulation of the units on the roster between home and abroad—because we intend to preserve the regimental idea very strongly in regard to the fighting squadrons of the Air Force—all these functions in the Air Force as in the Army will be found to absorb the greater part of the modest sum at our disposal. When to these are added the two fighting squadrons which are all we can maintain at home and the 2½ squadrons which will be working with the Navy, and the one which will be working with the Army—I am supposed to be exceptionally favourable towards the Army as against the Navy; but it will be seen that only one squadron is allocated to the military division as against 2½ allocated to the Navy—the rest of the force will be on independent duty abroad.

When we have considered all those, and the necessary schools and the training and experimntal centres and the general establishment charges, the whole of the available sum is absorbed with the exception of these £2,000,000. Necessity has to come first. The Royal Air Force is now reduced to the very minimum in finance which will enable it to discharge its peace-time military functions and to have an integral independent life as a permanent Service. If, therefore, larger sums are required for civil aviation, as some are inclined to demand, additional money must be voted by Parliament. That must be faced. I do not myself believe that it is the business of the Government to carry civil aviation forward by means of great expenditure of public money. Our business is first of all to do all we can to facilitate the development of civil aviation, to develop the routes and the key aerodromes, to develop the legislation, to assist in all those ways which are open to a Government Department to advertise and push British civil aviation. But the effort which is to sustain it must be a spontaneous effort arising from the country and the trade, and the best thing we can do in regard to that is to make sure that we do not get in the way of it.

I do not propose this evening to embark upon a lengthy statement on this subject. I will reserve that for the Estimates which will be presented in February, as I have so much to say on the military side this evening. But with regard to what my right hon. and gallant friend said on the subject of civil aviation, we have at the head of civil aviation in Gen. Sykes an extremely competent officer, who is throwing a great deal of personal ability into his task, and I feel with great confidence that his treatment of the problem of civil aviation from the Government point of view will be attended by the same measure of success as has attended Sir Hugh Trenchard's treatment of the military. I think it is a great achievement on the part of Sir Hugh Trenchard to have been able, within the narrow limits assigned to him, to work out a complete scheme which meets all the varying needs and duties with which he and the Royal Air Force were confronted. As to the provision for the Navy, very satisfactory relations have been established between the Air Staff and the Admiralty. Admiral Beatty in particular has shown that he is a sincere friend and well-wisher of the Royal Air Force. I look forward to the most favourable results from his co-operation. It is perfectly true that the Admiralty have not got what they asked for. They asked for a great deal more than they got, and I never remember a time, I rarely remember a subject, on which the Admiralty have not asked for more than they have been able to get. We simply cannot provide the trained mechanics next year, even if the money allowed, to meet all requirements of the Navy any more than we can meet all the requirements of the Army. What we have to do is to get our system established, our training plans at work, to get our establishments in full activity for preparing the personnel of the new force. The scheme which is outlined by the Chief of the Air Staff is the most which is physically practicable within the time and limits available. But I give the general assurance that the Air Ministry will do their utmost to study the special needs of the Navy and meet them in every possible way. Those who seem to think that we are immediately on the verge of some enormous development whereby battleships and surface craft will disappear and will be replaced either by a submarine Navy or an Air Force, or a combination of both, must realise that in proportion as such evolution obtains the support of professional opinion, in that very proportion the large funds which are now spent on the construction of a surface Navy will be liberated and be available for the development of additions to the Air Force.

But the task before us is severely practical; we have to find the necessary air garrisons to defend the British Empire, to create a permanent independent Air Force, to offer young officer airmen or mechanics a decent regular life in a good profession to which it is an honour to belong. This is a task which is self-contained and must be discharged quite apart from any theoretical decision either for revolutionising either the art of war or for the combined organisation of the three Services. It would be a great mistake to delay the practical steps which are needed until an entirely new system of defence organisation has been thrashed out and developed. To make it a unit, to make it in a form where it is not only efficient in itself, but will fit into a higher organisation—that is the practical task on which we are engaged. But if the Air Force is to be independent of the other two Services, it must also be interdependent upon them. It must be so organised as to fit naturally and easily in peace or war into a combined organisation of defence. It must be that for its own sake, in the interests of the other Services and in the general interests. Take the case of officers of the Air Force, for instance. Every Service must offer a reasonable advancement to young men who enter it, but a boy entering the Air Force ought to have as good a chance as a boy entering the Army or the Navy of making a career for himself. But as the proportion of general officers during the flying period of their lives in the Air Force necessarily exceeds very largely the proportion of higher posts, therefore we have to turn to the two great Services to assist us, and we have to adopt a system of temporary commissions. About 50 per cent. of the Air Force will be composed of its own officers in permanent commission, 40 per cent. will be the short-service commissioned officers, and 10 per cent. will be birds of passage from the two other Services. It may be in future years that it will be still further extended.

It is good for us because it reduces *pro tanto* the pressure of candidates on the limited number of higher appointments. It is good for the other two Services because it familiarises them with the air, and later on it will give them the higher officers who know the true value of the air arm. It is good for all because it tends to promote that solidarity and unity wth regard to defence organisation which is more and more demanded by those who are thinking out these problems, and it tends to eradicate the absurdity of mere departmental conceptions of war. Meanwhile the Air Force is dependent upon the Army and Navy for a certain proportion of the officers who will be flowing through it. There are certain subsidiary services which the Army and the Air Force can have in common. For instance, we have arranged to have the mapping Department in common. The rations are supplied to the Air Force by the Navy and Army and not purchased direct by the Air Force. The Air Force clothing is bought from the Army Clothing Department at Pimlico. The ordnance is supplied by the Army. The Air Force has its own technical supply, but in these more simple forms of supply there is not the slightest reason why purchasing should not be made through the existing organisation of the Army. The medical service is at present entirely separate. The chaplains' department is separate. It requires careful consideration as to whether it is necessary or proper to continue to duplicate any of these services. All this ground has to be very carefully studied in order—first, to secure the independence of the Air Force; second, not to waste money in duplicating organisation; and, third, not to take any steps inconsistent with the future combinations of the three fighting Services on the basis of common departments for common services. There is no doubt that very large economy and simplification would result from the combined treatment of defence problems, instead of having, for instance, two or three organisations. Instead of having two or three organisations for buying meat and bread, you would have one for all. Instead of three finance and contract branches, you would have one for all. Instead of three medical departments, three sets of hospitals, and three chaplains' departments, there would be one. These are very revolutionary ideas, and progress towards them can only be made gradually; but progress towards them must be continued, and nothing must be done in reconstructing the Air Force which in any way conflicts with the final system to which we will certainly be drawn by logic, by economic and by war efficiency, and, in fact, by everything except existing vested interests—namely, a combined general Imperial War Staff for the three Services, actuating and operating under single control. Air power may prove itself—many people declare it has proved itself—a substitute for other more expensive forms of man power or sea power. But it is obvious that any question of such difficulty as substituting one set of developments for another, or increasing air power at the expense of existing forms of naval or military effort, for instance, can only be dealt with upon the advice and through the agency of a combined general staff who feel impartial as to the method or instrument employed, so long as they are best and the right ones for the country to use. Therefore, I find myself in strong personal sympathy with the remarks made by Major Glyn in regard to the creation of such a joint staff. I hope that the discussions which are now taking place between the professional heads of the three Services, the First Sea Lord, the Chief of the General Staff, and the Chief of the Air Force, may be productive of real advance in this most urgent and important matter.

Here a word as to the position of the professional head of the fighting Services. I consider that in practice the control of the fighting Services is best exercised through the close co-operation of a Cabinet Minister and the professional head, who should be the principal soldier, the principal sailor, and the principal airman of the day in the fighting Service. As long as that arrangement works well everything works well, and when it breaks down the personality should be changed either in one direction or in another. This close co-operation involves almost daily intercourse between the Minister and the professional heads. It is not possible for a Parliamentary Under-Secretary to be the intermediary. It is not possible for the Under-Secretary to be the channel of all communications passing between the professional head of the Service and the Minister responsible. It has never been so at the War Office or at the Admiralty. The First Lord must deal with the First Sea Lord; the Secretary of State for War must deal with the Chief of the Imperial General Staff; and, similarly, whoever holds the seals of the Air Ministry must deal with the chief of the Air Staff. It is the chief of the Air Staff who is the one to insist on his right of direct access to the Minister responsible, for otherwise everything would have to be taken once to the Under-Secretary and then again to the Minister who had to decide.

The view I take is this: that the initiative in Service matters must in the main come, and as a general rule comes, from the professional head. He plans, he outlines, he proposes. The Minister examines, criticises, suggests, discusses with his Board or Council, and finally approves. That is the right way. It really is the only way to carry out a military policy. It is not possible for the initiative in such matters to come from the Parliamentary Under-Secretary, and it would not be fair to the professional head of the Department, nor would it be wise, nor would it work in practice. Just as I think that the initiative should, in the main, come, in the case of air policy, from the chief of the Air Service, in the case of the Army from the Chief of the General Staff, and in the case of the Navy from the First Sea Lord, so in the three Services together I hope that the initiative for joint action will come from the three heads sitting together, and that as a result of those conferences which are taking place proposals will emerge which will lead to the creation of that joint Imperial Defence Staff, which at the present time is so indispensable from every point of view.

Sir D. MacLean: The Secretary for War has taken great credit to himself and to his Department that this is the only one of the three great Services which has effected a reduction, and he has told us, with great frankness, that the real reduction is to £60,000,000. What will an anxious public, think when with a shock it comes to know that the Air Force was to be maintained during the current year at an expenditure of £66,000,000, and to what extent will it be satisfied when this splendid campaign of economy has reduced the total to £60,000,000?

Mr. Churchill: I meant to give the figures in my speech. Let us take £15,000,000 as representing a normal year. The difference between that and the present expenditure is £39,000,000. Liquidating war contracts and equipment, apart from the Ministry of Munitions, accounts for £12,000,000; liquidating works, £3,000,000; decrease in maintaining war force above the normal amount accounted for £4,000,000; war gratuities accounted for £5,000,000; the pay of abnormal numbers above what will be maintained next year, due to the military situation, accounts for £12,000,000; minor miscellaneous items account for £3,000,000. That gives a total of £39,000,000. all accountable to pure and definite war charges and war necessities, and not in any way attributable to mismanagement.

Replying to Captain Benn, Mr. Churchill said: The final wind up of the Women's Royal Air Force was much more rapid than was at one time contemplated. There was what was, perhaps, a pardonable reluctance to scrap and disband a force which had rendered such admirable service, and it led to the view being formed that they would be continued rather longer than was the case. Certain articles of clothing were issued and purchased which, had it been known that they were not to continue, would undoubtedly have been dispensed with. But on the whole the more rapid demobilisation which has taken place has overtaken that expenditure and has provided economy of a different character which on the balance leads to a position of advantage.

On the Technical and Warlike Stores Vote, Mr, Churchill, replying to Capt. Benn, said so far as the mechanical transport of the Air Force is concerned, I have not yet finally reached a conclusion as to what extent we can pool with the Army. I am certain we can pool reserves with the Army; so far as the ordinary pool of cars is concerned we can pool reserves. Of course, the mechanical transport repair department at Shrewsbury, which is under the control of the R.A.F., we hope will be wound up and handed over to Slough, which, although it has been very frequently abused in this House and out of it by ignorant persons, is increasingly establishing itself as a paying asset in the State and is vindicating in a most conclusive manner the wisdom and foresight of those concerned in its initiation. As far as civil aviation is concerned, I have the figures here. I said the total was £329,000, and these are the principal items: Meteorology, £25,000; pay (salaries), £39,000; air routes, Cairo to the Cape, £50,000; Karachi to Australia, £40,000; purchase of land, etc., £50,000; minor new works, £25,000.

Maj.-Gen. Sir Newton Moore: Is there any provision for a route beyond Karachi? Is there any provision for acquiring land at either of the stations that would be required between there and Australia?

Mr. Churchill: Oh, yes. This present flight to Australia has been done along a route which the Civil Aviation Department of the Air Ministry has been prospecting and developing. Only one machine has so far got through, but the trail has been blazed, not only as far as Karachi, but right away through to Australia. Of course, I think the best part of the route will be the Cairo, Bagdad, Karachi route, and there anyhow you will have large air establishments for fighting or strategic purposes, and it ought to be possible on a first-class route, with aerodromes and so forth, for large commercial craft to make their way. The Cape to Cairo route, on which £50,000 has been spent, is now practically complete. The present state of the scheme is this, that we want an incentive from South Africa as great as was offered by Australia to induce the civil aviation interests in this country to compete in the Cairo to the Cape flight, and I do think the great millionaires of the Rand might well make an offer of a prize equal to that which was given by the Government of Australia, and so offer an incentive to use this route. The route will be kept up by the different local Governments through which it passes. That is our policy, to negotiate with them to take over these landing grounds, keep them clear of the bush, and guard the stores of petrol and other commodities which are placed there, so that what has been done once will not fade away into the jungle altogether.

In the debate on the Report Stage on December 15, Mr. Churchill, replying to question, said that broadly speaking they were going to provide means by which men may enter the ranks of the Air Force, and may rise to be flying officers, but they will, he thought, in the future as in the past, relegate the conduct of the flying machines in the main to commissioned officers. Dealing with the question of new uniforms, Mr. Churchill said it involved no additional expense, because they made the strictest rule that every officer had to wear out his old clothing before adopting the new pattern.

On the question of the helicopter, he said there was no doubt that if civil aviation was to achieve really wide development, it must be through the agency of some quite different kind of aeroplane to that used at present. If this invention were successful it would give us a machine, which, if the engines stopped, would descend like a parachute without anyone being hurt. Investigation showed that it was by no means impossible, scientifically and theoretically, that the helicopter machine would not only rise and descend perpendicularly, but also progress laterally at great speed, although the las claim was not made by the inventor, Mr. Brennon. As long as there was any hope of a favourable result being arrived at he would see that the experiments were continued.

With regard to Lord Rosebery's farm at Sumhouse Mr. Churchill said the matter was not now at a stage in which it could be benefited by a discussion in the House, and he proposed to let matters take their course. The £50,000 for the London-India route was for the preparation of the aerodromes and accommodation at Cairo, Baghdad and Karachi. These were all places where we have our garrisons of air force for military purposes, because they expected to hold the Middle East theatre largely through the instrumentality of the air. It would be convenient to allow mail and civil flying over the route as the stations have to be there any way.

Mr. E. Kelly urged the great necessity for having two main aerodromes in Ireland, one in the south-west and the other in the north-west, in view of the establishment of trans-Atlantic flying.

▣ ▣ ▣ ▣

THE ROYAL AIR FORCE

London Gazette, December 12.

The following officers have been granted short service commissions in the ranks stated, with effect from Dec. 12. They will retain their seniority in the substantive rank last held by them prior to the grant of the short service commission.

In the case of officers now gazetted Flying Officer or Observer Officer from Pilot Officer or Prob. Flight Officer, seniority will date from the date of *Gazette*:—

Flight Lieutenants.—G. H. Hopper, M.C., D.F.C. (A.); C. T. Lally, M.C., A.F.C. (A.), C. E. M. Pickthorn, M.C. (A.), E. M. Pollard (A.), F. J. Powell, M.C. (A.), R. S. Smith (K.B.).

Flying Officers.—G. H. Allison (A.), M. Ballard (A.), G. C. Bladon (A.), M. Burbidge (A.), R. Clelland (T.), J. Cottle, D.F.C. (A.), F. H. Davies, M.C. (A.), N. L. Desoer (A.), L. C. Dodkins (A.), C. A. Elliott (T.), E. T. H. Ellis (A.), W. V. N Grant (A.), B. R. Harris (A.), L. N. Hollinghurst, D.F.C. (A.), J. S. Hughes (A. and S.), S. Jones, D.F.C. (A.), H. R. Junor, D.F.C. (A.), E. G. Keeping (A.), J. L. Kirby (A.), I. E. McIntyre, A.F.C. (A. and S.), H. W. McKenna, D.C.M. (T.), G. Martyn (A.), A. Miller (A.), J. L. Montgomery (A.), F. A. Norton (A. and S.), G. S. Oddie (A.), R. M. Rankin (A.), N. M. S. Russell (A.), A. W. Saunders, D.F.C. (A.), W. J. Seward (A.), O. E. Sharpe (A.), B. E. S. Smith (A.), R. de L. Stedman (A.), C. F. Toogood (A.), F. R. Wynne (A.).

Observer Officers.—H. A. Cooper, M.C., A. J. Cox, R. S. Greenslade, E. Major Greenwood, W. G. Hanton, P. Hardy, M.C., R. McK. Jamison, D.F.C., C. H. F. Nesbit, G. L. Nicholson, J. J. W. Nicholson, D.F.C., A. E. Reynolds, A. D. Sinclair, G. R. Terry, A. F. Wynne.

Flying Officers (from Pilot Officers).—E. A. C. Britton (A.), H. A. Dinnage (T.), F. R. Eason (A.), D. D. MacA. Eastwood (A.), E. N. Fenton (A.), H. W. Gill (A. and S.), D. E. Hall (A. and S.), E. N. Hewitt (T.), C. E. Howley (A.), D. G. R. Lord (A.), J. A. McDonald (T.), J. W. F. Merer (A.), W. Parkinson (T.), W. E. Purdin (A. and S.), B. H. C. Russell (A.).

Observer Officers (from Pilot Officers).—H. Alexander, L. W. Beck, C. G. Boothroyd, D.F.C., F. W. Brown, R. A. Brunton, M.C., A. H. Darnbrough, J. Davison, L. J. Hoare, W. McGowan, B. J. Malyan, D. H. Murray, R. T. Rich, H. Taylor, M.C., A. L. Willcox.

Flying Officer (from Probationary Flight Officer—late R.N.A.S.).—D. C. Duncan (A.).

The notifications appearing in the *London Gazettes* of the dates indicated below, appointing the following officers to short service commns., are cancelled:—Flying Officer G. A. F. Gibson (T.) (substituted for notification in the *Gazette* of Nov. 28); Sept. 12. Flying Officer E. A. M. Waterton (A.); Oct. 24. Flying Officer B. Turner (A.P., T.); Nov. 11. Flight Lieut. G. M. Boumphrey (A.); Nov. 28.

The rank of Observer Officer G. S. L. Hayward, M.C., is as now described, not Flying Officer (A.), as stated in the *Gazette* of Oct. 24.

ROYAL AIR FORCE

Flight-Lieut. K. H. Riversdale-Elliot (A.) is granted a permanent commn. in the rank stated, with effect from Aug. 1.

The following temp. appointments are made:—

Staff Officer, 2nd Class.—(T.) Sqdn.-Leader H. Stanley-Adams, D.S.C Dec. 4.

Staff Officer, 3rd Class.—(T.) Flying Officer O. W .de Putron; Nov. 11

Flying Branch

Sec. Lieuts. to be Lieuts.:—A. McK. Matheson; Feb. 22. C. A. B. Caukwell (since demobilised); March 26. H. Edge; May 28. G. C. Lugg; June 6. P. Fish; June 18. M. Tallentire; July 5. A. H. Allingham (since demobilised); July 20. S. P. Watts; July 24. A. Findley; July 30.

Pilot Officers to be Flying Officers:—H. B. Williams; Aug. 23. K. W. Jones; Nov. 8.

M. B. D. Whiteside (Lieut., High. L.I.) (since deceased) is granted a temp. commn. as Sec. Lieut., and to be Hon. Lieut.; May 31, 1918.

Pilot Officer (Hon. Flying Officer) L. R. Hihbert (Capt., R. Lanc. R.) relinquishes his temp. R.A.F. commn. on return to Army duty; Nov. 18.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. D. R. Bradley; Aug. 10, 1918; Capt. N. MacMillan, M.C.; June 10.

(Then follow the names of 112 officers who are transfd. to the Unemployed List under various dates.)

Capt. S. E. Adams relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Dec. 4.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—S. Scothill (caused by-wounds); Aug. 14 (substituted for notification in *Gazette* of Aug. 26). J. J. Lanctot (contracted on active service); Sept. 28.

Lieut. C. W. D. Bell (Lieut., P. of Wales Hrs.) resigns his commn.; Oct. 1.

Sec. Lieut. G. R. Howard relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; Dec. 5.

Sec. Lieut. R. Shillinglaw is antedated in his appointment as Sec. Lieut. (O.); Aug. 8, 1918.

The notification in *Gazette* of May 31, 1918, concerning Sec. Lieut. H. P. Brumell is cancelled.

The notification in *Gazette* of Nov. 5, 1918, concerning Sec. Lieut. E. G. Boyle is cancelled.

The notification in *Gazette* of March 11 concerning Sec. Lieut L. Edwards, M.C., is cancelled.

The notification in *Gazette* of June 24 concerning Capt. N. MacMillan, M.C., is cancelled.

The notification in *Gazette* of Sept. 5 concerning Sec. Lieut. (Hon. Capt., L. R. Hihbert is cancelled.

Administrative Branch.

Pilot Officers to be Flying Officers:—M. W. Taplin; Oct. 1. A. J. Burge; Nov. 20.

F. H. Bacque (Capt., Can. E.F.) is granted a temp. commn. as Capt.; June 1, 1918.

M. H. Toy (Capt., Canadian Militia) is granted a temp. commn. as Capt.; Aug. 1, 1918.

Sec. Lieut. E. McM. Spinney (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut., and to be secd. to R.E.; May 6, 1918.

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Capt. J. P. Cherry, M.C. (Capt. and Qrmr., Dur. L.I.); April 15 (the notification in *Gazette* May 2 is cancelled). Flying Officer F. D. Wright (Lieut., S. Lancs. R.); Nov. 7. Flying Officer G. B. Booth (Lieut., Midd'x R.); Nov. 26. Flying Officer A. Wehh (Lieut., 5th Dgn. Gds.); Dec. 1. Flying Officer (actg. Flight-Lieut.) E. S. C. Brooks (Lieut., Cameronians and Sco. Rif.); Dec. 3.

(Then follow the names of 7 officers who are transfd. to the Unemployed List under various dates.)

Lieut. J. H. Thompson; Sept. 29 (substituted for notification in *Gazette* of Nov. 4, wherein this officer's rank was shown as Sec. Lieut.). Lieut. V. N. Bonnes, Sec. Lieut. P. H. Brodziak; Oct. 9. Sec. Lieut. W. J. Begley, Lieut. C. T. L. Bowley, Lieut. T. S. Cowperthwaite, Capt. H. C. Jones; Nov. 7 (substituted for notifications concerning the above named officers in *Gazette* of Nov. 21). Sec. Lieut. T. H. Nunn; Nov. 16. Maj. H. Perry, Sec. Lieut. K. M. Vaughan; Dec. 2. Sec. Lieut. W. T. A. Jacoh; Dec. 4.

Capt. E. P. L. Baker (S. Staffs. E., S.R.) relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Nov. 29.

Lieut. W. J. Banham relinquishes his commn. on account of ill-health (contracted on active service), and is permitted to retain his rank; Dec. 4.

Sec. Lieut. J. G. Le Brun relinquishes his commn. on account of ill-health caused by wounds, and is granted the rank of Lieut.; Dec. 5.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—W. J. Cooper (contracted on active service), E. H. McEnery; Dec. 5.

Technical Branch

Sec. Lieut. L. Hawkins to be Lieut., Grade (A.); Dec. 23, 1918 (this notification does not affect the notification concerning this officer which appeared in *Gazette* of Aug. 29).

Lieut. J. H. Ferguson, M.B.E. (Sec. Lieut., Extra Reg. Employed List) resigns his commn.; Dec. 13.

(Then follow the names of 16 officers who are transfd. to the Unemployed List under various dates.)

The surname of Sec. Lieut. B. J. Beech is as now described and not "Beach" as stated in *Gazette* of Feb. 7.

The notification in *Gazette* of Dec. 31, 1918, concerning Sec. Lieut. J. S. Card is cancelled.

The notification in *Gazette* of Nov. 25 concerning Lieut. H. D. Patterson is cancelled.

The notification in *Gazette* of Dec. 24, 1918, concerning Sec. Lieut. L. Hawkins is cancelled.

Physical Training Branch

Lieut. J. Butterfield relinquishes his commn. on ceasing to be employed, and is granted the rank of Capt.; Sept. 28 (substituted for notification in *Gazette* of Nov. 7).

Chaplains' Branch

Rev. W. Moffat, R.A.C.D., is granted a temp. commn. as Chaplain, with the relative rank of Capt., and is granted the relative rank of Colonel while employed as Principal Chaplain; March 7.

The notifications in *Gazettes* of Feb. 4, March 28, May 9, May 20, and June 24, concerning the Rev. W. Moffat are cancelled.

Memoranda

(Then follow the names of 6 Cadets who are granted hon. commns. as Sec. Lieuts.)

Flying Officer W. Myers, M.C., D.C.M. (Lieut., North'd Fus.), relinquishes his temp. R.A.F. commn. on return to Army duty; Nov. 20.

Sqdn.-Leader (actg. Wing Com.) R. Hall, O.B.E. (Capt., R. Welsh Fus.) relinquishes his temp. R.A.F. commn. on return to Army duty; Nov. 1 (substituted for notification in the *Gazette* of Nov. 11, wherein this officer was shown under "Flying Branch").

The following temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed:—W. M. Harrison; W. Ramsay; Sept. 16. W. G. Knight; Oct. 2.

(3 officers transfd, to the Unemployed List.)

The notification in the *Gazette* of Aug. 1, appointing Capt. J. Gilmour, D.S.O., M.C. (A.), to a permanent commn. is cancelled.

The following temp. appointment is made at the Air Ministry:—

Staff Officer, 1st Class.—(Q.) Maj. A. L. C. Neame; Mar. 19, and to be actg. Lieut.-Col. till April 30 (substituted for notifications in the *Gazettes* of June 3 and Nov. 28).

The following temp. appointment is made:—

Staff Officer, 3rd Class (P.).—Lieut. V. Stranders, and to be actg. Capt. whilst so employed; June 11, 1918. Vice-Capt. A. E. Hartley (substituted for notification in the *Gazettes* of Aug. 6, 1918, Oct. 4, 1918, and Nov. 20, 1918).

Flying Branch

Sqdn.-Ldr. H. F. A. Gordon, O.B.E., to be Sqdn.-Ldr. (A. and S.), from (S.O.); Nov. 1.

Lieut. C. D. Palmer (Lieut., Arg. & Suth'd Highrs.) is granted a temp. commn. as Observer Officer on re-seconding from Arg. & Suth'd Highrs.; Nov. 24.

Sec. Lieuts. to be Lieuts.—L. G. Spinney; Apr. 27, 1918. F. Ihhotson (since demobilised); Oct. 26, 1918. W. Z. Grandi; Jan. 27. L. A. West; May 8. R. M. Guiney; May 30. R. Tindle; July 5.

Pilot Officers to be Flying Officers.—J. Duncanson; Aug. 2. G. W. Sweney; Aug. 3. S. C. Millar; Aug. 7.

PERSONALS

Deaths

Lieut. Stanley Blackall, late R.A.F., who died as the result of an aeroplane accident, at Croydon General Hospital, on December 13, at the age of 32, was the fourth son of Rev. Walter Bradley, late Vicar of Birchfield, Birmingham.

Lieut. I. F. George, D.S.M., R.A.F., late R.N.A.S., who was reported missing when returning from a raid on August 26, 1918, and is now officially presumed killed on that date, at the age of 25, was the youngest son of Mr. and Mrs. George, of "Beltinge," Cranford, Middlesex.

It is with great regret that we have to record the death of Mr. José Weiss, who was one of the British pioneers and worked most painstakingly first with gliders and later with power driven machines, in which both the body and the wings were given the characteristic shape of a bird.

Married

Geoffrey Norton Allen, only son of Mr. and Mrs. Alex. W. Allen, Stamford House, Bedford, was married on December 2 at Christ Church, Galle Face, Colombo, Ceylon, to Cecil Margaret Warlow, younger daughter of the Rev. E. J. Warlow, late Archdeacon of Lahore.

Maj. John William Kidston Allsop, late R.N.A.S. and R.A.F., son of the late T. W. Allsop, and Mrs. Allsop, of Langland Mansions, Hampstead, was married on December 4 at the Savoy Chapel, to Frances, daughter of the late C. W. Hubbard, J.P., and Mrs. Hubbard, of Riversdale, Sleaford, and granddaughter of the late W. Bedford, J.P., of Allan House, Boston, Lincs.

Capt. Cuthbert George Bellord, late R.A.F., elder son of Mr. E. J. Bellord, Hampstead, was married on December 9 at St James's, Spanish Place, to Margaret Isabel, elder daughter of Sir Alexander Cardew, K.C.S.I., and Lady Cardew.

Lieut. Eric M. Greenwood, R.A.F., son of Dr. and Mrs. George Greenwood, of Goswell Road and Harrow, late of Enfield, was married on November 19 in Calcutta Cathedral, to Jeanne Edith, only daughter of the late M. and Mme. George Favreau, of Bochefort-sur-Mer, France.

Lieut. E. S. Wheatley, D.F.C., son of Col. H. S. Wheatley, C.B., S.M., and Mrs. Wheatley, of The Knoll, Farnham, was married on December 4 at All Souls', Langham Place, to Dorothy, eldest daughter of Dr. Alexander and Mrs. Hodgkinson, of Bradshaigh, Farnham, Surrey, formerly of Manchester and Wilmslow.

Capt. George Ferguson Wilson, late of Seaforth Highrs., attached to R.A.F., was married on December 18 at Epsom, to Mrs. Wilhelmina Margaret Bridle, younger daughter of Mr. and Mrs. T. O. L. Becker, of "St. Goar," Barnet Wood Lane, Ashtead, Surrey.

To be Married

The engagement is announced between Capt. Leslie Clarke, A.F.C., R.A.F., and Winifred, youngest daughter of Mr. and Mrs. S. A. Jackson, of St. Anne's-on-the-Sea.

The engagement is announced between Lieut. E. L. Ridley, R.A.F., elder son of Mr. and Mrs. W. E. Ridley, of Heathfield, Coulsdon, Surrey, and Leslie, younger daughter of Mr. and Mrs. St. Clair Bolton, of 6, Hyde Park Mansions, W.

MODEL AEROPLANES

By F. J. CAMM

NOTE.—*All communications should be addressed to the Model Editor.*

Calculating Areas

THE calculation illustrated diagrammatically by Fig. 1 relates to the problem of finding the correct disposition of surfaces without resorting to a trial flight. In power-driven machines the trial and error method may easily result in a disintegrated plant, and it is therefore advisable to adopt a more certain method of ensuring that the centres of pressure and gravity are coincident, and thus obviating the necessity of making several small surfaces in order to obtain one of the correct area. It is assumed that the machine is complete with the main plane fixed in position. The machine should be poised by suspending it by a fine line until it balances in a longitudinal direction; this gives the position of the centre of gravity which should be marked on the *fuselage*. Now, knowing the area of the main plane and the position of the centre of gravity, it is really only a simple proportion sum to determine the area of the small surface (an approximate weight for which should be fixed to the *fuselage* when finding the position of the centre of gravity). The formula for calculating the area of the smaller surface is :—

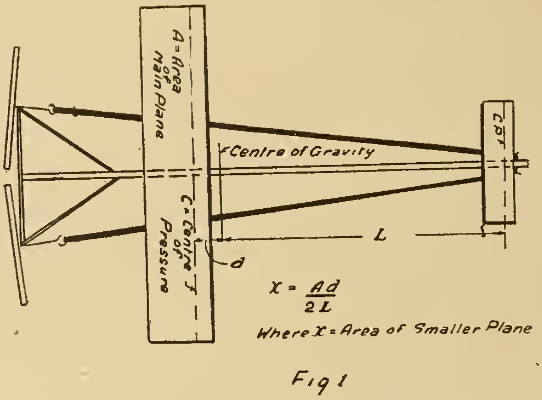


Fig 1

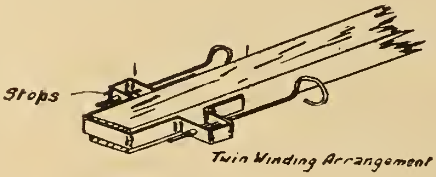


Fig 3

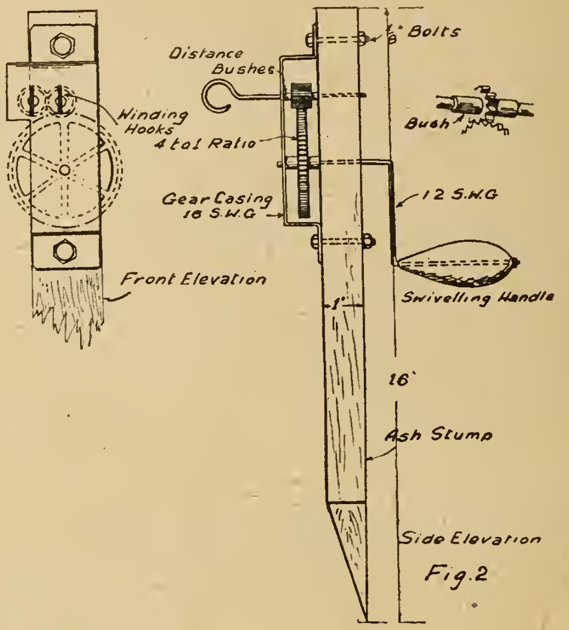


Fig. 2

$$x = \frac{A\,d}{2\,L}$$

Where x = area of surface to be found

d = distance of centre of gravity of machine to the centre of pressure of the main plane

L = distance of centre of gravity of machine to the centre of pressure of the elevator.

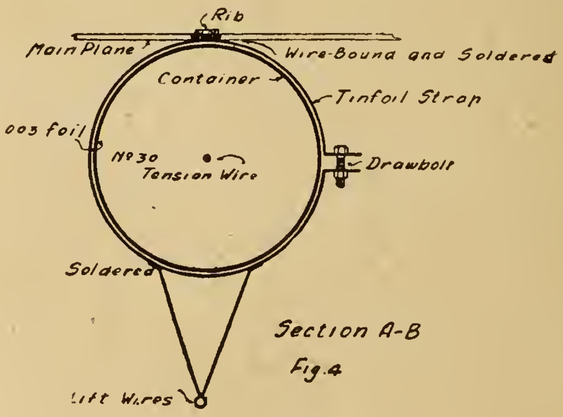
The centre of pressure of the main plane can safely be assumed (with cambered surfaces) to lie at a point two-fifths of the chord from the leading edge, and a line drawn transversely through this point is the line on which the pressure affects the plane.

The coefficient 2 in the formula is a constant to allow for the positive angle made by the elevator, since a canard machine is being considered. The angle of incidence of the elevator should be nearly twice that of the main plane. To work an example, suppose that A measures 300 sq. ins., L = 40 ins., and d = 5 ins.,

then x will equal $\frac{300 \times 5}{2 \times 40} = 18\cdot6$ sq. ins.

I have checked this formula against many machines, and it has proved itself to be remarkably accurate. A compressed-air model recently constructed by the writer flew at the first attempt and the area of its elevator had been calculated by means of this formula. With the ordinary flying stick it is so very easy to vary the position of the main plane that it would be unnecessary to adopt this method, but as larger machines are contemplated it becomes increasingly difficult to have to move the main plane, once it is fixed.

There is another simple formula relating to hydroplanes which many do not seem to be cognisant of. I refer to the calculation of the flotational capacity needed to support a given weight. The machine exclusive of floats should be weighed and an ounce or so allowed for the weight of them. Suppose the model weighs 8 oz. × 3 oz. for floats = 11 oz., the capacity of the floats are calculated in the following manner. A cubic foot of water = 1,728 cubic ins., weighs



Section A-B

Fig. 4

1,000 oz. approximately. Then, to float 11 oz., the capacity of the floats must *at least* be :—

$$\frac{1,728}{1,000} \times \frac{11}{1} = 19 \text{ cubic ins.}$$

Now, since it is essential that the floats should only be about one-fourth immersed it follows (since weight equals displacement, therefore 19 cubic ins. would only just support the machine), that the total cubic capacity should be 4 × 19 = 72 cubic ins.

The point is that floats must be made which will displace four times the model's weight of water in order to efficiently float the machine.

A Durable Twin-Winder

In Fig. 2 I show a twin-winding apparatus that can be used without the aid of a second party to support the machine—a disadvantage of the ordinary converted egg whisk type of winder. It is intended for use in conjunction with a simple apparatus to be fixed to the front of the model, and when in use it is forced into the ground, thus leaving one hand free for winding and the other for supporting the machine. Fig. 3 shows the attachment fitted to the nose of the model.

The apparatus consists of two pinions in gear with one another and driven by a wheel, the ratio between them being 4 to 1, that is to say, one turn of the crank imparts four turns to each pinion shaft. A higher gear should not be used, as the two skeins are being wound synchronously.

Each pinion shaft-extension is formed into a hook to engage with the attachment on the machine, the pinions themselves being kept central between the gear casing by means of the distance bushes shown in detail. The gear casing should be of brass, and the gears can conveniently be those sold for geared elastic motors. Winders can also be improvised from ordinary hand braces, although rather low geared.

A friend of the writer's (a wag in his way) made a winding attachment to gear off the back wheel of his cycle. The cycle was inverted and a friction-driven pulley held against the tyre by means of springs; this drove the chuck. It was an inefficient arrangement, and after several machines had been smashed due to unequal winding (whereat the projector of the idea was glad to use the cycle to escape the wrath of his dupes!) the idea was discarded.

(*To be continued.*)

THE AIR ESTIMATES

IN our last issue we gave the main divisions of the Air Estimates for the year 1919-20, amounting to £54,030,850, together with Mr. Churchill's statement and now we supplement this with a detailed statement, showing how the two largest items—pay, etc., and technical and warlike stores are split up.

The sum which it is estimated will be required for the pay of the R.A.F. is divided under nine sub-headings, showing the following details :—

	£
Pay and personal allowances of officers ..	4,600,000
Pay and personal allowances of men	6,400,000
Separation allowance	2,250,000
Miscellaneous allowances	500,000
Women's Royal Air Force	900,000
Civil employees	1,601,000
Service gratuities to officers and to men on discharge	5,100,000
Air Force Reserve	30,000
Recruiting staff and expenses	120,000
Gross total	£21,501,000
Deduct appropriations in aid	450,000
Net total..	£21,051,000

The details of the proposed expenditure of £19,322,850 on technical and warlike stores are as follows :—

	1919-20. £
Aeroplanes, seaplanes, engines and spares ..	1,413,000
Airships, airship engines and spares	144,000
Balloons, winches and spares	72,300
Aircraft technical and warlike stores	158,550
Armament and ammunition	168,200
Electrical and engineering stores	169,700
Hangars	64,500
Mechanical and other transport	23,000
Marine craft and equipment	7,500
Petrol and oil	1,522,100
Rewards to inventors	25,000
Aircraft supplies delivered under War Contracts	16,100,000
Aircraft Inspection Departments, salaries and wages	—
R.A.E., Farnborough, salaries and wages ..	—
Gross total	£19,867,850
Deduct— Appropriations in aid	545,000
Net total..	£19,322,850

Under the Vote for work, buildings and lands £5,072,000 is set aside for new works, additions, alterations and special repairs amounting to £2,000 each and upwards.

R.A.F. Cadets

AN unique document is the following list of names of the 55 candidates who were successful in the competitive examination held last month for admission to the Royal Air Force Cadet College, as it is the first of the kind to be published :—

Name.	Marks.	Name.	Marks.
*Mills, G. H.	9,908	*Keightley, C.F. ..	6,347
Buttar, C. P.	9,295	Gay, G. W.	6,320
*Henslowe, F. A. ..	9,108	Mackay, M. B. ..	6,308
Huxham, G. H. ..	9,098	*Whelan, R. D. ..	6,302
*Shepherd, G. C. ..	9,050	Lindsay, H. D. R. P.	6,239
Barrett, J. B. ..	8,929	Martin, J. L. ..	6,016
*Revington, A. P. ..	8,872	Goss, E. O.	5,948
Wilcock, W... ..	8,687	Pontifex, R. W. ..	5,811
Shortt, R. G. ..	8,673	Griffith, W. S. de G. D.	5,778
Brook, W. A. D. ..	8,485	*Kearon, H. V. ..	5,771
*Porter, N. A. ..	8,263	Desmond, T. J. ..	5,768
Waite, R. N. ..	8,249	Fleming, T. S. S. ..	5,689
Taylor, J. E. ..	7,812	Mitchell, F. G. S. ..	5,686
*Murphy, T. C. E. ..	7,402	*Davis, J. H. A. ..	5,651
*Stone, R. A. B. ..	7,394	*Gore, C. W.	5,643
*Johnson, S. H. ..	7,257	Spicer, G. H. ..	5,621
Loch, D. R.	7,131	*Bernard - Smith, G. C. B.	5,490
Rowe, F. C. T. ..	7,098	*Cooper, R. A. B. ..	5,438
Boultbee, H. L. ..	7,093	Glenn, R. W. L. ..	5,115
Mangles, R. A. R. ..	7,043	Hawtrey, J. G. ..	5,086
*Brown, J. R. ..	7,041	*Falconer, C. L. ..	5,071
Muir, J. E. R. ..	6,871	Hayter, M. C. ..	5,054
Connolly, S. G. ..	6,865	*Spaight, R. H. S. ..	4,973
Hayter-Hames, N. C.	6,810	Cooke, D. A. R. B. ..	4,938
Faithfull, A. F. ..	6,797	Springfield, C. M. O. O	4,909
Berridge, T. D. ..	6,707	*Lacey, E. V. S. ..	4,807
*Combe, G.	6,371	Watts, G. E. ..	4,776
Royd, E. A.	6,351		

* These candidates have received 400 marks for military efficiency.

Air Customs Facilities at Hounslow at Christmas

THE Air Ministry announces that Customs Officers will not be in attendance at Hounslow between December 25 and 28 inclusive. Steps have been taken, however, by which their attendance can be arranged for on short notice. Owners or pilots of aircraft who desire to obtain a clearance to or from the Continent on these days should give notice to the Civil Aerial Transport Officer at Hounslow at least one hour before the attendance of the Customs Officer is required.

Sir Hugh Trenchard's Message

To the current issue of the *Ex-Service Man* Air-Marshal Sir H. Trenchard contributes the following message to ex-Service men : "I would like to say that I hope the ex-Service men will put their shoulders to the wheel in peace as they did in war, and help to pull the country through these difficult times. I wish them every good fortune in their work. For those who have been unfortunate, and have not been able so far to obtain employment, I hope that this—their just reward for past services—will speedily be forthcoming."

R.A.F. Mess Uniform

WE understand that the pattern for the mess dress of officers of the Royal Air Force has been officially approved. Particulars can be obtained from the principal military tailors.

Capt. Ross-Smith's Progress

IN his flight from Port Darwin across Australia, Capt. Ross-Smith has not been quite as lucky as in his flight from England. He left Port Darwin on the morning of December 13, and the following day he was reported at Newcastle Water. Then followed a silence, explained by the fact that trouble with a propeller has entailed a forced landing about 20 miles before reaching Anthony's lagoon. Repairs were effected and he arrived safely at Camooweal (Queensland) on December 20.

SIDE-WINDS

MESSRS. SMITH AND SONS (M.A.) LTD. are proud of the fact, and rightly so, that the Vickers-Vimy-Rolls machine piloted by Capt. Ross Smith and Lieut. Keith Smith, which has achieved such a great triumph in flying from Britain to Australia in 28 days was equipped with the following Smith instruments and accessories:—Revolution indicators, airspeed indicators, Cambridge radiator thermometer, plugs and Husun compasses, Type 253. It is also worthy of note that every competitor in the Australian Competition had his machine equipped with Smith instruments, viz.:—Capt. Matthews (Sopwith); Capt. Wilkins (Blackburn Kangaroo); Lieut. Douglas (Alliance) and Lieut. Howell (Martinsyde).

* * *

THE Dissolved Acetylene Co., Ltd., 268, South Lambeth Road, familiarly known throughout the trade as D.A., held their Dinner, Annual, at the Horse Shoe Hotel, the Day *A*fter Friday of last week, when a large gathering of employees *d*ecidedly *a*rose to the festive feeling prevalent and did justice to the excellent fare provided. In addition a *d*istinguished *a*ssembly of visitors also entered whole-heartedly into the enjoyment both before and after meat. Mr. L. M. Fox, who has always the employees' interests at heart, occupied the chair, supported by Mrs. and Miss Fox, and under his ever-watchful eye no reveller was found neglected of *d*ue *a*ttention; in fact, every waiter, not forgetting Mr. Lucas, who had the arrangement in hand, was kept *d*ecidedly *a*lert. Many interesting speeches were made regarding the *d*evelopments *a*head, also *d*evelopment *a*chieved *d*ue *a*ssuredly to the loyalty of both the men and women of the firm. The evening closed all too soon, but no one failed to *d*istinctly *a*cclaim a grand evening.

* * *

AN observant visitor to both the Car Show and the Motor Cycle Show at Olympia noted a fine achievement by Messrs. C. A. Vandervell and Co., Ltd. He records that among cars fitted with lighting and starting sets the Acton firm were easily first, having their C.A.V. sets upon 128 cars, or 32 per cent. of the number of entire exhibits. At the Motor Cycle Show 148 machines were fitted with C.A.V. magnetos, practically the same large percentage.

* * *

IT is interesting to note that every aeroplane, seaplane and airship which has crossed, or attempted to cross, the Atlantic was equipped with "Tabloid" First-Aid.

◆ ◆ ◆ ◆

NEW COMPANIES REGISTERED

DAVIES AND STACK, LTD., 30, Bedford Row, W.C.—Capital £600, in £1 shares. Aeronautical, motor and general engineers, etc. First directors: E. J. V. Howard-Davies and A. R. Stack.

WHITEHALL INSURANCE CO., LTD.—Capital £100,000, in £1 shares. For carrying marine, aircraft and general insurance. Solicitors, Solam, Middleton and Co., Sunderland.

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages li, lii, liii and liv).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

AERONAUTICAL PATENTS PUBLISHED

APPLIED FOR IN 1916

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 24, 1919.

16,951 and 17,005. FAIREY AVIATION CO. and C. R. FAIREY. Controlling devices for aeroplanes. (135,520 and 135,521.)

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 24, 1919.

3,725. FAIREY AVIATION CO. and C. R. FAIREY. Controlling devices for aeroplanes. (135,522.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 18, 1919

19,375. BLACKBURN AEROPLANE AND MOTOR CO. and H. BOOTH. Wing spars. (135,312.)
19,584. SOC. DES MOTEURS SALMSON. Metal fitting for connecting structural members of aeroplane. (121,468.)
20,612. H. BLACKBURN. Parachutes. (136,337.)
20,643. S. E. SAUNDERS. Aircraft. (135,338.)

Published December 24, 1919.

8,675. A. DAVIES. Aerial, etc., propulsion. (135,529.)
10,485. R. ESNAULT-PELTERIE. Direct-acting I.C. engines. (118,091.)
10,594. FAIREY AVIATION CO. and C. R. FAIREY. Hydrovanes. (135,531.)
17,303. W. D. ODDY. Device for balancing propeller blades. (135,548.)
19,240. H. G. DEBNAM. Rotary I.C. engines. (135,566.)
19,479. G. GOODWILL. Instruments for ascertaining speed of aircraft. (135,585.)
19,618. H. F. PARKER. Aerial machines. (135,601.)
20 978. S. G. BROWN. Gyro-compasses. (135,664.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 18, 1919

8,590. J. HUSKISSON. Inclinometer. (135,412.)
10,319. J. W. DICKSON. Means for securing aeroplane stay-wires. (135,420.)
16,918. J. BRIZON. Indicator for ground-speed of aircraft. (129,634.)

Published December 24, 1919.

21,194. SOC. DES MOTEURS GNOME ET RHONE. Piston-rod connections. (132,249.)

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates:—*

UNITED KINGDOM	s.	d.	ABROAD*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 " " ..	14	1	6 " " ..	16	6
12 " " ..	28	2	12 " " ..	33	0

These rates are subject to any alteration found necessary under War conditions.

** European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*

FINIS TO VOL XI.

UNSPLINTERABLE
Fragments cannot fly

TRIPLEX SAFETY GLASS

For Goggles, Panels and Windshields

UNIVERSITY OF ILLINOIS LIBRARY

FIRST AERO WEEKLY IN THE WORLD

FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

A JOURNAL DEVOTED TO THE INTERESTS, PRACTICE, AND PROGRESS OF AERIAL LOCOMOTION AND TRANSPORT.

FFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

o. 574. (No. 52. Vol. XI.) Registered at the General Post Office as a Newspaper. DECEMBER 25, 1919. SIXPENCE WEEKLY.

EMAILLITE

AIRSHIP DOPING SCHEME "P."

Still Unsurpassed

WEIGHT FOR WEIGHT

BRITISH EMAILLITE CO., LTD.,

SPECIALISTS,

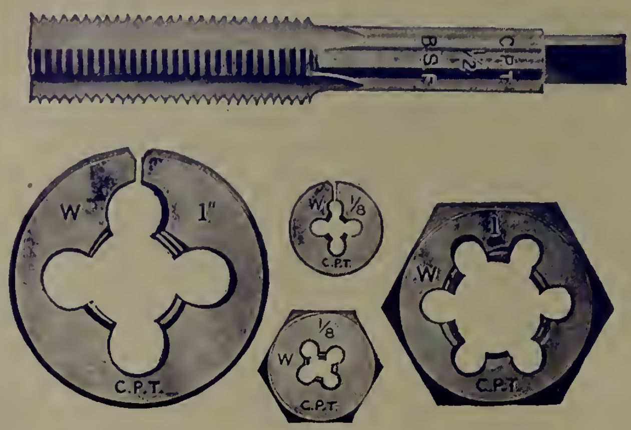
5, HYTHE ROAD, WILLESDEN, N.W. 10.

Wire: "Ridleypren, London." 'Phone: Willesden 2846 and 2847.

CELLON, LTD.,
CONTRACTORS TO
H. M. GOVERNMENT
22, CORK STREET
LONDON W. 1.
Telegrams:—"AJAWB, LONDON."
Telephone:—GERRARD 440 (2 lines

CELLON
DOPE

THE WORLD'S BEST



as used
EXCLUSIVELY
by THE
LARGEST MOTOR MANUFACTURERS
in the
UNITED KINGDOM & OTHERS.

WHY?

Chelsea Taps and Dies
= Accurate Thread Work
= INTERCHANGEABILITY
= PRINCIPA DESIDERATA
of
MASS PRODUCTION.

CHELSEA PRECISION TOOLS, Ltd.,
Canada House, Norfolk Street, W.C. 2.

Telephone:
CENTRAL 2292
(3 lines).

'Grams and Cables:
"AGSTROPAR, ESTRAND."
Code: A B C. 5th Edition.

"VALOR" OIL CABINETS

Japanned red or green, and lettered in black letters with brands of oil as may be desired without extra charge.

THE ONLY PERFECT SYSTEM OF KEEPING ALL KINDS OF OIL FOR DAILY USE.

STOCK SIZES:
6 to 50 Gallons
capacity.
Prices on application

Crates and Delivery Free to any Railway Station in the United Kingdom.

Full descriptive List will be sent on application to

THE VALOR COMPANY, LTD.,
Aston Cross, BIRMINGHAM.
"Where the 'New Era' Fire Extinguishers come from."

THE BRITISH WRIGHT CO., Ltd.

Owners of the British, Italian and Belgian Patents of Wilbur and Orville Wright.

THE ONLY FIRM IN GREAT BRITAIN WHOSE SOLE MANUFACTURE IS AERONAUTICAL INSTRUMENTS.

Manufacturers of

OGILVIE AIR SPEED INDICATORS, for Aeroplanes, Airships, Kite Balloons and Air Stations.

BUBBLE STATOSCOPES, for instantly indicating change in direction of rise or fall, used on all Airships in His Majesty's Service.

DARWIN AERO TURN INDICATORS, for flying in clouds and fog. This instrument was the subject of a Secret Patent by Sir Horace Darwin and has lately been used on large numbers of Government machines for avoiding side slipping, turning and diving, due to loss of horizon in fog and clouds. The instruments are now available for commercial aviation.

RECORDING MANOMETERS, WIND SPEED RECORDERS, SPEED of RISE and FALL INDICATORS, and CLOUD DIRECTION INDICATORS.

THE BRITISH WRIGHT CO., LTD.,
33, Chancery Lane, London, W.C. 2.

In The Forefront of Plane Construction

Qualities that will withstand the most exacting demands of durability, finish, and ease of working, are found in Naylor Brothers' Aero Varnishes, Paints and Enamels, which have an unrivalled reputation, being perfectly mixed in a splendidly equipped modern laboratory. Every Sealed Can carries a guarantee that never lets you down.

SOME SPECIAL "NAYLOR" LINES IN AERO VARNISHES, PAINTS AND ENAMELS

Woodfillers
Undercoat Copal Varnishes
Airscrew Varnishes
Copal Varnish for Strut
Dope-Resisting Paint
Shellac Spirit Varnishes
Seaplane Varnishes
Stoving Japans
Service Paints
Battleship Grey Paint
Enamels, Goldsize, etc.

NAYLOR BROTHERS
(LONDON) LTD
Manufacturers of Superfine Varnishes, Paints and Enamels.
SOUTHALL, MIDDLESEX

THE
VICTORIA RUBBER Co LTD
EDINBURGH

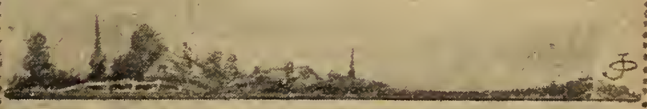
FABRICS
FOR
RIGID
AIRSHIP BALLONETS.

NON-RIGID and SEMI-RIGID AIRSHIP ENVELOPES and BALLONETS.

OBSERVATION BALLOON ENVELOPES, BALLONETS & RUDDERS.

PROOFERS OF FABRICS FOR THE FIRST BRITISH KITE BALLOON.

Low Permeability
and
Maximum Durability
Guaranteed



VICTORIA INDIA RUBBER MILLS. EDINBURGH

MARTINSYDE

DESIGNERS OF THE FAMOUS

F4 FIGHTER

WHICH ESTABLISHED THE

FINEST PERFORMANCE

FOR CLIMB AND SPEED AT HEIGHT.

ROLLS-MARTINSYDE

CARRIED GOVERNMENT DISPATCHES

FROM LONDON TO PARIS IN 75 MINUTES.

COMMERCIAL TYPE A.

ENQUIRIES INVITED FOR PASSENGER—OR MAIL—CARRYING MACHINES OF THIS TYPE.
SPECIFICATIONS WILL INCLUDE

285 H.P. ROLLS-ROYCE FALCON ENGINES,
or 300 H.P. HISPANO-SUIZA ENGINES.
APPROXIMATE PRICE £2,500.

Note all above Types can be fitted with interchangeable Land undercarriage or Sea floats.
Special provision is made for hot climates.

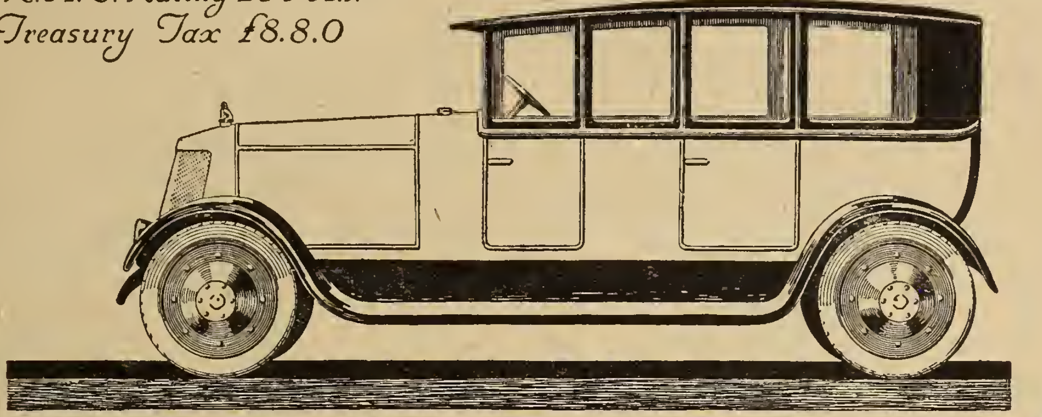
MARTINSYDE, LTD., WOKING, ENGLAND.
London Office: 17, Waterloo Place, Regent St., S.W. 1.

Telephones—551, 552 and 553 Wokin
Telephones { Regent 899. Gerrard 4500.

The ARMSTRONG SIDDELEY

Six Cylinder Car

R.A.C. Rating 29·5 H.P.
Treasury Tax £8.8.0



Saloon Double Phaeton (as illustrated) £1,000.

A Famous Motorist's Opinion.

"FROM one end to the other of the chassis, everything is made as well as it can be. . . . . . To sum up, this 29·5 h.p. six-cylindered Armstrong Siddeley is a true after-war car, selling at prices (according to the coach work fitted) about one-half those quoted for many other chassis of equivalent engine power, which may or may not be as good jobs. They cannot be better. The price of £720 for the chassis, with a full complement of fittings, is the best evidence I have yet seen of a really courageous effort by a great firm, showing real confidence in their ability to make profits at this price in the future, when they have justified a really gigantic British output. This car is right." S. F. EDGE,

From the "Auto," Nov. 28th, 1919.

PUBLIC opinion at the Olympia Show unanimously endorsed our statement that you cannot buy a better car than the new Armstrong Siddeley 6-Cylinder. It is a motor carriage of high efficiency, stately appearance, and ample power—constructed of the best materials. ¶ It is light. It is comfortable. It is dependable. It runs smoothly, silently, and easily managed. Maintenance costs are small. ¶ Three years free inspection. ¶ You cannot buy a better car.

PRICE *of* CHASSIS EQUIPPED WITH Disc Wheels and one Spare Rim; four 820 × 135 Rubber Studded Tyres; Specially Designed Wings, Scuttle Dash with instrument board; Lucas Engine Starter and Electric Lighting, complete with 5 lamps, Mechanical Tyre Pump, Kit of Tools, etc. **£720**

ARMSTRONG SIDDELEY MOTORS LIMITED, COVENTRY.
Formerly the Siddeley-Deasy Motor Car Co., Ltd.
(Allied with Sir W G Armstrong Whitworth & Co., Ltd.)
London: 10, Old Bond Street, W. 1.
Telephone—Gerrard 6439. Wires—"Armsidco, Piccy, London."

YOU CANNOT BUY A BETTER CAR

Godbolds.

The "SALVUS" Provides the certainty of escape for AVIATORS

IN CASE OF FIRE OR OTHER MISHAPS

MAKERS OF
BALLOONS.
AIRSHIPS
PARACHUTES
GAS CONTAINERS
AND
AERONAUTICAL
APPARATUS OF
EVERY DESCRIPTION

FIRST IN 1835
FOREMOST TO-DAY

For particulars of THE "SALVUS" PARACHUTE

WRITE C.G. SPENCER & SONS, LTD.,

56A HIGHBURY GROVE, LONDON, N.5

Phone. 1893. DALSTON. Telegrams "AERONAUT LONDON"

The Combined Metals and Reinforced Casting Co. Ltd.

Many Tons of Aluminium Sheeting of our manufacture have been supplied to the Actual Proprietors and Makers of the SUNBEAM COATALEN "MAORI" ENGINES as fitted to H.M.A. R.33 and R34, for use in the construction of Water Jackets.

Practically all the non-ferrous metal parts used in the construction of the VICKERS-VIMY type of TRANS-ATLANTIC FLYER have been manufactured by US in our DIE and SAND Casting Foundries and in many cases finished in our Machine Shops.

WE HAVE RECEIVED MANY REPEAT ORDERS. WHY?

BECAUSE WE CAN BE RELIED UPON FOR QUALITY OF WORKMANSHIP.

All Enquiries to :—

Point Pleasant Works, Wandsworth, S.W. 18.
Telegrams :—"Overturned, 'Phone, London." 'Phone :—Putney 2405.

Also at 3, Portsmouth Street, Kingsway, W.C. 2.
(J. J. BROAD, Sales Agent). Telephone —Holborn 4523.

G R

By direction of the Disposal Board

AIRCRAFT DISPOSAL DEPARTMENT

MINISTRY OF MUNITIONS.

BESSONEAU HANGARS

FOR SALE.

These HANGARS are constructed with an exceptionally strong wooden frame-work, easily and quickly erected. No foundation is required, and they are covered with strong weather proof canvas, and, besides being suitable for Aircraft, would also be suitable as temporary buildings. A typical size of Hangar is 66 ft. by 79 ft. by 13 ft. head room at front.

A QUANTITY OF THE ABOVE ARE FOR IMMEDIATE DISPOSAL, SITUATED AT THE PLACES AS ENUMERATED BELOW :—

3 "H" type, dismantled, lying at	41 Training School, **Radlett.**
1 "H" type, dismantled. lying at	30 Training School, **Fowlmere.**
1 "H" type, erected, lying at	R.N.A. Station, **Wormwood Scrubbs.**
15 "H" type, erected, lying at	R.A.F. Depot, **Uxbridge.**
4 "H" type, dismantled, lying at	R.A F. Depot, **Uxbridge.**
2 Hervieu III type. lying at	No. 6 Stores Depot, **Ascot.**
4 "C" type, lying at	No. 1 S.A.R.D., **Hamble.**
5 "H" type dismantled, lying at	No. 15 A.A.P., **Manchester.**
3 "H" type, erected, lying at	255 Sqd , **Pembroke.**
5 "H" type, erected, lying at	35 Training School, **Wittlesford.**
3 "H" type, erected, lying at	Redcar, **Yorkshire.**
1 "H" type, dismantled, lying at	Redcar, **Yorkshire.**
11 "H" type, erected, lying at	No. 2 Flying Sqd., **Marske.**
1 "H" type, erected, lying at	Airship Station, Langside, **Minshaw.**
2 "H" type, dismantled, lying at	Airship Station, Langside, **Minshaw.**
1 "Howard NESTLER" "E" type lying at	**Redcar.**
2 "A," lying at	**Redcar.**
11 "C" type, dismantled, lying at	**Tadcaster,** Yorkshire.
2 "C" type, erected, lying at	**Branham Moor.**
1 "H" type, erected, lying at	52 Training School, **Cramlington**
30 "C" type, dismantled, lying at	**Newcastle.**
1 "B" type, dismantled, lying at	**Newcastle.**
1 "H" type, erected, lying at	246 Sqd., **Seaton Carew.**
2 "Admiralty" type, collapsible, lying at	246 Sqd., **Seaton Carew.**
2 "H" type, erected, lying at	The Gloucester Aircraft Co., **Cheltenham.**
2 "F" type, erected, lying at	Airship Station, **East Fortune.**
1 "F" type, dismantled, lying at	Airship Station, **East Fortune.**
2 "C" type, erected, lying at	Airship Station, **East Fortune.**
6 "H" type, erected, lying at	Port Meadow, **Oxford.**
4 "H" type, erected, lying at	**Upper Heyford.**
13 "H" type, dismantled, lying at	**Upper Heyford.**
4 "H" type, erected, lying at	No. 14 A.A.P., **Castle Bromwich.**
3 "H" type, new, unerected, lying at	No. 1 A.A.P., Witley Abbey, **Coventry.**
5 "H" type, not erected, lying at	13 Training School, **Ternhill.**
1 "H" type, lying at	Weedon, **Northampton.**
4 "C" type, with covers, lying at	Winton Aerodrome, **Bournemouth.**
3 "C" type, without covers, lying at	Winton Aerodrome, **Bournemouth.**
1 "H" type, with covers, lying at	Winton Aerodrome, **Bournemouth.**
3 "H" type, without covers, lying at	Winton Aerodrome, **Bournemouth.**
3 "H" type, lying at	No. 3 R.A.F. Stores, **Milton.**
6 "G" type, lying at	R.A.F. Station, **Lee-on-Solent.**
4 "H" type, erected, lying at	Prawle Point, **Salcombe, Devon.**
1 "H" type, lying at	R.A.F. Station, **Scilly Isles.**
1 "H" type, dismantled, lying at	**Felixstowe.**
4 "H' type, dismantled, lying at	1 Marine Observers School, **Aldeburgh.**
2 "H" type, erected, lying at	1 Marine Observers School, **Aldeburgh.**
2 "H" type, dismantled, lying at	Martlesham Heath, **Woodbridge**
1 "B" type, dismantled, lying at	**Feltwell.**
3 "H" type, erected, lying at	4 A.A.P. Bracebridge Heath, **Lincoln.**
1 "H" type, erected, lying at	39 Training School, **Grantham.**
2 "H" type, erected, lying at	**Harlaxton.**
2 "H" type, dismantled, lying at	**Harlaxton.**
1 "H" type, erected, lying at	5 Training School, **Easton.**
3 "H" type, erected, lying at	R.A.F. Station, **Cranwell.**
1 "F" type, dismantled, lying at	R.A.F. Station, **Cranwell.**
5 "H" type, erected, lying at	R.A.F. Station, **Killingholme.**
2 "C" type, lying at	R.A.F. Aerodrome, **Wittering.**
8 "H" type, erected, lying at	7 Training School, **Sedgeford.**
1 "H" type, lying at	R.A.F. Station, **Gt. Yarmouth.**
14 "H" type, dismantled, lying at	1 Marine Observers School, **Eastbourne.**
2 "H" type, erected, lying at	Joyce Green, **Dartford.**
1 "C" type, erected, lying at	**Lydd.**
1 "H" type, erected, lying at	**Woolwich, Kent.**
1 "C" type, erected, lying at	Manston Aerodrome, **Margate.**
1 "C" type, erected, lying at	112 Flying Squadron, **Throwley.**
3 "Howard Nestler," lying at	S.A.R.D., **Farnborough.**
4 "C" type, erected, lying at	S.A.R.D., **Farnborough.**
1 Kite Balloon Hangar, lying at	Airship Ltd., **Merton.**

Enquiries are invited and Tender Forms and all particulars may be obtained on application to :—

THE CONTROLLER,
Aircraft Disposal Department,
"Welcome Club," EARLS COURT.

Telephone—Hammersmith 2300.
Telegrams—"Clearhouse Aero Supply, London."
(Nearest Station :—West Kensington.)

NOTE :—For particulars of other Government Property for sale, see **"SURPLUS"** price **3d.**, at all bookstalls ; or by quarterly subscription of **2/-** post free, payable in advance to the Director of Publicity, Ministry of Munitions, Whitehall Place, London, S.W. 1.

Telephone: WILLESDEN 2455 (2 lines). Telegrams: Nieuscout Crickle, London.

HANDLEY PAGE AIR SERVICES.

3,978 . . . Passengers
40,101 . . . lbs. of Freight
59,930 . . . Miles flown

HANDLEY PAGE

(TYPE W.8.)

Fitted with 2 - 450 Napier Engines.

The World's Most Luxurious
Commercial Aeroplane

Now on show at the
INTERNATIONAL AIRCRAFT EXHIBITION
PARIS.
STAND NOS. 36-38.

London-Paris — 2 hrs. 10 m.
Accommodation, 15 Passengers.
Cargo Capacity — 2 Tons.

HANDLEY PAGE LTD.

LONDON ——— ENGLAND.

Die-cast & *finished*
without machining.

The accuracy of intricate parts is assured and will appeal to you no less than the substantial economies effected by

"PRANA" DIE-FINISHED CASTINGS
for aircraft, automobile and kindred trades.

Send for booklet to—

Aerators, Ltd., "Prana" Foundry, Edmonton, N. 18.

THE
AVIATION AIA INSURANCE
ASSOCIATION

Policies issued by Underwriting Members of Lloyd's, the Eagle, Star and British Dominions Insurance Co., Ltd., and the Excess Insurance Co., Ltd., for whom the Association Acts as Agent.

AIA POLICIES
Cover all classes of Aviation Risks.

Accidental Damage under all circumstances to Aircraft of all descriptions, including Fire, Burglary, and Theft.
Covering Policies of various kinds to meet the requirements of Carriers by Air.

Accidental Damage to Cargo.
Personal Accident to male Pilots of Aircraft, to Crew and Passengers.
Third Party Risks of all descriptions.
Accidental Damage from Aircraft.

MINIMUM RATES. MAXIMUM SECURITY.

1, ROYAL EXCHANGE AVENUE, LONDON, E.C. 3.
Telephone: LONDON WALL 9944.

Telephones:
Gosport 217.
London: Gerrard 5716.

Telegrams:
"Flight, Gosport."
"Embellishment, London."
"Embellishment, New York."

GOSPORT AIRCRAFT Co.

DESIGNERS AND BUILDERS OF

FLYING BOATS

FOR

THE AIR MINISTRY AND FOR COMMERCIAL AND PLEASURE USE.

HEAD OFFICE & WORKS: GOSPORT.

Sir Charles Allom.
Charles E. Nicholson.
M. H. Volk, A.F.Ae.S. (General Manager).

London Office: 15, George Street,
Hanover Square, W. 1.
New York Office: 19, East 52nd Street.

Telegrams: "Bucheron, London."
Telephone: Hop 3811 (2 lines).

TIMBER

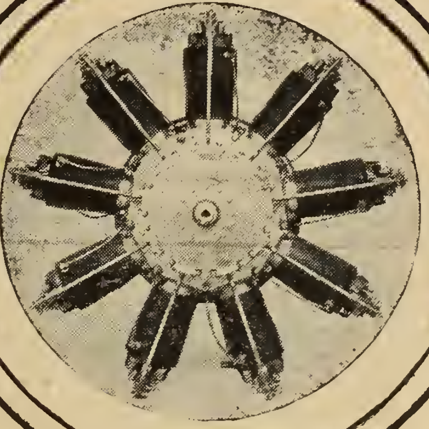
CLEAR SILVER SPRUCE,
POPLAR AND CYPRESS,
WALNUT and MAHOGANY,
ENGLISH ASH,
&c., &c.

Joseph Owen & Sons, Ltd.,
Borough Sawmills, LONDON, S.E. 1.

POWER

—an outstanding point in "the most efficient Aero Engine in the world"

ABC



The Engine illustrated is the DRAGONFLY—340 h.p.—9 cyl. (Static Radial).

WALTON MOTORS, Ltd.,
Walton-on-Thames.

Telephone:
ESHER 306 & 307.
Telegrams:
"MOTORS, WALTON-ON-THAMES."

Telephone:
WILLESDEN 2214.

CONTRACTORS TO
H.M. GOVERNMENT.

THE BRITISH ANZANI ENGINE CO., LTD.,

SOLE BUILDING AND SELLING RIGHTS
FOR
THE BRITISH EMPIRE AND DEPENDENCIES.

MANUFACTURERS OF ANZANI AIR ENGINES OF ALL TYPES. MAGNETOS. MOTOR CYCLE, CYCLE CAR, LIGHT CAR, AND MOTOR BOAT ENGINES

The Anzani Engine has the biggest record for school and cross-country flying.

IT IS THE MOST RELIABLE, CHEAPEST, ECONOMICAL AND SIMPLEST IN THE WORLD, AND WAS THE FIRST TO FLY THE CHANNEL.

SPECIAL NOTICE.—All types of Anzani Engines have been officially approved by the Civil Aviation Department of the Air Ministry.

Works and Registered Offices: **SCRUBBS LANE, WILLESDEN, N.W. 10.**

Flying Boats..

THE SUPERMARINE CHANNEL TYPE FOUR SEATER FLYING BOAT

illustrated above has been designed and constructed by the S.A.W., Ltd., Southampton, and passed for sea and air worthiness by the British Air Ministry. We have standardised this machine which is fitted with folding wings, 160 H.P. Beardmore engine, and the latest and most up-to-date improvements in marine aircraft. We are using this model for our FLYING BOAT Passenger Service on the South Coast. Demonstration flights will be given by arrangement. Enquiries are invited for these machines, which we have ready complete for shipment to any part of the world. We are prepared to act as consultants to give advice as the result of our experience on the establishing of a Flying Boat Passenger Service. A FLYING BOAT Passenger Service is the best paying proposition to-day in Civil Aviation.

LONDON OFFICE: Donnington House, Norfolk Street, Strand, W.C. 2.

TELEPHONE: CENTRAL 7770.

CABLE CODES: Western Union. ABC 5th Edn. Marconi International.

TELEPHONE: 37 Woolston (2 lines).
TELEGRAMS and CABLES: "Supermarin," Southampton.

THE SUPERMARINE AVIATION WORKS, LTD.

ESTABLISHED 1912

SOUTHAMPTON: ENGLAND.

McGRUER HOLLOW SPAR COMPANY LIMITED

PATENTS
U.K. 4794/15.
U.S.A. 19/5/1918.

ENGLAND
TO
AUSTRALIA

THE **"VICKERS-VIMY-ROLLS"** WHICH ACCOMPLISHED THIS WONDERFUL **FLIGHT** HAD

McGRUER HOLLOW SPARS

FITTED AS **LONGERONS** AND **FUSELAGE STRUTS.**

COMMERCIAL
RD., LAMBETH,
LONDON. S.E. 1,

Telephone: Hop 718.
Telegrams: "Ollosparsh, Watloo, London."

S.B.A.C.

The Alliance Aeroplane Company Ltd.

CONTRACTORS
TO

**Ministry of Munitions of War
Air Board.**

Registered Offices:
45, EAST CASTLE ST.
LONDON
W. 1.

CAMBRIDGE ROAD
HAMMERSMITH.

NOEL ROAD
ACTON.

HOPE'S · LOK'D-BAR · SASH
WALLS of DAYLIGHT.
Specially suited to Aerodrome Construction
Vents are Watertight and easily operated.
SMETHWICK, BIRMINGHAM · 59, BERNERS ST LONDON, W.

BATH AIRCRAFT LTD.
Manufacturers of Planes, Propellors Struts, Fuselages, etc.
Highest possible quality guaranteed.
FLIGHT WORKS, LOWER BRISTOL ROAD. BATH.

TRADE MARK ENOTS REGISTERED
PATENT CORK-DISC SEATED
PETROL COCKS
WERE USED EXCLUSIVELY ON
THE VICKERS-VIMY-ROLLS MACHINE
that successfully crossed the Atlantic.
For particulars of
THE ONLY POSITIVELY PETROL-TIGHT COCK
on the market,
write the Makers and Sole Patentees.
ENOTS WORKS, Birmingham.
Benton & Stone Ltd.
THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS S·B·A·C

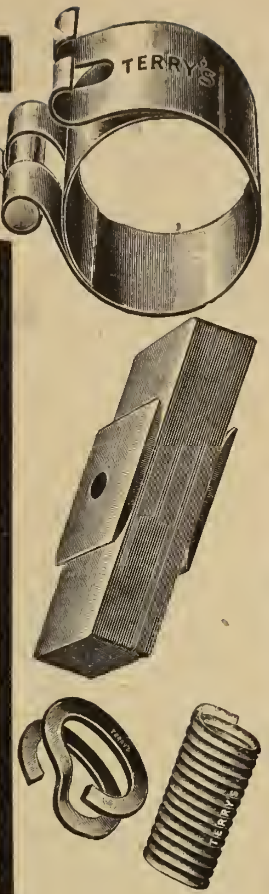
THE PRODUCTS OF GREAT BRITAIN'S LARGEST PAINT & VARNISH MAKERS.
WILKINSON, HEYWOOD & CLARK, LTD. WHC
WILKINSON HEYWOOD
AIRCRAFT FINISHES
FOR ALL AIRCRAFT PURPOSES
AS RELIABLE IN PEACE AS IN WAR
WILKINSON HEYWOOD & CLARK LIMITED
POPLAR :: LONDON :: E.14.

The range of TERRY Resources

is wide, it is specialized, and is organized to meet heavy delivery requirements, of any patterns we are asked to produce, with accuracy, and in high grade quality.
Why not send us samples and ask us to quote for your supplies?

HERBERT TERRY & SONS, LTD.
THE SPRING AND PRESSWORK SPECIALISTS,
REDDITCH, ENGLAND.

Estab. 1855.



Propellers ONLY

DESIGNERS AND MANUFACTURERS:

W. D. Oddy & Co.,
LEEDS.

Telegraphic Address: "AIRSCREWS, LEEDS."
Telephone Nos: 20547 and 20548.

CONTRACTORS TO H.M. GOVERNMENT

Please Note our New Address—
Globe Rd., Holbeck, Leeds

Aircraft Radiators
OF ALL TYPES.

— *ALSO* —
Petrol & Oil Tanks
Sheet Metal Work,
Spinnings,
Presswork,
Etc.

The Doherty Motor Components, Ltd.
EARL STREET, COVENTRY.
Contractors to Admiralty, War Office & Russian Government.

STOP!

We won't detain you one moment.

YOU are in the market for PETROL and OIL TANKS, WATER TANKS, GENERAL SHEET METAL WORK and WELDING? GOOD.

WE ARE OUT FOR BUSINESS.

Send us your enquiries
when we will quote you

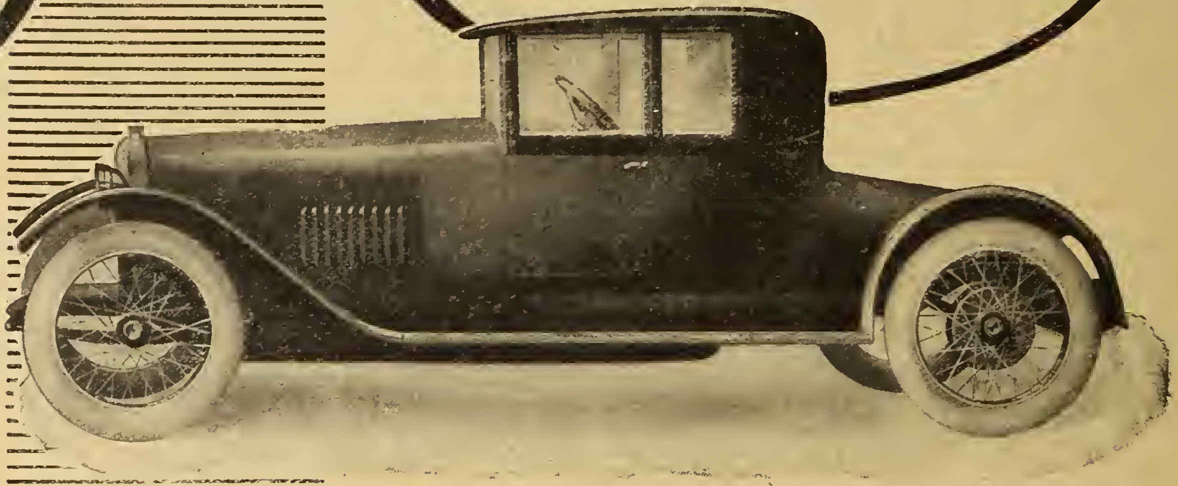
AS LOW AS POSSIBLE.

All materials of Best Quality and our workmen are skilled in their craft.

COPPERSMITHS and SHEET METAL WORKERS, also MAKERS and REPAIRERS of MOTOR CAR WINGS, PANELS and RADIATORS, Etc.

Allin & Newbold, Ltd.,
Newall Works, Letchworth, Herts.
Telephone: Letchworth 61. *Telegrams:* "Allnew, Letchworth."

REGENT
BODIES



There's Nothing now to hinder your ordering a body for your new car (no matter the make), that will reflect credit on your choice in any company.

THE REGENT CARRIAGE Company bodies are built for the discriminating, those who require distinction without freakishness, comfort without complication, and sterling quality at an honest price.

Send for particulars of the latest Regent bodies.

THE
REGENT
CARRIAGE Co. Ltd.
126-132 NEW KING'S ROAD
FULHAM, LONDON, S.W. 6.
Telegrams: "Carbodis, London."
Telephone: Putney 2240-1.

VICKERS

LIMITED.

"VICKERS-VIMY-ROLLS."

The Start from Hounslow. 9.10 a.m. November 12th, 1919.

THE FIRST FLIGHT FROM ENGLAND TO AUSTRALIA.

Nov. 12th to Dec. 10th, 1919.

TIME—27 days, 20 hrs., 20 min. DISTANCE—approx. 11,500 miles.

THE WORLD'S LONGEST FLIGHT.

THE FIRST DIRECT TRANS-ATLANTIC FLIGHT.

June 14th-15th, 1919.

TIME—15 hrs. 57 min. DISTANCE—1,890 miles.

THE WORLD'S LONGEST NON-STOP AEROPLANE FLIGHT.

Telegraphic Address:
Vickerfyta, Knights, London.

Telephone:
Kensington 6520 (4 lines).

Aviation Department
Imperial Court, Basil Street,
KNIGHTSBRIDGE, S.W.3.

*FLIGHT WITH ECONOMY

THE

Sopwith

AVIATION & ENGINEERING Co. LTD

has designed and is building

Three New Types

TRANSPORT.—Single-engine long distance, high-performance, weight - carrying utility aeroplane, carries passengers or cargo.

GNU.—High-performance, enclosed cabin, three-seater.

DOVE.—Very fast sporting two-seater.

Appointments for Demonstration Flight and further particulars on application.

The Sopwith Aviation and Engineering Co., Ltd., originators of the high performance wide-speed range biplane, has designed a larger number of types, which have been accepted and standardised by the British Government, than any other aircraft manufacturer. Its enormous works have been devoted exclusively to the production of its own machines which have been also made in huge quantities by sub-contractors. Its designs have been made in great numbers by the French Government and also for the American Government, and have been also used by the Italian, Russian, Greek and Rumanian Forces.

The Sopwith "Gnu" 3-Seater.

IT IS PREPARED TO DESIGN AND BUILD THE BEST AND MOST EFFICIENT UTILITY MACHINES (SEA OR LAND) FOR ANY SPECIFIED SERVICE AND PERFORMANCE.

Registered Offices and Works:
KINGSTON-ON-THAMES.
Telephone: Kingston 1988 (8 lines).
Telegrams: "Sopwith, Kingston."

S.B.A.C.

London Offices:
65, SOUTH MOLTON ST., W. 1.
Telephone: Mayfair 5803-4-5.
Telegrams: "Efficonomy, Phone, London."

Australia: THE LARKIN SOPWITH AVIATION COMPANY OF AUSTRALASIA, LTD., 18, GURNER STREET, ST. KILDA, MELBOURNE, also ABERDEEN HOUSE, 94, KING STREET, MELBOURNE, and LONDON BANK CHAMBERS, CORNER OF PITT AND MOORE STREETS, SYDNEY.

AVRO

This Trademark is the
GUARANTEE
of
EXCELLENCE,
RELIABILITY,
and
EXPERIENCE

in the production of

Aeroplanes,
Seaplanes,
and
Accessories.

We are now booking orders for Avro Machines for all Commercial and Military purposes. . .

Complete particulars on application to—

A. V. ROE & Co., Limited,

Aircraft Designers and
:: Constructors. ::

MANCHESTER, :: SOUTHAMPTON,
and
44a, Dover Street, London, W. 1.

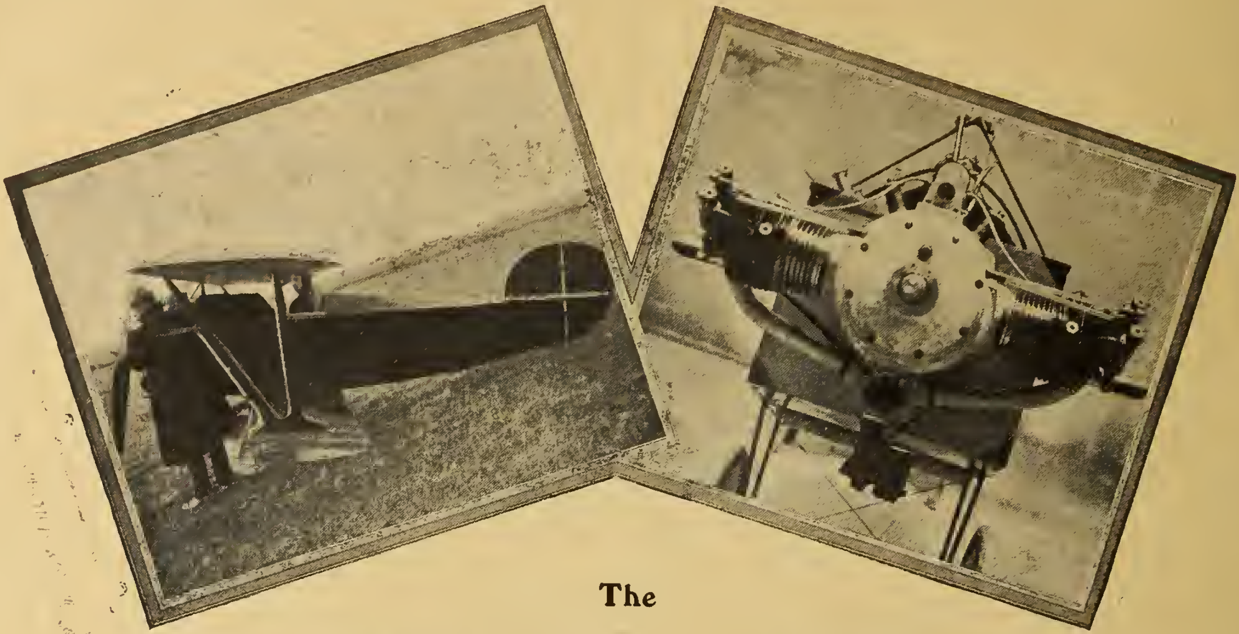
Telegrams— "Senalpirt, 'Phone."
Telephone— Regent 1613.

Send for Illustrated Brochure.

The "Bristol" Aeroplanes

Stand 65

International Aircraft Exhibition ::: Paris.



The

"BRISTOL" BABE.

Quality - Efficiency - Economy

Highly Efficient and Extremely Economical.

This Aeroplane can easily be handled by one man and can be housed in an ordinary garage. It is a sturdy construction, the fuselage being of three-ply wood throughout without bracing wires. Fitted with a 40 h.p. two-cylinder, air-cooled, Siddeley engine, a speed of 85 miles per hour can be obtained, and the petrol consumption is only three gallons per hour. The Anzani engine can also be fitted if desired. The main specifications are :—

Weight empty		*460 lbs.*	*Wing area*	*107·8 sq. ft.*
Weight loaded		*683 lbs.*	*Wing loading*	*6·34 lbs. per sq. ft.*
Wing Span	*Top Wing*	*19 ft. 8 in.*	*Overall length*	*14 ft. 11 in.*
	Bottom Wing	*18 ft. 8 in.*	*Maximum height*	*5 ft. 9 in.*
Chord of Wing	*Top Wing*	*3 ft. 11 in.*	*Petrol capacity*	*6·5 gallons*
	Bottom Wing	*2 ft. 6 in.*	*Landing speed*	*40 m.p.h*

THE
BRITISH & COLONIAL
AEROPLANE CO., LTD.
FILTON — BRISTOL.

Telegrams :
"AVIATION, BRISTOL.

Telephone :
3906 BRISTOL

GWYNNES
LIMITED.

Contractors to H.M. Government.

Manufacturers and Sole Licensees in the British Empire

"Clerget" Patent Aero Engines.

S·B·A·C

ENGINEERS,
LONDON.

"Gwynne, London."

NORTH BRITISH
BALLOONS FOR
ADVERTISING PURPOSES.

Captive and Free type Spherical Balloons.

Moderate in price and most effective in use.

AIRSHIP ENVELOPES AND BALLOONETS.

Parachutes, Fabrics, Aeroplane Wheels and Tyres, Petrol Tubing, Etc.

Illustrated Lists free on application.

THE NORTH BRITISH RUBBER
Company, Limited.
Castle Mills,
EDINBURGH.

ACTUAL MANUFACTURERS

TAPES

JAMES NORTH HARDY & SON, LTD.

54, PORTLAND ST., MANCHESTER.

Telegrams: HARDSON, Manchester. Telephone: 6471 Central.

3, FITCHETTS COURT, NOBLE ST., LONDON, E.C. 2

Telegrams: JANORHAR, Phone, London. Telephone: City [illegible].

GLASGOW: 76, Virginia St. BELFAST: 29, Franklin St.

WEBS

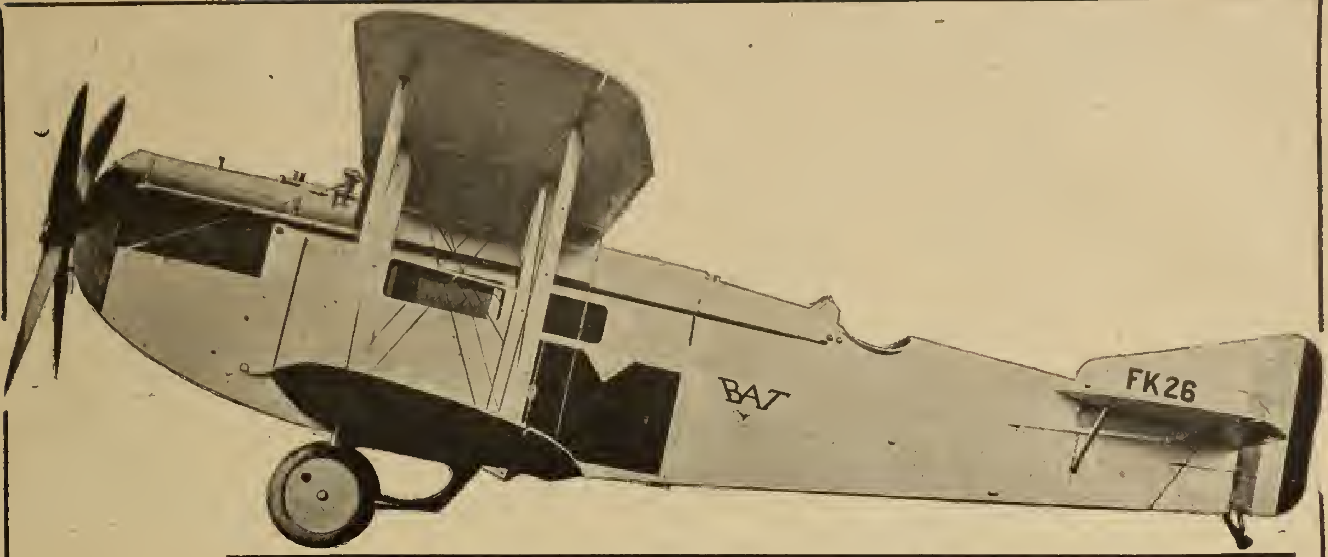
Contractors to
The AIR BOARD
WAR OFFICE
ADMIRALTY
and all
GOVERNMENT
DEPTS.

CORDS

for all classes of AIRCRAFT and ELECTRICAL Work.

LARGE STOCKS KEPT.

SAMPLES by RETURN on application.



THE IDEAL COMMERCIAL AEROPLANE

The machine here illustrated is the B.A.T.—F.K. 26—universally acknowledged to be the most practical and efficient commercial aeroplane yet produced. Although a relatively small machine—only 34 feet over-all length—it possesses surprisingly commodious cabin and cargo accommodation. Four passengers can be carried comfortably, with ample room for personal luggage, or, alternatively, parcels or mails to the extent of 1,000 lbs. in weight and **150 cubic feet in capacity.**

Here are some additional interesting points concerning the machine :—

Engine :—375 *Rolls-Royce Eagle VIII.*

Speed :—45-120 *m.p.h.*

Cabin :—*Is clear of any transverse cross bracings or other obstruction, and measures* 8 *ft. by* 3 *ft.* 3 *in. by* 6 *ft.—this is a machine of* 34 *feet overall length. Direct entry off ground through ordinary door.*

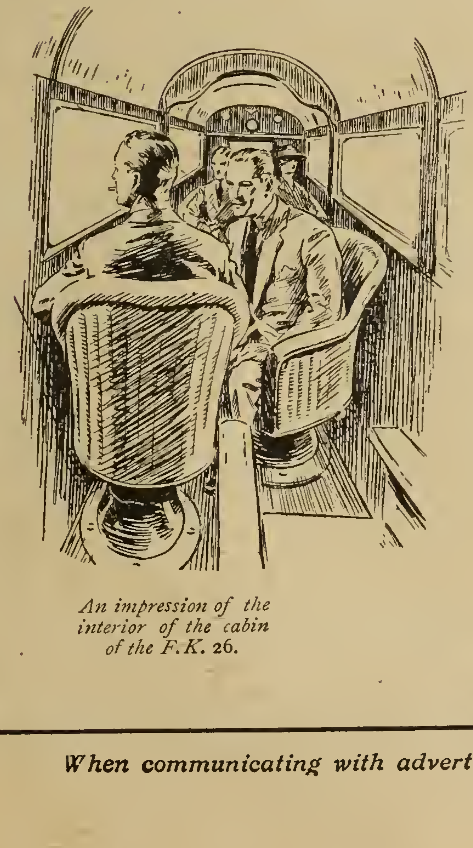
Load :—*With* 600 *mile range of fuel*—1,000 *lbs.*

Fuel Cost at Full Load :—7.2 *pence per mile.*

Chassis :—*A sturdy job, sprung by an unique combination of oleo and rubber shock absorbers.*

Tail :—*Can be trimmed in flight from pilot's seat—steerable and practically unbreakable tail skid.*

General Construction :—*Straightforward—simple to repair and recondition.*



An impression of the interior of the cabin of the F.K. 26.

The B.A.T.-F.K. 26 as a commercial machine has so many natural advantages and is so moderate in first cost, that it is really the ideal machine to employ in inaugurating air transport services.

A demonstration flight can be arranged and all particulars obtained on application to :—

The BRITISH AERIAL TRANSPORT Co., Ltd.,

38, Conduit Street, London, W. 1.

Telephone :
Mayfair 637 and 638.

Telegrams :
"Batigram, Reg, London."

EXPRESS TRAVEL BY AIR

The remarkable reliability of the Airco machines which are running the Daily Air Service between London and Paris is shown by the following summary of flights and mileages :—

1. THE NEW AIRCO 16.

45 Flights were made during the first twelve weeks, with a total approximate mileage of 11,400 miles.

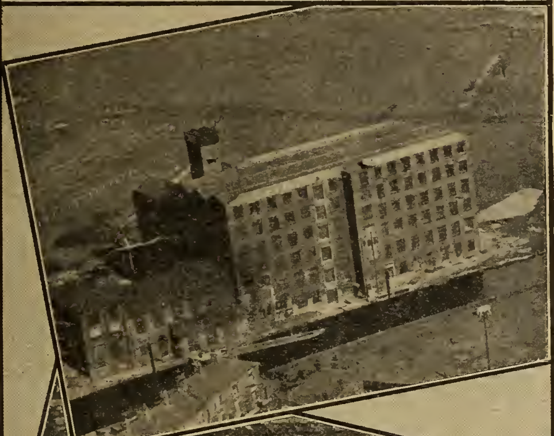
2. AIRCO 9B

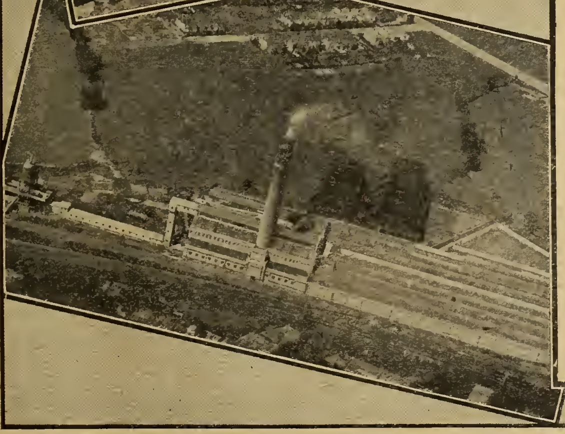
37 Flights have been accomplished by this machine, covering an approximate total of 9,250 miles.

3. AIRCO 4A.

This well-known machine has successfully made no fewer than 95 flights between London and Paris during the first 12 weeks, covering a total distance of approximately 23,750 miles.

AIRCRAFT MANUFACTURING
CO., LTD.
London Office
25-27, OLD QUEEN STREET, S.W.1.
Works:
THE HYDE, HENDON, LONDON, N.W.9





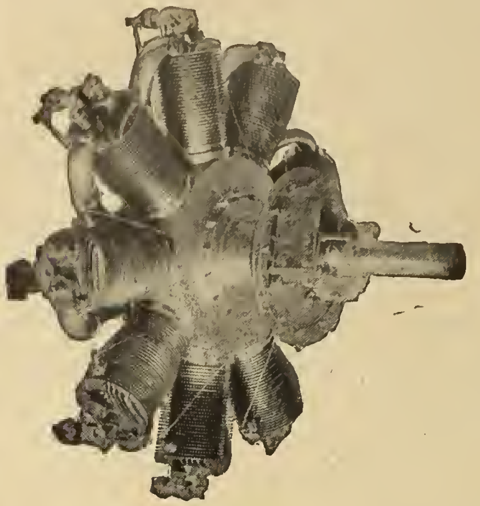
Have your Works Photographed

from the

AIR

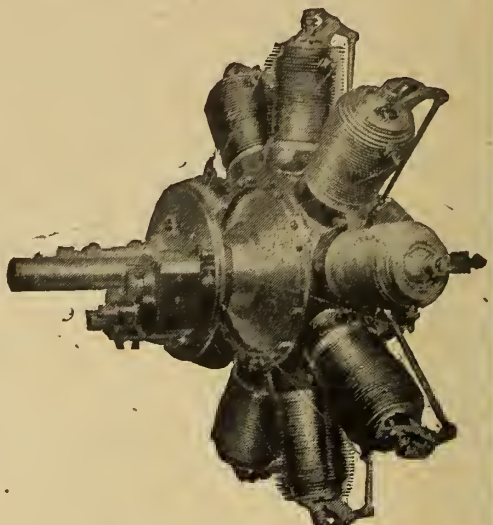
These striking photographs of famous Factories taken from the air illustrate the remarkable value of Aerial Photography for commercial and advertising purposes. Business men interested in obtaining really first-class aerial photographs of their factories, workshops, estates, etc., should write for full particulars of the Airco Aerial Photographic Department. Airco Aerial Photos are the finest in the world, and, owing to the excellent definition, are admirably suited for enlargement or reproduction.

**THE AIRCRAFT
MANUFACTURING CO., LTD.,
(Dept. A7a), HENDON, N.W.9.**
Telephone: Kingsbury 220.



110 h.p. Le Rhone.

Contractors
to the
War Office,
Admiralty
and
Air Ministry



100 h.p. Monosoupape.

GNÔME AND LE RHONE ENGINE COMPANY

MANUFACTURERS AND SOLE LICENSEES for the British Isles, and Licensees for Overseas Dominions of the Gnome and Le Rhone Aero Engines.

The Gnome and Le Rhone Engine Co. beg to give notice that they cannot accept any responsibility for Engines and Spares which have not been supplied direct from them, or which have not been overhauled and tested by their staff.

LONDON OFFICE:
25-27, OLD QUEEN STREET, S.W. 1.
WORKS AND OFFICES:
BLACKHORSE LANE, WALTHAMSTOW, E. 17.

The first

FLIGHT TO AUSTRALIA

was made with

ROLLS-ROYCE

AERO ENGINES

in a Vickers-Vimy-Rolls-Royce Aeroplane, piloted by
Capt. ROSS SMITH, M.C., D.F.C., A.F.C.

The first direct

FLIGHT ACROSS THE ATLANTIC

was also made with

ROLLS-ROYCE

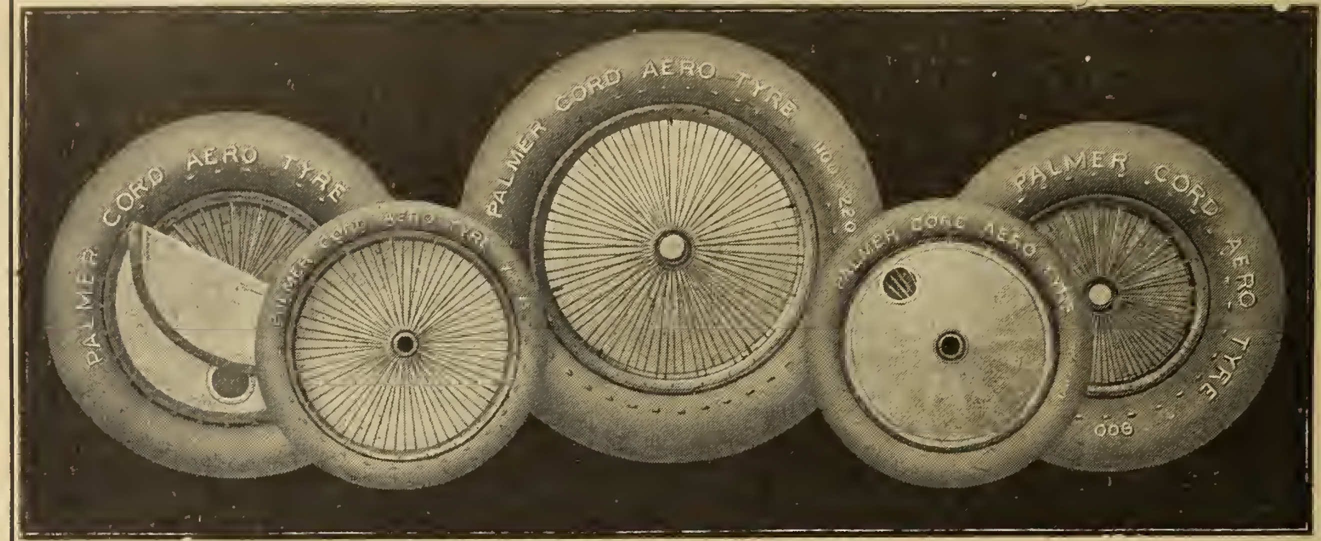
AERO ENGINES

in a Vickers-Vimy-Rolls-Royce Aeroplane, piloted by
the late Capt. SIR JOHN ALCOCK, K.B.E., D.F.C.

ROLLS-ROYCE, Ltd., 15, Conduit Street, LONDON, W. 1.

Telegrams : "Rolhead, Reg, London." *Telephone : Gerrard 1654 (3 lines).*

PALMER
LANDING WHEELS and TYRES



STANDARD SIZES:

Tyre Sizes	Wheel No.	Hub		Track Line	Tyre Sizes	Wheel No.	Hub		Track Line	Tyre Sizes	Wheel No.	Hub		Track Line
		Length	Bore				Length	Bore				Length	Bore	
		m/m	m/m	m/m			m/m	m/m	m/m			m/m	m/m	m/m
300 × 60	16	111.12	25.4	Central	700 × 75	100	178.	38.09	132/46	1000 × 150	102	185.	55.	125/60
,,	17	72.39	12.7	Central	,,	101	178.	31.75	132/46	,,	141	250.	80.	Central
										,,	201	185.	60.32	125/60
450 × 60	30	89.	31.75	Central	700 × 100	77	178.	44.45	132/46	,,	209	185.	55.	Central
,,	138	130.	38.09	Central	,,	92	185.	55.	135/50	,,	210	185.	60.32	Central
					,,	95	185.	55.	Central					
575 × 60	21	160.	28.	Central	,,	96	178.	55.	132/46	900 × 200	107	185.	55.	Central
,,	34	150.	31.75	104/46	,,	99	178.	38.89	132/46	,,	108	185.	55.	125/60
,,	111	150.	38.09	104/46	,,	112	150.	38.09	Central	,,	128	220.	66.67	Central
										,,	137	250.	80.	Central
650 × 65	78	178.	44.45	132/46	650 × 125	119	178.	55.	132/46	,,	202	185.	60.32	Central
,,	79	178.	44.45	Central										
,,	100	178.	38.09	132/46	750 × 125	77	178.	44.45	132/46	1100 × 220	134	220.	66.67	Central
,,	101	178.	31.75	132/46	,,	92	185.	55.	135/50	,,	136	250.	80.	Central
					,,	95	185.	55.	Central					
600 × 75	21	160.	28.	Central	,,	96	178.	55.	132/46	1250 × 250	133	250.	80.	Central
,,	34	150.	31.75	104/46	,,	99	178.	38.89	132/46					
,,	111	150.	38.09	104/46	,,	112	150.	38.09	Central	1500 × 300	115	304.8	101.6	Central
										,,	126	304.8	152.4	Central
700 × 75	78	178.	44.45	132/46	800 × 150	82	185.	55.	135/50					
,,	79	178.	44.45	Central	,,	85	185.	55.	Central	1750 × 300	139	400.	152.4	Central
					,,	131	220.	66.67	Central					

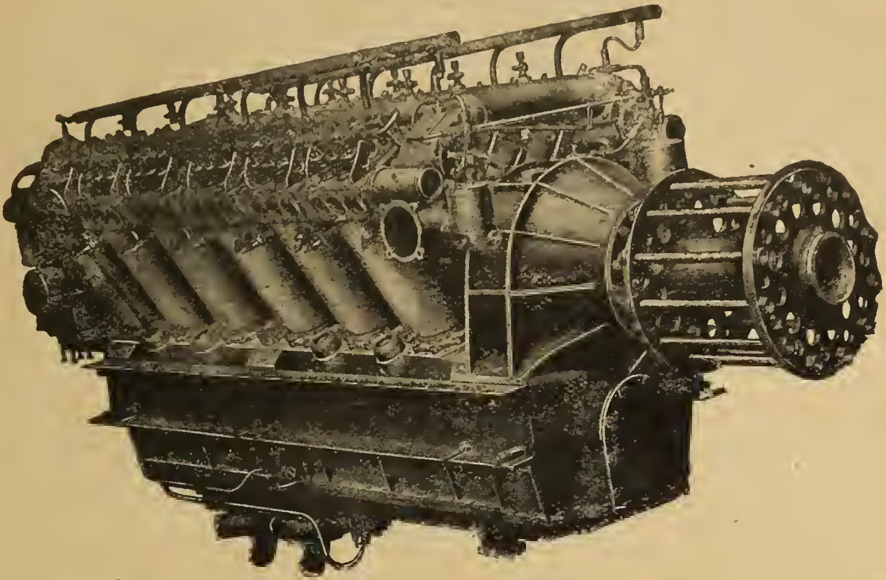
THE PALMER TYRE LIMITED,

Contractors to the Admiralty, the War Office, and the Ministry of Munitions,

119, 121, 123, SHAFTESBURY AVENUE, LONDON, W.C. 2.

Telegrams: "TYRICORD, WESTCENT, LONDON." Telephone: GERRARD 1214 (Five Lines).

PARIS: 24, Boulevard de Villiers, Levallois-Perret.
AMSTERDAM: Stadhouderskade 91.



"SIKH" Aero Engine 800 h.p.

SUNBEAM-COATALEN AIRCRAFT ENGINES

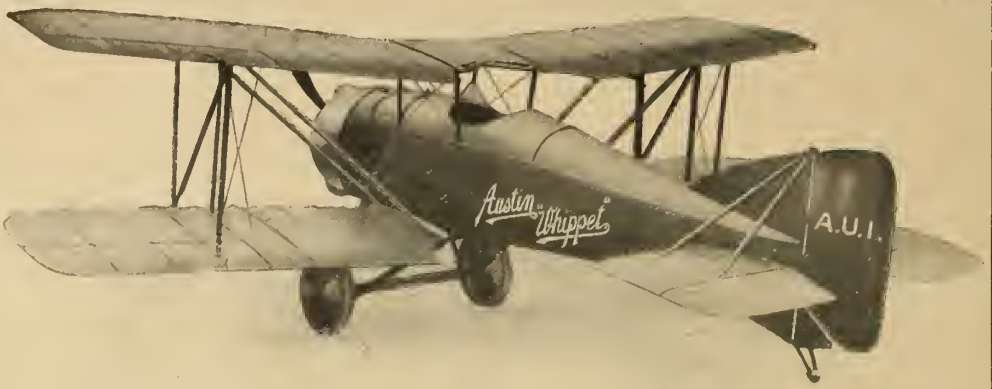
on Exhibition at the

PARIS AERO SHOW

STAND No. 48

GRAND NEF.

The Sunbeam Motor Car Co., Ltd.,
Moorfield Works - - Wolverhampton.



The Austin "WHIPPET"

The PLANE for the OWNER-PILOT.

The age of practical private aviation is here. Everyone who has a desire to possess and fly his own plane can now do so without entailing fabulous expense.

Approximately £500 or less than the cost of a good car, will buy the Austin Whippet, a single-seater biplane of small dimensions but great capabilities.

The Austin Whippet can be housed in an ordinary garage when its wings are folded, and can be handled with ease by anyone.

Wonderfully stable in flight, it will climb to 10,000 feet and attain a speed of 85 miles per hour. Of steel construction throughout, it is built essentially for safety

THE AUSTIN MOTOR CO., LTD.

Head Office - - Northfield, Birmingham.
Telephone: King's Norton 230 Telegrams: "Speedily, Northfield."
LONDON - - - - 479-483, Oxford Street, W. 1.
MANCHESTER - - - - - - - 130, Deansgate.
And at PARIS and BRUSSELS.

REG. TRADE MARK

Engineers Have Found That

I. L. O.

MEANS

O I L

OBTAINING IMPROVED LUBRICATION

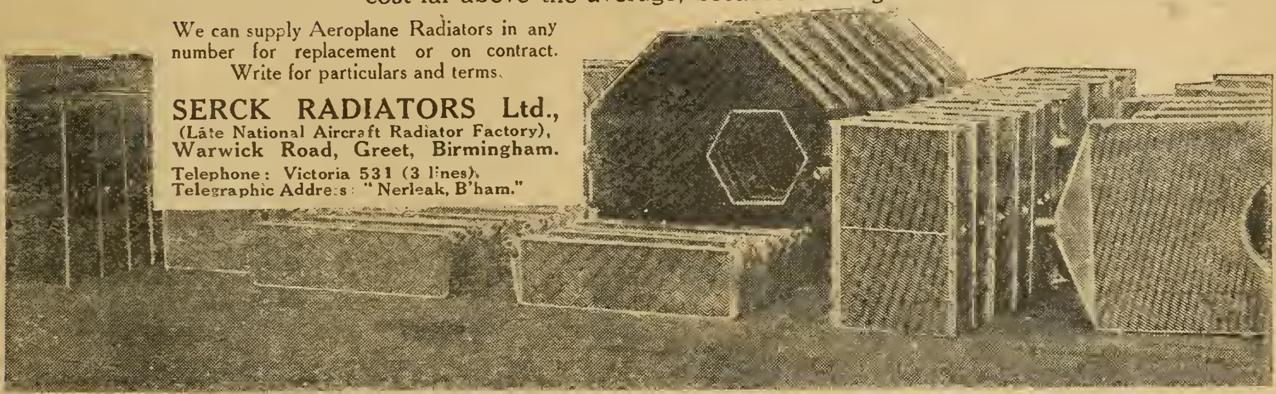
W. B. DICK & Co. Ltd. 90, Fenchurch Street, LONDON, E.C. 3.
Telephone—Avenue 7854 (2 lines). Telegrams—"Dicotto," Fen, London.

Send to Serck

for all types of

AEROPLANE RADIATORS

Mass production on scientific principles means an unusually high standard of efficiency with a saving of cost far above the average, because of decreased cost of materials and labour. Our output numbers thousands of radiators and we do the whole job, from drawing the tubes to the complete radiator.

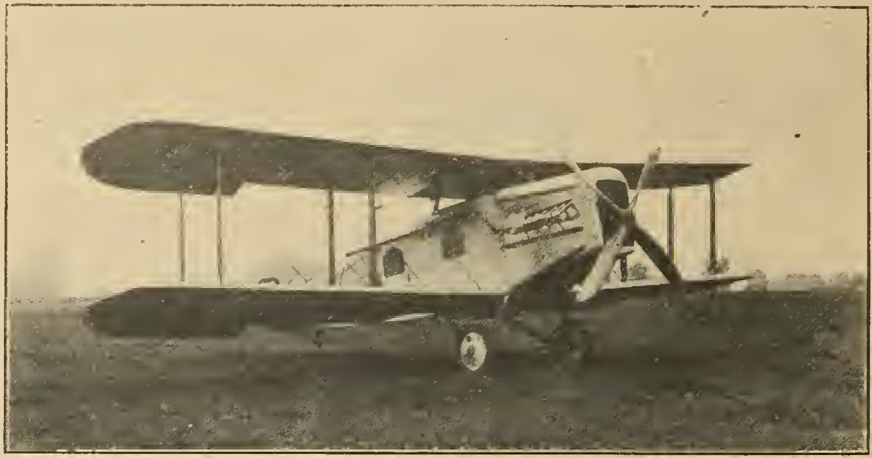


We can supply Aeroplane Radiators in any number for replacement or on contract. Write for particulars and terms.

SERCK RADIATORS Ltd.,
(Late National Aircraft Radiator Factory),
Warwick Road, Greet, Birmingham.
Telephone: Victoria 531 (3 lines).
Telegraphic Address: "Nerleak, B'ham."

Aeroplane Radiator Blocks ready for insertion in cases.

WESTLAND.



If you are visiting the Paris Aeronautical Exhibition we shall be pleased to show you the Westland "Limousine" on Stand 20.

We shall also have another machine at Le Bourget Aerodrome for giving demonstration flights.

Above is illustrated the model we intend to exhibit. The first machine, which has been flying since last July, has proved an ideal machine for mail carrying or passenger transport-de-luxe.

For full particulars and arrangements as to trial flights, apply to our London Representative, Lieut.-Colonel C. H. Meares, c/o Messrs Petters, Limited, 6, Dean's Yard, Westminster, London, S.W.1.

Westland Aircraft Works

(Branch of PETTERS Limited), **YEOVIL.**

Westland Aircraft Works, Branch of Petters Ltd, Yeovil

Telephone: 141 and 142 Yeovil.
Telegrams: "Aircraft, Yeovil."

NIGHT LANDING LIGHTS

Bird's-eye view of Aeroplane Landing at Night.

As adopted by
AIR MINISTRY.

Orders now undertaken for Commercial Purposes.

An "IMPERIAL" Landing Light.

Send for free Booklet.

IMPERIAL LIGHT Ltd.,
Specialists in Oxy-Acetylene Apparatus,
123, Victoria Street, London, S.W. 1.
Telephone : Victoria 3540 (3 lines). *Telegrams : "Edibrac, 'Phone, London."*

MONK BRIDGE IRON & STEEL CO. LTD.

LEEDS.

MANUFACTURERS OF

ALLOY STEELS

SUITABLE FOR AIRCRAFT ENGINES.

DIE STEEL

SUITABLE FOR DROP STAMPERS.

CONTRACTORS TO
H.M. ADMIRALTY and WAR OFFICE.

BY APPOINTMENT

JEWELLERS TO
HIS MAJESTY
THE KING.

CHRISTMAS PRESENTS FROM A COLLECTION AT THE GOLDSMITHS & SILVERSMITHS COMPANY

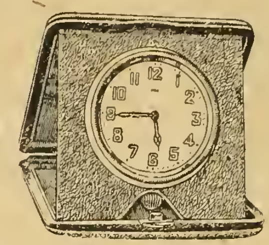
A selection will be sent for approval, if desired, post paid and at the Company's risk, or a Catalogue of Christmas Presents will be posted free on application.

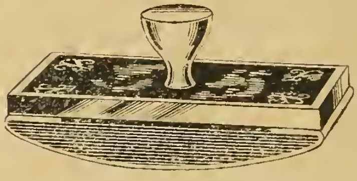
WARNING.
The Goldsmiths and Silversmiths Company have no branch establishment in Regent Street, Oxford Street, nor elsewhere in London—only one address, 112, Regent Street, London, W. 1.

Solid Silver and Inlaid Tortoiseshell Hair Brush. **£8 0 0**

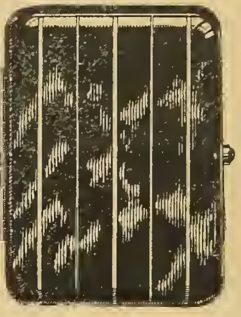
Solid Silver and Inlaid Tortoiseshell Scent Bottle with Engraved Glass Body. **£4 10 0**

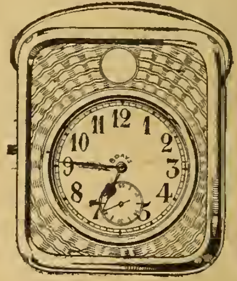
Solid Silver and Inlaid Tortoiseshell Hand Mirror. **£11 15 0**

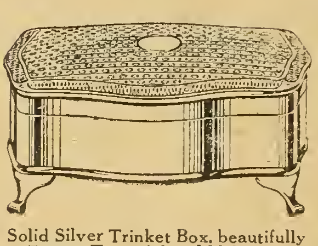

8-day Lever Watch with Luminous Dial in Fold-up Leather Case. **£6 15 0**

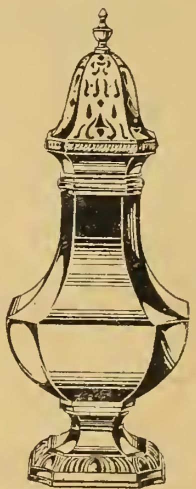

Silver Mounted and Inlaid Tortoiseshell Rocker Blocker. **£5 0 0**

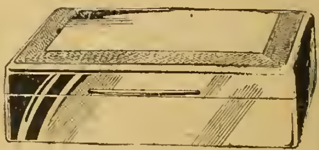
9-ct. Gold Vanity Case, Engine Turned, with Mirror and Powder Puff. **£4 10 0**


Finely Figured Tortoiseshell Cigarette Case, Inlaid 18-ct. Gold Decoration. **£15 10 0**


8-day Lever Travelling Watch, with Engine Turned Silver Front. **£6 10 0**


Solid Silver Trinket Box, beautifully Engine Turned, lined Velvet. **£5 15 0**


Solid Silver Sugar Dredger, copy antique. Height 8½ inches. **£5 15 0**


Solid Silver Cigar Box, lined Cedar, beautifully Engine Turned, size 7×5 inches. **£12 5 0**

THE GOLDSMITHS & SILVERSMITHS COMPANY LTD.

with which is incorporated The Goldsmiths Alliance Ld. Estd. 1751

112, REGENT STREET, LONDON, W. 1.

The Australian Flight

Another Great Triumph for

THE SMITH AVIATION INSTRUMENTS AND THE FAMOUS K.L.G. PLUGS

The Vickers-Vimy-Rolls Machine (piloted by Capt. Ross-Smith, M.C., D.C.M., A.F.C.), which has just achieved the remarkable success of flying from Great Britain to Australia (10,000 miles in 28 days), was fully equipped with the following Smith Instruments and Accessories :—

Revolution Indicators **Cambridge Radiator Thermometers**
Airspeed Indicators **Husun Compasses No. 253**
and the Famous K.L.G. Plugs.

It is also worthy of note that EVERY competitor in the Australian Competition—Capt. Matthews (Sopwith); Lieut. Douglas (Alliance); Capt. Wilkins (Blackburn Kangaroo); and Lieut. Howell (Martinsyde)—carried Smith Instruments and Accessories. Proving once again that for serviceability, accuracy and reliability the Smith Aviation Instruments and the K.L.G. Plugs have no equal.

Write for Catalogues of the Smith Aviation Instruments and K.L.G. Plugs to :—

S. SMITH & SONS (M.A.) Ltd.,
179, Great Portland Street, London, W. 1.

Telephone: Mayfair 6350. *Telegrams: "Speedomet, London."*

Midland Depot: 6, Livery Street, Birmingham.
Northern Depot: 12, Jackson's Row, Deansgate, Manchester.
Scottish Depot: 141, Bath Street, Glasgow.

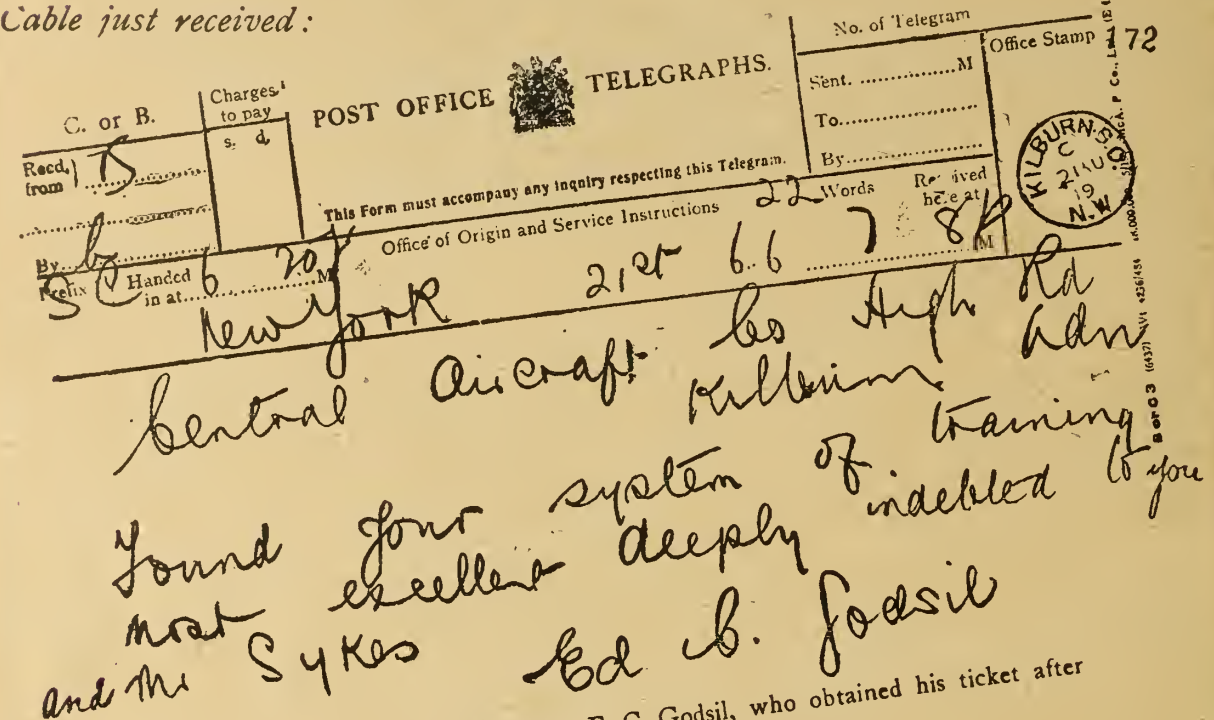
THE

Central Aircraft Company

School of Aviation

NORTHOLT AERODROME.

Cable just received:



POST OFFICE TELEGRAPHS.

No. of Telegram 172

C. or B.

Charges to pay s. d.

Recd. from TS

By lg

Prefix SC

Handed in at 6 20 P M

Sent. ....M

To..........

By..........

Office Stamp

KILBURN S.O. C 21 AU 19 N.W.

This Form must accompany any inquiry respecting this Telegram.

Office of Origin and Service Instructions 22 Words

Received here at 7 8 P M

New York 21st 6.6

Central Aircraft Co High Rd Kilburn Ldn

Found your system of training most excellent deeply indebted to you and Mr Sykes Ed C. Godsil

The above Cable was received from Mr. E. C. Godsil, who obtained his ticket after 2 hours 5 minutes' actual flying instruction.

THIS RECORD

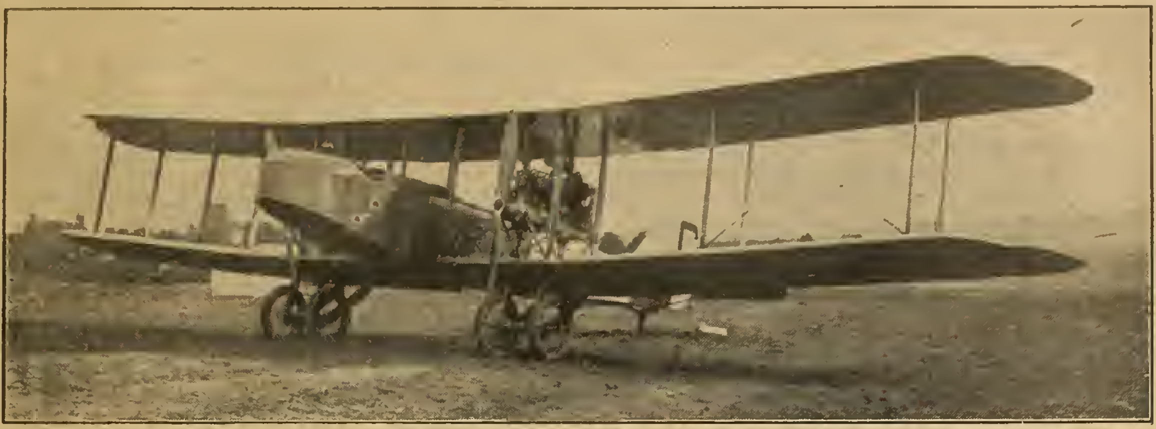
was made on the C. A. Co.'s 80 h.p. Training Machine.

JOIN NOW to take advantage of the Flying Boom.
Classes for Theoretical and Practical Flying now being formed.

Write for Illustrated Booklet to

THE CENTRAL AIRCRAFT COMPANY,
179, High Road, Kilburn, N.W. 6.

Telephones: *Hampstead* 4403 & 4404. *Telegrams:* "*Aviduction, Phone, London.*"



Type—"CENTAUR 2a," 320 H.P. Twin Engine, 9 Seater Passenger Machine.

THE

CENTRAL AIRCRAFT COMPANY.

Orders are now being booked for the following Models :—

Type CENTAUR	1a	- -	300 H.P.	Single-seater Scout Aeroplane.
,, ,,	2a	- -	320 ,,	Twin engine, 9 Seater Passenger Aeroplane.
,, ,,	2b	- -	460 ,,	,, ,, ,, ,, Seaplane.
,, ,,	4	- -	100 ,,	and 80 H.P. Dual Control Training Aeroplane. (Can also be converted into a 3 seater).
,, ,	5	- -	100 ,,	2 or 4 Seater Sporting or Touring Aeroplane
,, ,,	5a	- -	100 ,,	2 Seater ,, ,, Seaplane.
,, ,,	6	- -	230 ,,	2 Seater Passenger Amphibious Aeroplane.

Nous sommes prêts à accepter des commandes pour les modèles suivants :—

Type CENTAUR	1a	- -	300 H.P.	Monoplace Scout.
,, ,,	2a	- -	320 ,,	Bi-moteur, 9 places.
,, ,,	2b	- -	460 ,,	Hydro-avion, bi-moteur, 9 places.
,, ,,	4	- -	100 & 80 H.P.	Double contrôle, appareil d'école (Peut être converti en appareil à 3 places).
,, ,,	5	- -	100 H.P.	2 ou 4 places, modèle sporting ou tourisme.
,, ,,	5a	- -	100 ,,	Hydro-avion à 2 places, sporting ou touring.
,, ,,	6	- -	320 ,,	Appareil amphibien à 2 places.

Write for Illustrated Catalogue and full Particulars to—

The Central Aircraft Company,

Kilburn, London, England.

Telephones :
HAMPSTEAD 4403, 4404.

Code :
ABC, 5th Edition.

Cables :
AVIDUCTION, London

Beardmore

NOT NATIONAL BUT INTERNATIONAL SUPERIORITY.

IN PRE-WAR DAYS RECORD on RECORD

earned BEARDMORE ENGINES more than national fame.

They were events in the World's Aviation Progress, and recognised as such.

To-day the name of "Beardmore" is the acknowledged standard of unfailing reliability under all circumstances.

BEARDMORE DEVELOPMENTS will have a dominating influence on the coming era.

We are exhibiting at the PARIS AERO SHOW
Stand No. 22, Gallery.

BEARDMORE AERO ENGINES LTD.,
112, Great Portland Street, London, W. 1.
Telephone: Gerrard 238.
Works: Parkhead Steel Works Glasgow.

AeroEngines

London-Paris Air Express

Mails—Parcels—Passengers

DAILY TIME TABLE.

HOUNSLOW (depart)... 12.30 p.m.
LE BOURGET (arrive) 2.45 p.m.

LE BOURGET (depart) 12.30 p.m.
HOUNSLOW (arrive)... 2.45 p.m.

Mails

By arrangement with the British and French Post Offices an express air-mail is now carried daily on this route. The fee is 2s. 6d. an ounce, over and above the usual rates of postage, and letters which are handed in during the morning in London, up to the times indicated, and at the Post Offices specified below, will be delivered in Paris by about 4 p.m. the same afternoon.

G.P.O., King Edward's Buildings, 11 a.m.; Threadneedle Street, 10.45 a.m.; Lombard Street, 10.45 a.m.; Parliament Street, 10.45 a.m.; Charing Cross 10.50 a.m.; W.C. District Office, 11.10 a.m.; W. District, 11.15 a.m.; S.W. District Office, 10.40 a.m.

Passengers

The passenger fares are as follows:—Single, £21; return, £42. This fare includes free conveyance by motor-car to Hounslow Aerodrome from any point within a mile of Piccadilly Circus, and also conveyance by motor from Le Bourget into Paris. Similar arrangements exist as to the journey from Paris to London. A passenger, called for at an hotel in London at 11 a.m., arrives at the door of his hotel in Paris by 4 p.m. the same afternoon.

Parcels

The rate for parcels is 5s. lb., but in the case of parcels weighing more than 2 lbs., or for regular consignments, much lower rates can be quoted If handed in up to 10 a.m. at the agents specified below, parcels will reach Paris the same afternoon; whereas by land and sea, even if a special "Grand Vitesse" fee is paid, a parcel is several days, and perhaps a week, in reaching its destination.

Full particulars regarding freights can be obtained from Aircraft Transport and Travel, Ltd., 25-27, Old Queen Street, S.W.1., or from the American Express Co., Queen Street and Haymarket; Thos. Cook & Son, Ludgate Circus, E.C., and 38-39, Piccadilly, W.; General Transport, Ltd., 52, Crutched Friars; J. Jackson & Sons, 7-8, Charing Cross, and King William Street, E.C.; Henry Johnson & Sons, 18, Byward Street, and Beak Street, W.; Carter Paterson & Co., 6, Maddox Street, W., and 3, Cannon Street, E.C.; Lep Aerial Travel, Piccadilly Circus (Criterion Corner); and Hernu, Peron & Co., 98-100, Queen Victoria Street, E.C.

NOTE.—Parcels are received up to 10.30 a.m. at the two depots mentioned above of the American Express Company; or up to as late as 11.30 a.m. at the Hounslow Aerodrome.

LONDON:
AIRCRAFT TRANSPORT & TRAVEL, LTD.,
25-27, Old Queen Street, S.W.1.

PARIS:
COMPAGNIE GÉNERALE TRANSAERIENNE,
118, Champs Elysées.

THE
ENGLISH
ELECTRIC
COMPANY, LIMITED.

DICK, KERR WORKS,
PRESTON.

ORDNANCE WORKS,
COVENTRY.

ORDNANCE WORKS,
SCOTSTOUN.

PHŒNIX WORKS,
BRADFORD.

SIEMENS WORKS,
STAFFORD.

WILLANS WORKS,
RUGBY.

Specialists
in Electric Power
Production
and
Industrial Electric
Driving.

HEAD OFFICE:
QUEEN'S HOUSE,
KINGSWAY, LONDON, W.C. 2.

Telephone:—Holborn 830.
Telegrams :—"Enelectico,
Westcent,
London."

The 35 h.p. GREEN

Avro-Baby

flew from HOUNSLOW to BRUSSELS

in

2 hours 50 minutes

1st in 1909 FOREMOST in 1919

The Green Engine Co., Ld.,
166, Piccadilly, W. 1.

Telephones: Gerrard 8165.
Richmond 1293.
Telegrams:
"AIRENGINE, LONDON."

BLOCTUBE CARBURETTORS

FOR AERO-ENGINES

RENÉ TAMPIER

CONSTRUCTING ENGINEER.

INVENTOR AND PATENTEE.

CONTRACTOR TO H.M. AND ALLIED GOVERNMENTS.

PARIS. LYONS. TURIN.

BLOCTUBE CARBURETTORS, COMPLETE.

BLOCTUBE PETROL VALVES.

BLOCTUBE CONNECTIONS.

BLOCTUBE CONTROLS.
Large Variety of Models.

INTERMEDIATE BRACKETS.
Straight or Bell Crank.

BLOCTUBE CARBURETTOR WORKS:

DANEMERE STREET, PUTNEY, LONDON, S.W.15.

Telephone—PUTNEY 242.

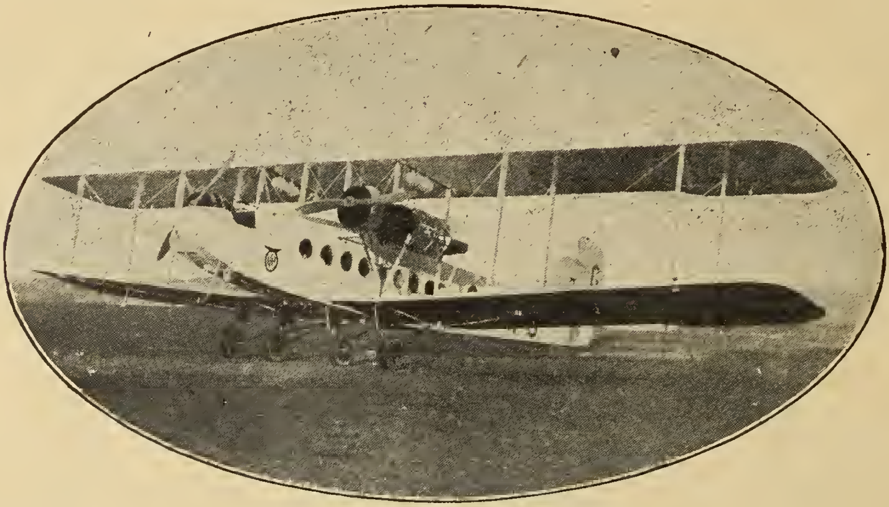
Telegrams—"TUBLOCARB, PUT, LONDON."

COMMERCIAL AIR SERVICE

EMAILLITE

DOPING SCHEME

used on



Type W8 Handley Page Commercial Biplane.

London-Paris—2 hrs. 10 mins.

PARIS AERO SHOW—Stands 36 & 38.

BRITISH EMAILLITE CO., LTD.,

SPECIALISTS,

5, HYTHE ROAD, WILLESDEN, N.W. 10.

Wire: "Ridleypren, London."

'Phone: Willesden 2346 and 2347.

HALF-WAY ROUND THE WORLD ON "SHELL AVIATION" MOTOR SPIRIT

Cable just received from the hero of the great Australian Flight:—

"SHELL SPIRIT USED THROUGHOUT FLIGHT WITH COMPLETE SATISFACTION." **Ross Smith.**

"Shell Aviation" Motor Spirit, as used by Captain Ross Smith in his great Australian Flight, and by Capt. Sir John Alcock in his historic Trans-Atlantic Flight is now available for your car, in the TWO-GALLON CANS PAINTED ALL-GOLD, typifying the incomparable quality and purity of this the world's most powerful and dependable motor spirit.

"SHELL AVIATION" MOTOR SPIRIT

"SHELL" MARKETING CO., LTD.,
PARKER STREET, LONDON, W.C. 2.

RADIATOR TUBES

S. SANSUM & Co

Eagle Tube Works, WOLVERHAMPTON.

The Firm who **PIONEERED** the Air Board Standard Radiator Tube.

HIGHEST EFFICIENCY COOLING SYSTEM.

OXYGEN
For the cutting and welding of metals

If you are not yet making use of Oxygen for Cutting, and the Oxy-Acetylene Welding Process, or wish to hear of the latest improvements in both, write to the British Oxygen Company.

THE BRITISH OXYGEN COMPANY, the Founders of the Oxygen Industry, have highly equipped and up-to-date factories in all the important British Industrial centres capable of producing over

1,500,000 CUBIC FEET OF OXYGEN DAILY.

The Company are the foremost manufacturers in Great Britain of

OXYGEN METAL CUTTING APPARATUS, OXY-ACETYLENE, OXY-HYDROGEN AND OXY-COAL GAS WELDING BLOWPIPES, HIGH PRESSURE GAS REGULATORS, ETC.

For Catalogues and full particulars apply to any of the Company's Works:—

Elverton Street, Westminster, S.W.
North Wembley, Middlesex.
Tunnel Avenue, East Greenwich.
Shields Road, Walker Gate, Newcastle.
Lower Walsall Street, Wolverhampton.
Warton Road, Stratford, E.
Saltley, Birmingham.
Terry Road, Coventry.
Great Marlborough Street, Manchester.
Rosehill, Polmadie, Glasgow.
East Moors, Cardiff.
Savile Street, Sheffield.
Bromborough Port, near Birkenhead.

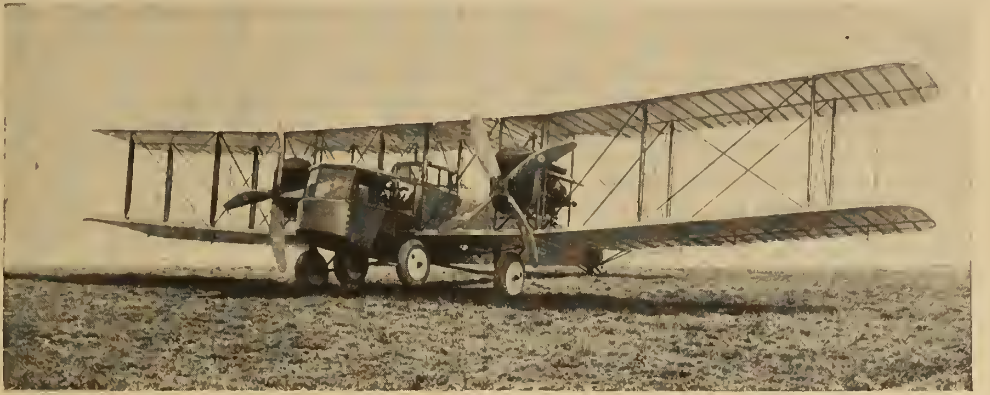
The British Oxygen Co., Ltd.,
Elverton Street, Westminster, London, S.W. 1.

CELLON

LEADS!

For Sport or Commerce
"CELLON"
is
"The Dope of
Proved Efficiency."

Cellon (Richmond) Ltd.,
22, Cork Street,
LONDON, W. 1.
Telephone: Gerrard 440 (2 lines).
Telegrams: "Ajawb (Reg), London.



The

Grahame-White-Rolls-Royce Aero Limousine.

THIS machine, which can be seen in flight at the London Aerodrome, Hendon, has been designed specially for pleasure and commerce. It is not an adapted war machine, but is a specially constructed limousine fitted with two Rolls-Royce engines, luxuriously upholstered, and containing an electrically heated carpet. There is ample accommodation for four passengers. The pilot, with whom communication is maintained by speaking tube, sits in a separate compartment above and at the rear of, the passengers' quarters.

There is also the Grahame-White-Rolls-Royce Aero Limousine (9-seater), which is of the same construction as the 5-seater, with slight variations. The front cabin has been enlarged to take six passengers and the pilot. Moved further back and between the pilot and planes, a special cabin has been placed to afford comfortable accommodation for two additional passengers or luggage.

For those requiring a sporting machine there is the Grahame-White Bantam Single-seater, fitted with 80 h.p. Le Rhone engine, Speed 100 miles per hour.

Illustrated catalogues and further information regarding the above and other types of machines may be obtained upon application to :—

THE GRAHAME-WHITE COMPANY, Ltd.

Head Office & Works: The London Aerodrome, Hendon, N.W. 9.
'Phone: Kingsbury 120 (8 lines).

London Office: 12, Regent Street, Pall Mall, S.W. 1.
'Phone: Regent 2084, 829.

SPEED WITH SAFETY

Equally good for Car or 'Plane.

If you are thinking of the type of petrol gauge you will fit, recollect that the Simms is the simplest of all, and maintains its initial accuracy for years. It was

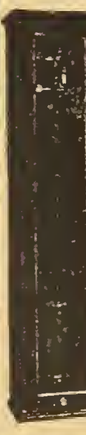
SIMMS MAGNETIC PETROL GAUGE

which was fitted by the majority of Aeroplane Builders and Government Contractors during the war.

Write for Gauge booklet showing the various models we make.

Simms Motor Units, Ltd.,
Percy Buildings, Gresse Street,
Rathbone Place, London, W. 1.

E.I.H.



SPEED UP PRODUCTION BY TIME DISCIPLINE.

BELL SOUND SIGNAL.

Send for Pamphlet "F 25"

Adopted by so many. The alert will at once demand Illustrated Literature.

Gents' Pulsynetic System of Electric Clocks does not end in keeping a few timepieces in step, but deals also with—

"START & CEASE WORK" SOUND SIGNALS,
WORKMEN'S REGISTERS, OF ANY MAKE,
WORKS, OFFICE AND YARD CLOCKS,
AND SO ENSURES—
ONE FACTORY—ONE TIME.

GENT & CO., LTD., "FARADAY WORKS," LEICESTER.
MANUFACTURING ELECTRICAL ENGINEERS,

London: 25, Victoria St., S.W. 1.
Newcastle-on-Tyne: 52, Blackett St.

TRANSMITTER.

The Superlative Kit
for service on International Air-ways

Burberrys long ago recognised that the institution of transcontinental flying necessitates equipment capable of withstanding inordinate strain, and, with a view to satisfying the exactin demands of such service, have, with the assistance of prominen Flying Officers, designed the BURBERRY

CARAPACE AIR-SUIT

Illustrated Catalogue & Patterns Post Free

The Carapace Air-Suit is made up of three layers, each of a different material, scientifically combined to ensure the greatest possible resistance to wet or cold.

The outer covering is of Burberry Gabardine—the famous material chosen by Sir Ernest Shackleton for all his Polar Expeditions—so densely-woven and proofed that it will withstand intense pressure from wind or rain.

The second layer is in the form of a luxurious lining of thick, woollen fleece, that supplies a wealth of luxurious warmth, yet is extremely lightweight. The innermost lining is of Glissade, which enables the Aviator to slip into or out of the suit without a moment's delay.

The suit is reinforced by a double plastron of Burberry Gabardine across the chest and shoulders. An adjustable belt adds comfort and stability to the whole, whilst a Burberry Puttee Collar prevents any possibility of wet trickling down the neck.

Adjustable tabs at the wrists and ankles enable the sleeves and legs to be tightened, and large accessible pockets are provided for maps and other flight impedimenta. The helmet is the latest approved Burberry pattern.

R. A. F. & Mufti Kit in 2 to 4 Days or Ready to Wear

Burberrys Copyright.

Every Burberry Garment is labelled "Burberrys."

BURBERRYS HAYMARKET S.W. 1 LONDON
8 & 10 Boul. Malesherbes PARIS; also Provincial Agents

Paris Aero Exhibition

The COSMOS Engineering Co.'s 450 h.p. "Jupiter" Engine will be shown in a "Bristol Bullet" Machine exhibited on

Stand 65

The British & Colonial Aeroplane Co., Ltd.

The COSMOS Engineering Co.'s 100 h.p. "Lucifer" Engine will be shown on

Stand 44

Boulton & Paul, Ltd.

THE ENGINES THAT ARE "SUPREME IN POWER FOR WEIGHT."

THE
COSMOS
ENGINEERING CO., LTD.,

16 & 17, PALL MALL, LONDON, S.W.1.

Telegrams:
"Radiary,
Charles,
London.

Telephone:
1476
Regent.

Proved itself a Great Success.

RADIO ELECTRIC CLOTHING
FOR AVIATION.

Manufactured by

THE RADIO ELECTRIC CLOTHING CO.,

17, Gt. Chapel Street,
Oxford Street,
London, W.1.

—'*Phone*:—
4278 REGENT.

Contractors to H.M. Admiralty and the Air Board.

FOR

MASS PRODUCTION

USE

ALUMINIUM DIE-CASTINGS.

QUOTATIONS ON APPLICATION.

THE

Aluminium Plant & Vessel Company, Ltd.,

POINT PLEASANT, WANDSWORTH, LONDON, S.W. 18.

Telephone—2353 Putney.

Telegrams—"Anaclastic, Wands, Lond."

£10,000 flight to Australia

Capt. ROSS SMITH

M.C., D.F.C., A.F.C.,

on a Vickers-Vimy Biplane

lubricated his

Rolls-Royce Engines with

WAKEFIELD

CASTROL 'R'

Throughout the entire flight the climatic conditions were severe and variable, yet Castrol 'R' withstood them and helped to make this fine achievement possible.

C. C. WAKEFIELD & COMPANY, LIMITED

Wakefield House, Cheapside
London, E.C 2; and 21
Rue du Mont Thabor, Paris.

ARROL-JOHNSTON

THE firm that made the "Beardmore" Aero Engine won a distinct claim upon the goodwill of airmen. It is the same firm that to-day manufactures the "Victory" Arrol-Johnston Car.

Arrol-Johnston, Ltd.,
DUMFRIES.

When you can get a

ZENITH

Carburetter

now

why have any substitute

Send for booklet

ZENITH CARBURETTER Co., Ltd., 40 & 42, Newman Street, W. 1.

Telephone: Regent 4812-4813.

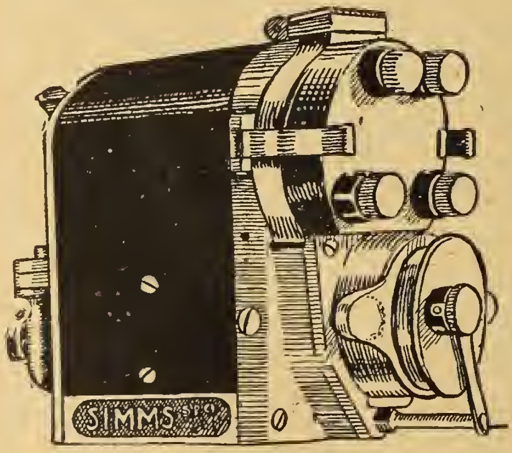
Simms Magnetos

The Simplest Ignition System.

If you are undecided which system of ignition to have fitted to your new car, recollect the following: With coil and accumulator, or dynamo ignition, you have several vital components, and the failure of any of these throws the whole system out of gear.

Compare this with Magneto Ignition. Here you have one machine, and an extremely reliable one at that, which is connected directly to the plugs. In the one case complexity, in the other simplicity, plus reliability. Decide to have Magneto Ignition, and specify a Simms Magneto.

WRITE FOR OUR BROCHURE
"SIMMS MAGNETO."



SIMMS MOTOR UNITS LTD.,
PERCY BUILDINGS, GRESSE STREET,
RATHBONE PLACE, LONDON, W. 1.

E.I.H.

T. WHEELER
SCIENTIFIC INSTRUMENT MANUFACTURER
217, GOSWELL ROAD, LONDON
ALTIMETERS FOR AIRCRAFT

Telegrams—"SCIENOID, ISLING, LONDON."

'Phone—CITY 419.

Contractor to H.M. Government, War Office, Air Ministry, &c., &c.

GOVERNMENT £40,000
FLIGHT COMPETITION.

Our offer to
Manufacturers of Aeroplanes.

WE will make up and supply a single sample radiator for use on any machines which have been entered for the Government £40,000 Flight Competition.

Write for particulars to:—

SERCK RADIATORS, LTD.,
(Late National Aircraft Radiator Factory)
Warwick Road, Greet,
BIRMINGHAM.

Telephone:
Victoria 531 (3 lines).

Telegraphic Address:
"Nerleak, Birmingham."

Winter or Summer
-quality and efficiency always the same

At all times—under all conditions

PRATT'S AVIATION SPIRIT

maintains its high standard of efficiency.

In the GREEN CAN with the GOLD TOP
AVAILABLE EVERYWHERE.

Anglo-American Oil Co., Ltd.
36, Queen Anne's Gate, S.W.1.

LEARN TO FLY AT BOURNEMOUTH

AND GAIN THE ROYAL AERO CLUB CERTIFICATE

UNDER OUR NEW SPECIAL COURSE OF TRAINING.

The Aerodrome is now open for

Landing and Garaging of Private and Commercial Aircraft.

Repairs, Overhauls, Petrol, Lubricating Oil, etc., etc.

The Bournemouth Aviation Co., Ltd.
Aerodrome, Bournemouth.
Tel.: 1160.

TRY

TELEPHONE:
HOLBORN 5141.

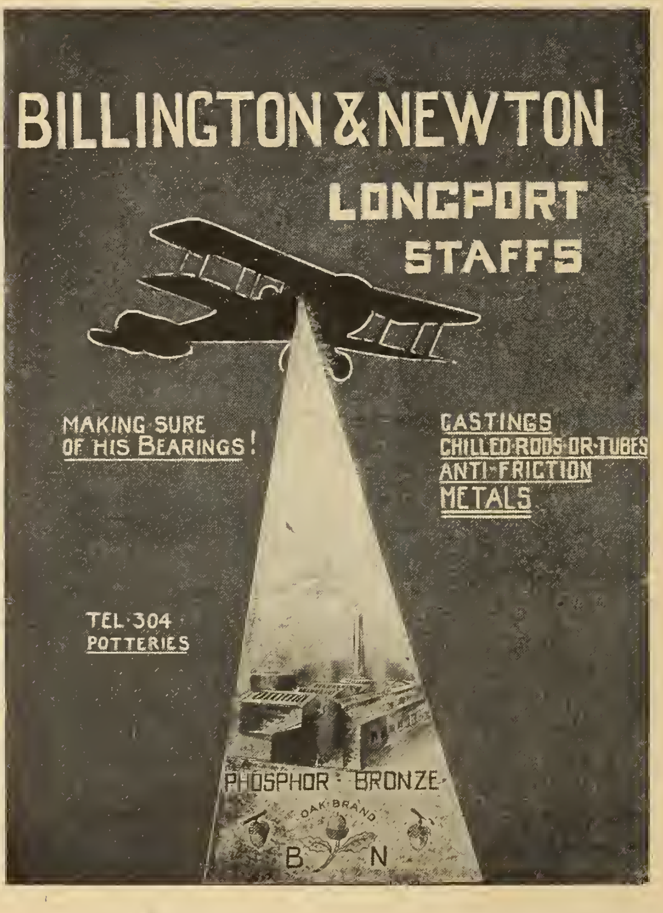
TELEGRAMS:
GALVEQUIP HOLB, LONDON.

The Galvanizing Equipment Company,
Limited.

WORKS AND OFFICES:
29a, Portpool Lane, Gray's Inn Road,
London, E.C.1.

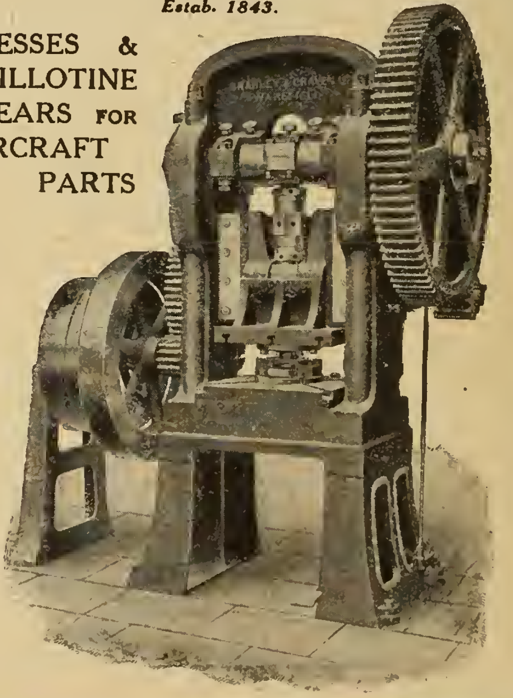
FOR

RUST PROOFING



BRADLEY & CRAVEN, Ltd.
WAKEFIELD.
Estab. 1843.

PRESSES & GUILLOTINE SHEARS FOR AIRCRAFT PARTS



Allen
PISTON RINGS

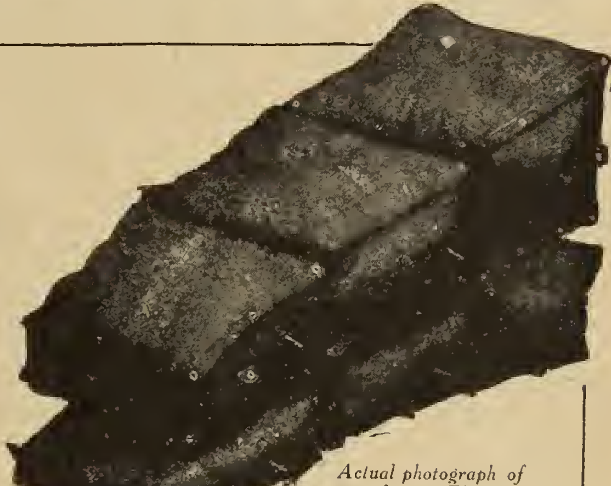
ALLEN and SIMMONDS,
LTD.,
Piston and Piston Ring Makers,
READING.

Allen narrow-surface contact rings give greatest power and least friction with gas-tightness.

"Stressed" with mathematical precision by patent method of machine stressing in one operation.

Aeroplane Flotation Bags

The latest and most successful device for sustaining an Aeroplane when a forced descent has to be made upon the water. These bags, which are guaranteed absolutely air and water tight, are specially shaped to fit compactly into the framework of the fusilage. They are indispensable where flying is undertaken continuously over the sea, or other large stretches of water.



Actual photograph of a set of six Flotation Bags specially made for the London-Paris Air Service.

AIRSHIPS LTD.

LONDON OFFICES: 25-27, OLD QUEEN STREET, S.W.1.
WORKS: HIGH STREET, MERTON, AND HENDON.

OUR OBJECT

in this announcement is to ask you to write us—if you require to get in touch with a firm that has materials in stock for aircraft factory and hangar construction or if, in the first place, you want designs only.

Our specialisation in this particular line has been of admitted value to others. We hold large stocks and we are ready now for your enquiries.

AIRCRAFT FACTORIES.

Stocks of
British Standard Section
in Joists, Channels, Angles,
Tees, Flats, etc.

ARCHIBALD D. DAWNAY & SONS, LTD.

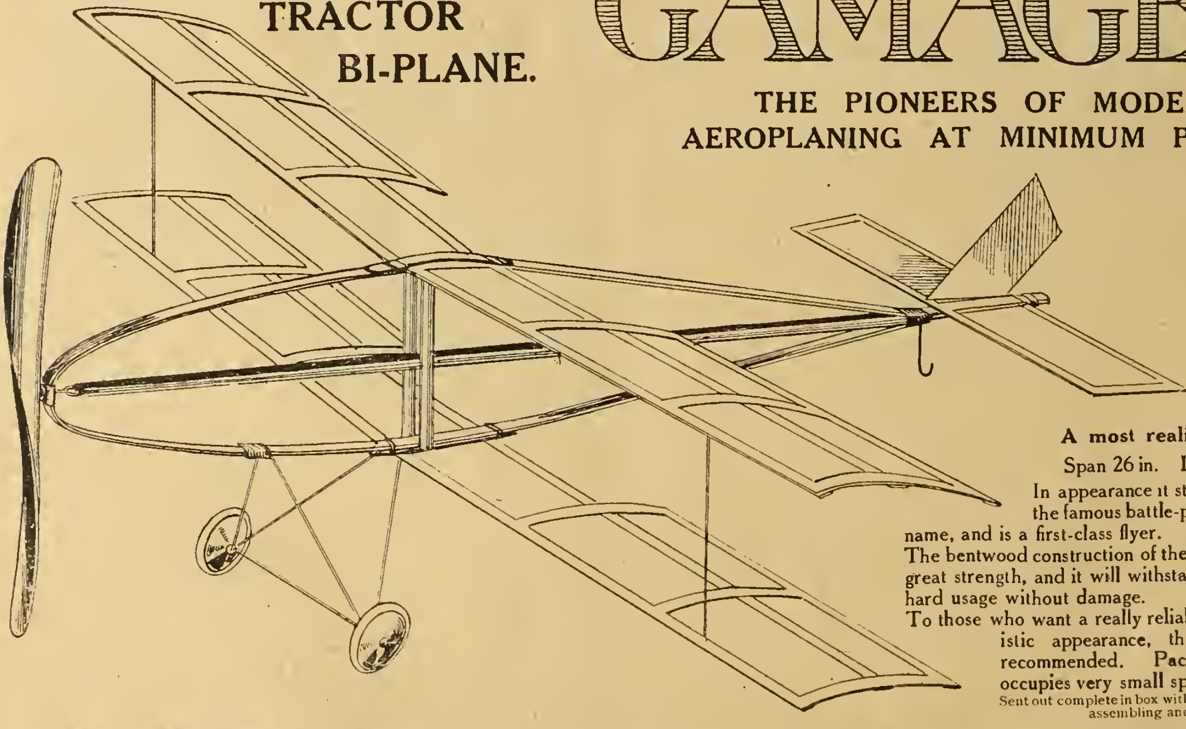
STEELWORKS ROAD, BATTERSEA, S.W. 11.
Telephone—Battersea 1094 (3 lines). Telegrams—"Dawnay, Battsquare, London."
AND AT EAST MOORS, CARDIFF.
Telephone—Cardiff 2557 Telegrams—"Dawnay, Cardiff."

4

SOPWITH SCOUT
TRACTOR
BI-PLANE.

GAMAGES

THE PIONEERS OF MODEL
AEROPLANING AT MINIMUM PRICES.



Price
32/6

Larger Size
37 6

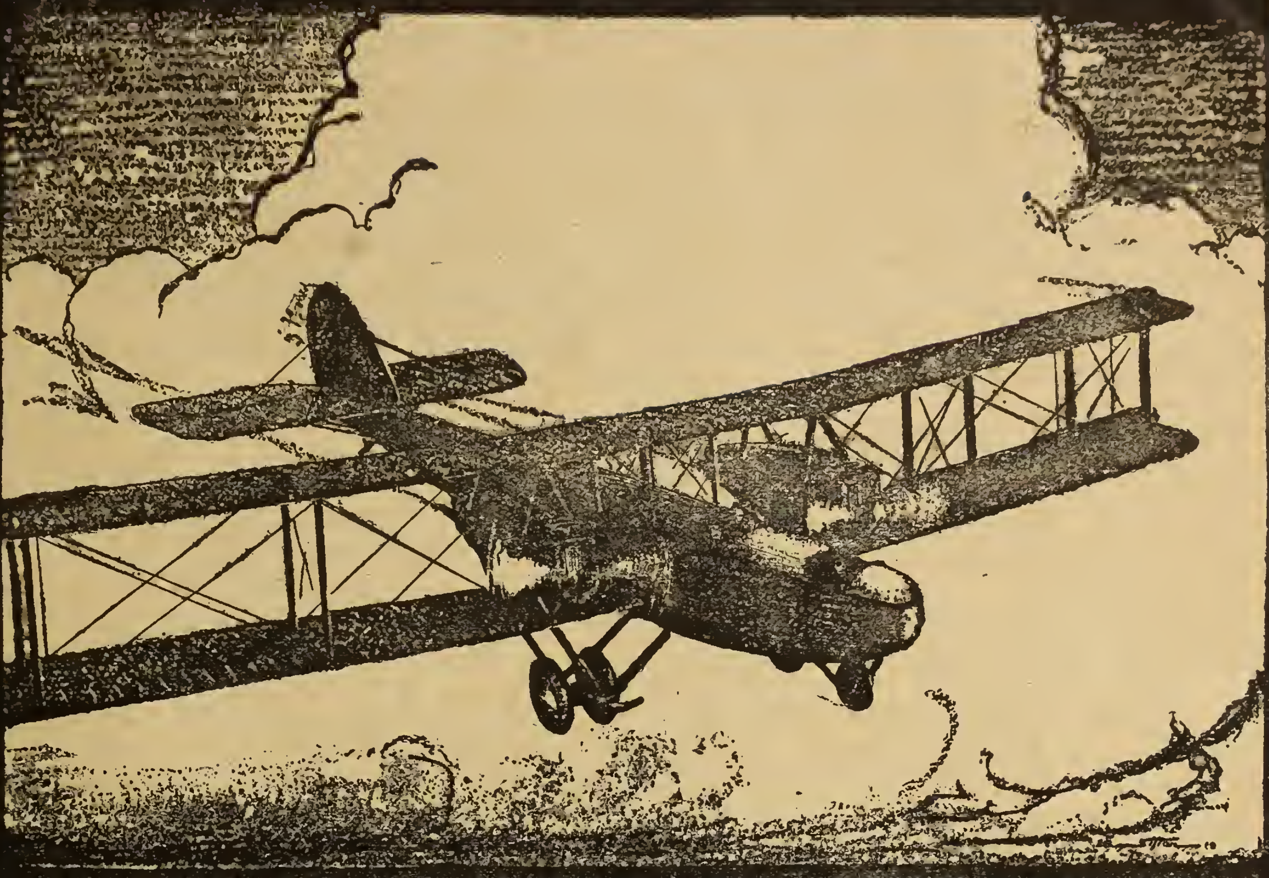
Carriage and Packing free.

A most realistic model.

Span 26 in. Length 28 in.

In appearance it strongly resembles the famous battle-plane of the same name, and is a first-class flyer.
The bentwood construction of the fuselage imparts great strength, and it will withstand astonishingly hard usage without damage.
To those who want a really reliable flyer of realistic appearance, this machine is recommended. Packs quite flat and occupies very small space.
Sent out complete in box with full instructions for assembling and flying.

HOLBORN——LONDON——E.C. 1.



TITANINE
DOPE

SAFETY FIRST.

OFFERS GREATEST RESISTANCE TO FLAME. NON-POISONOUS.

MANUFACTURERS AND SOLE PROPRIETORS:

TITANINE, LTD.

(Contractors to H.M. Government),

175, PICCADILLY, LONDON, W. 1.

Telegrams:
"Tetrafree, Piccy,
London."

Telephone:
Gerrard 2312.

S·B·A·C

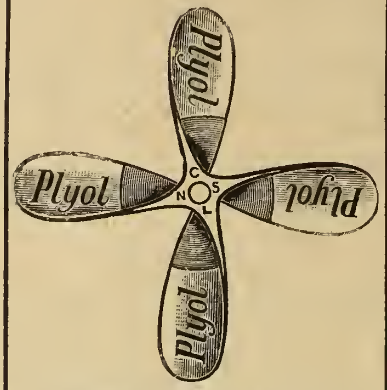
WILLIAM MOSS

AIRCRAFT
SUNDRIES.

'Phone: GERRARD 6731.
'Grams: "AIROBILMOS—PHONE."

52, HIGH STREET,
NEW OXFORD ST., W.C. 2.
Facing Tottenham Court Road.

PLYOL



Registered Trade Mark.

Wood cement for Three-ply Wood is the best cement for this purpose on the market, has been approved by the A.I.D. It has given the best results obtainable.

Manufacturers are warned against cheap offers of Casein which has been stored for considerable time and has lost its strength for cementing purposes.

ALDGATE
CASEIN
WORKS.

PROPRIETORS:

Nieuwhof, Surie
& Co., Limited,
5, Lloyd's Avenue, London, E.C.3.

This Book Helps.

The new and amplified Edition of the undermentioned catalogue is now ready, and should be in the possession of every Automobile Engineer.

Edgar Allen's

"Steel for Motor Cars & Aircraft"

contains full details of the Edgar Allen Special Alloy Steels, instructions for their heat-treatment, valuable reference tables, charts, etc. Pin the request form to your letter, and a copy will be sent by return.

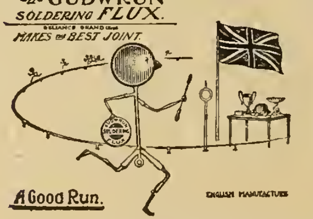
Write for it.

To Edgar Allen & Co., Ltd., Sheffield
Please send me Catalogue D.
Name.........
Firm.........
Address.........
F

THE
"Gudwrun"
Soldering Flux

RELIANCE BRAND (Regd.).

MAKES THE BEST JOINT.


"GUDWRUN"
RELIANCE BRAND (Regd.)
SOLDERING FLUX.
MAKES THE BEST JOINT.
A Good Run.
ENGLISH MANUFACTURE

- The Paste Flux that Solders Best.
- Superior to Acid and Easier to Use.
- Saves Time.
- Saves Money.
- Sells itself on Merit.
- Clean and Economical.
- The Flux that makes Soldering Easy.
- For ALL KINDS of Soldering.

Of all Engineers' Furnishers and Ironmongers
at 8d., 1/4 and 2/8 per tin.

THE SANITARY & WATER FITTINGS MFG., CO. H. A. PINCHBECK, Proprietor.

24, Garlick Hill, Mansion House Station,
LONDON, E.C. 4.

Telegraphic Address: "PINCHERIES, PHONE, LONDON."
Telephone No.: CITY 3689.

THE FLYING PUBLIC at PARIS will have another opportunity of witnessing next week the wonderful flying qualities and constructional features of the famous KANGAROO.

The BLACKBURN AEROPLANE and MOTOR CO., LTD.,
Leeds. Hull. London

Blackburn
AIRCRAFT

Steele's Adv. Serv.

JONAS & COLVER LIMITED,
SHEFFIELD.

Telephone No.: 4660
(Private Branch Exchange).

Telegrams:
"Jonas, Sheffield."

MANUFACTURERS OF
ALLOY STEELS
FOR
AIRCRAFT.

Full Particulars of Our Alloy Steels supplied on application.

IMPORTANT SPECIALITIES:

S.S.G. A Special Nickel Chrome Gear Steel. FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties, and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. A Nickel Chrome Steel in Four Grades. Eminently suitable and strongly recommended for Gears, Crankshafts, and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. A High Grade Alloy Case-Hardening Steel in four grades for severely stressed parts, such as Gear Wheels, Gudgeon pins, etc.

HOGGETT YOUNG & Co
17, Essex Rd., London, N. 1.

BRITISH MADE
OXY-ACETYLENE WELDING & CUTTING PLANTS

Hotter than even "He" can bear

The outfit that's second to none.

Phone: North 1752.

Telegrams: "Weldomeet, Nerdo, London."

TRANS-ATLANTIC and AUSTRALIA FLIGHTS
R.34 and VICKERS-VIMY PLANES
were Doped with
CELLULOSE ACETATE DOPE
MANUFACTURED BY THE
BRITISH CELLULOSE & CHEMICAL MFG. CO., LTD.
Works: Spondon, Derby.
8, WATERLOO PLACE, LONDON, S.W. 1.

WADKIN & Co. LEICESTER

Light Type Boring & Recessing Machine, L.P.

Can be fitted with compound table.

Wadkin & Co., Leicester.

RUBERY, OWEN & Co.,
DARLASTON,
S. STAFFS.

Turnbuckles
a
Speciality.

BRIGHT STEEL
BOLTS & NUTS

We shall be pleased to quote for special parts turned from the bar. Send your inquiry direct to us, and it shall have our prompt attention.

ROOFS

AND

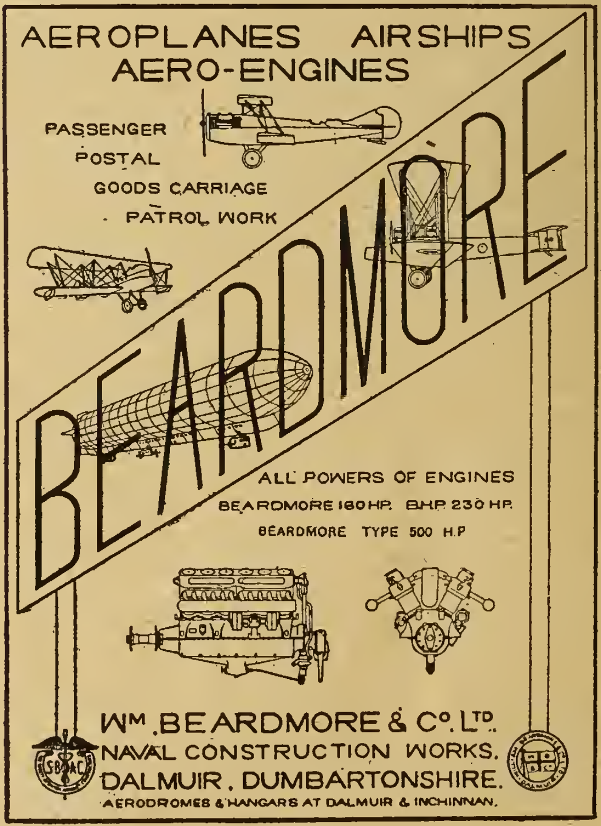
ROOF-COVERINGS

FOR

HANGARS

D. ANDERSON & SON, LTD.,
Dept. I, LAGAN FELT WORKS,
BELFAST.

ROACH ROAD WORKS, OLD FORD, LONDON, E.



AEROPLANES AIRSHIPS
AERO-ENGINES

PASSENGER
POSTAL
GOODS CARRIAGE
PATROL WORK

BEARDMORE

ALL POWERS OF ENGINES
BEARDMORE 160 HP. B.H.P. 230 HP.
BEARDMORE TYPE 500 H.P

WM. BEARDMORE & Co. LTD.
NAVAL CONSTRUCTION WORKS.
DALMUIR. DUMBARTONSHIRE.
AERODROMES & HANGARS AT DALMUIR & INCHINNAN.

You couldn't see it from below

but it's nevertheless a fact—a fact which every flying man and aircraft manufacturer should note—that the majority of the machines competing in the Aerial Derby, including the three which were placed 1st, 2nd and 3rd, at the end of the race, were fitted with

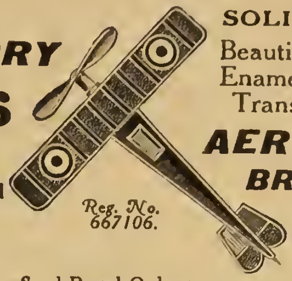
Auster Triplex Aero Wind Shields

And that proves what the men who "know" think of them. Let us have YOUR enquiries.

Auster Ltd

London—
133 Long Acre, W.C.2.
Birmingham—
Crown Wks., Barford St.

A 173



The **VICTORY** 3/6

Complete in velvet padded box.

Postage Free.

SOLID SILVER, Beautifully Modelled Enamelled in Pale Translucent Colours

AEROPLANE BROOCH.

(Very Strong.)

SIZE AS SKETCH.

Reg. No. 667106.

Send Postal Order to—

W. WRIGHT, Ltd., 4, East St., Brighton,

Established 1848. - - - - Manufacturing Jewellers.

Money willingly refunded if not approved.

ORIENTAL

None but the best of tubes may be used for Aircraft construction—and ORIENTAL TUBES have never failed to stand the severest tests for reliability. No better tubes are made for constructional work.

Let us quote you for tubes of any section.

The ORIENTAL TUBE Co., Ltd., West Bromwich, Birmingham.

'Grams :" Tubes, West Bromwich."
'Phone: West Bromwich 45 & 166.

SEAMLESS STEEL TUBES

TO

PILOTS and EX-PILOTS.

MASCOTS and SOUVENIRS.

SCALE MODELS of Aeroplanes

made of Brass throughout, Hard Soldered and heavily Silver-Plated.

PRICE LIST.

	£ s.		£ s.
Bristol Fighter F.2B. S.P.A.D. Sopwith Triplane Sopwith Snipe Short Seaplane 84	4 10	D.H. 9 and 9a. Sopwith Camel Sopwith Pup Bristol Scout Nieuport 27. S.E. 5a	3 15
Monoplane.	30/-		

Or any other type.

STANDS . . 10/- and 15/-

Send for Price List. Models sent on approval.

ANY OTHER TYPE SUPPLIED TO ORDER can be obtained from

LEPAERIAL TRAVEL BUREAU

CRITERION CORNER, PICCADILLY CIRCUS, W.1. or from
L. C. RAWLENCE & Co., Ltd., 40, Sackville Street, W. 1.
AERONAUTICAL INTELLIGENCE BUREAU, 50, Jermyn Street, W. 1.

Also from the Showrooms of
MODERN MOTION, Ltd., 93 Old Christchurch Rd., Bournemouth.

Makers:—

ROGERS BROS., *FARNHAM ROYAL, SLOUGH, BUCKS.*

A New Clutch Ring

Pure Asbestos without WIRE.

An entirely new departure in the method of fitting fabric linings to plain clutches. The rings are made endless of die-moulded asbestos without wires, and are so constructed that free movement is assured in all circumstances; they float in a recess.

The rings being free both sides take up the pressure, which is evidenced by the marked sweetness of action.

We have tested these rings exhaustively at our works. A $\frac{7}{8}''$ wide ring of $14''$ outside diameter, area 36 sq. ins., under a pressure of 22 lbs. per sq. in. transmitted 30 H.P. at 1,000 revs.

This is undoubtedly the last word in clutch linings, and fuller information will be sent on request.

FERODO FRICTION LININGS

The Herbert Frood Co., Ltd.,
Works: Chapel-en-le-Frith.

Contractors to the War Office and Admiralty, London General Omnibus Company, and Underground Electric Railways of London and Paris.

Depots at London, Birmingham, Bristol, Cardiff, Coventry, Edinburgh, Glasgow, Liverpool, Manchester and Newcastle.

E10

ALPHABETICAL INDEX TO ADVERTISERS.

This index taken in conjunction with "Flight" Buyers' Guide and Directory is the most reliable Trade Directory to the firms associated with the aircraft industry.

Accles & Pollock, Ltd.
Aerators, Ltd. *9*
Aero Coverings, Ltd.
Aeroplane & General Publishing Co.
A.G.S. Manufacturing Co., Ltd liv
Aircraft Mfg. Co., Ltd. xii & xiii
Aircraft Steel Construction Co.
Aircraft Transport & Travel, Ld. xxvii
Air Navigation Co.
Airships Ltd. xli
Allen & Simmonds, Ltd. xli
Allen, E., & Co., Ltd. xliv
Alliance Aircraft Co., Ltd. *13*
Allin & Newbold *15*
Aluminium Plant & Vessel Co. xxxvi
Anderson, D., & Sons, Ltd. xlvi
Apollo Mfg. Co.
Armstrong, Whitworth & Co.
Arrol-Johnston, Ltd. xxxvii
Anster, Ltd. xlvii
Austin Motor Co., Ltd. xviii
Auto-Carriers (1911) Ltd.
Aviation & General Insurance Co.
Aviation Insurance Association *9*

Bath Aircraft Co. *14*
Baynes & Partners
Beardmore Aero Eng. Co., Ltd. xxvi
Beardmore, Wm., & Co., Ltd. xlvi
Benton & Stone *14*
Billington & Newton xl
Birmingham Guild, Ltd.
Blackburn Aeroplane Co. xlv
Bleriot & Spad xlix
Bloctube Carburettor Co. xxix
Bolton & Son
Boulton & Paul, Ltd.
Bournemouth Aviation Co. xl
Bovier & Co.
Bowden Wire, Ltd.
Bradley & Craven, Ltd. xl
Bray, Gibb & Co.
British Aerial Transport xi
British & Colonial Aeroplane Co., Ltd. viii
British Aluminium Co.
British Anzani Engine Co., Ltd. *12*
British Caudron Co., Ltd. (inside cover)
British Cellulose & Chemical Mfg. Co., Ltd. xlv
British Emaillite Co., Ltd. xxx & (outside cover)
British Lighting & Ignition Co., Ltd.
British Metals, Ltd.
British Oxygen Co., Ltd. xxxii
British Piston Ring Co., Ltd.
British Wright Co. Ltd. (inside cover)
Brookman & Co. xlix
Brooks, J. B., & Co.
Brown Brothers, Ltd.
Brunton's Ltd.
Bulpitt & Co.
Burberrys Ltd. xxxii
Burnett, Sir W., & Co., Ltd.
Burton Aircraft Co., Ltd.
Burton Griffiths & Co.

Calthrop, E. R., Aerial Pat. Ltd.
Cambridge School of Flying
Cellon, Ltd. (inside cover) & xxxii
Central Aircraft Co. xxv
Central Flying School xxiv
Chelsea Precision Tool Co. (inside cover)
Chloride Electrical Storage Co., Ltd.
Clark, Robt. Ingham & Co.
Clifford, C., & Sons, Ltd. xlix
Coan, R. W. xlix
Cole, Wm., & Sons, Ltd.
Combined Metals & Reinforced Castings Co. *5*
Cosmos Eng. Co. xxxv
Crawley, Gates & Co. (inside cover)
Cradock, Geo., & Co., Ltd.
Crosby, Lockwood & Co. liii
Curtiss Aeroplane & Motor Corporation

Dart Spring Co.
Davidson & Co., Ltd.
Dawnay, A., & Son xlii
Dick, W. B., & Co. xix
Dissolved Acetylene Co.
Doherty Motor Components, Ltd. *15*
Dunford & Elliott
Duralumin (Vickers, Ltd.)
Durke, H., Ltd.

Eastbourne Aviation Co.
East London Rubber Co.
Ebora Propeller Co.
Endolithic Manufacturing Co.
English Electric Co. xxviii
Ericsson Mfg. Co.

Falcon Airscrew Co.
Fellows & Co.
Ferodo xlvii
Flnxite
Fox, Elliott & Co. xlix
Frood, Herbert, Co., Ltd.

General Electric Co.
Galvanizing Equipment Co. xl
Gamage, Ltd. xlii
General Aeronautical Co., Ltd.
Gent & Co. xxxiv
Gilbertson & Co.
Gieves & Co., Ltd.
Gledhill-Brooke Time Recorder (outside cover)
Glendower Aircraft Co.
Gnome Engine Co. xiv
Goddard & Smith
Goldberg, Y.
Golden Eagle Aviation Co.
Goldsmiths & Silversmiths Co. xxii
Gosport Aircraft Co. *10*
Grahame-White Co., Ltd. xxxiii
Green Engine Co., Ltd. xxix
Grove Chemical Co., Ltd.
Gudwrun Flux xliv
Gwynne's, Ltd. ix

Handley Page, Ltd. *8*
Hardy, J. North, & Son x
Harland & Son
Harris & Sheldon
Herrtage, Holyoake & Co. li
Hobson, H. B., Ltd.
Hoffmann Mfg. Co., Ltd.
Hoggett, Young & Co. xlv
Hope & Co. *14*
Hopton & Sons xlix
Humber, Ltd.

Imber Tanks, Ltd.
Imperial Light, Ltd. xxi

Jacobs, W. A. & R. J.
James Talbot & Davison, Ltd.
Jonas & Colver, Ltd. xlv
Jones, A. E., Ltd.

Keeling, A. D., Ltd.
Kinnell & Co., Ltd.
K. L. G. Plug

Library Press
Lindley, C., & Co., Ltd.
Lodge Sparking Plug Co., Ltd (outside cover)
London Aluminium Co., Ltd.
London County & Westminster Bank
London Die Castings Co., Ltd.
London & Provincial Aviation Co.

Madgwick, Ltd.
Marconi's Wireless Tel. Co., Ltd.
Martinsyde, Ltd. *2*
Mather & Co. liii
McGowan, Wild & Co. xlix
McGregor, Gow & Co.
McGruer Hollow Spars, Ltd. *13*
MacLellan & Co. (inside cover)
Messenger Bros.
Mestre & Blatge
Meteor Mfg. Co., Ltd. xlix
Midland Fan Co. xlix
Midland Radiator Co.
Monk Bridge Steel & Iron Co. xxi
Monk Engineering Co.
Moss, Wm. xliv

Napier, D., & Son, Ltd.
Naylor Bros., Ltd. *1*
New Pegamoid, Ltd.
Nieuport & General Aircraft Co *7*
Nieuwhof, Surie & Co., Ltd. xliv
North British Rubber Co. ix

Oddy, W., & Co. *15*
Oriental Tube Co., Ltd. xlvii
Owen, Joseph, & Son, Ltd. *10*

Page, Handley, Ltd.
Palmer Tyre, Ltd. xvi
Parsons, Thos., & Sons
Pegamoid, Ltd.
Petters, Ltd. xx
Pinchbeck Bros.
Power Steam Jointing Co.
Pratt & Co.
Pratt's Motor Spirit xxxix

Radio Elec. Clothing Co. xxxv
Regent Carriage Co., Ltd. *16*
Ripault's Oleo Plug
Roe, A. V., & Co., Ltd. vii
Rogers Bros. xlvii
Rolls-Royce, Ltd. xv
Rotax Motor Accessories Co.
Roots & Co. li
Rubery, Owen & Co. xlvi
Ruston & Hornby, Ltd.
Ryland, Llewellyn, Ltd.

Salmson & Co.
Sanitary & Water Fittings Mfg. Co.
Sansum, S., & Co. xxxi
Selwyn & Co., Ltd.
Serck Radiator Co. xix & xxxix
Shell Marketing Co. xxxi
Short & Mason
Siddeley-Deasy Motor Co., Ltd. *3*
Simms Motor Units, Ltd. xxxiv & xxxviii
Smith, S., & Sons (M.A.) Ltd. xxiii
Smith, S., & Sons (Strand)
Snercold Eng. Co., Ltd.
Sopwith Aviation Co., Ltd. vi
Spencer & Sons *4*
Sphinx Mfg. Co., Ltd.
Sunbeam Motor Car Co., Ltd. xvii
Supermarine Aviation Works, Ltd. *12*

Terry, H., & Sons, Ltd. *15*
Thompson Bros. (Bilston), Ltd (inside cover)
Titanine, Ltd. xliii
Triplex Safety Glass Co., Ltd

Valor Co., Ltd. (inside cover)
Vandervell, C. A., & Co., Ltd. liii
Venus Pencils
Vickers, Ltd. v
Victoria Rubber Co. *1*

Wadkin & Co. xlvi
Wakefield, C. C., & Co., Ltd. xxxvi
Walker & Co. xlix
Walton Motors *11*
Westland Aircraft Works xx
Wheeler, T. xxxix
Whiteman & Moss
Wilkinson, Heywood & Clark *14*
Wireless World
Woodside Eng Co., Ltd.
Wright, Ltd. xlvi

Y.E.S., Ltd.
Yorkshire Steel Co.

Zenith xxxv

Italic figures show Supplement pages.

If no page number appears against an advertiser's name, the advertisement will be found in the preceding or subsequent issue.

When communicating with advertisers, mention of "Flight" will ensure special attention.

TIMBER

HOPTON & SONS
(HOPTONS)

GEORGE ST.,
EUSTON SQ., N.W. 1.
'PHONE: MUSEUM 496.

&

UNION WORKS,
MARKET HARBORO'.
'PHONE: 13.

BENT TIMBER

CORONA JUNR. The New British Motor Cycle. With 4-cycle long stroke engine, outside flywheel, one piece crankcase and cylinder.

Has fewer working parts than any other.

Send for particulars.

THE METEOR MANUFACTURING CO., Ltd.,
Hornsey 2430. 98, TOLLINGTON PARK, N. 4.

Propeller Stock

FOX ELIOTT & CO., LTD.

Timber Importers, :: PLYMOUTH :: Walnut and Mahogany.

Telegrams: "Baltic, Plymouth." Telephone: 1217 (2 lines).

THE AIR NAVIGATION CO., LTD.

BLERIOT & SPAD

ADDLESTONE, SURREY.

CONTRACTORS TO H.M. GOVERNMENT.

NORBERT CHEREAU, Managing Director.
Telegrams: BLERIOT, WEYBRIDGE. *Telephone: 353 WEYBRIDGE.*
Flying Ground: BROOKLANDS AERODROME.

Manufacturers of **PHOSPHOR BRONZE,**
GUN METAL, MANGANESE BRONZE,
BRASS & COPPER
Tubes, Sheets,
Rods, Wire and
CASTINGS.
PHOSPHOR TIN.
PHOSPHOR COPPER.

CHARLES CLIFFORD & SON, LTD.,
BIRMINGHAM.

RSB

SENSITIVE DRILLS

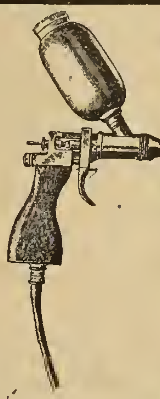
R. S. Brookman & Co.,
24, Paddenswick Rd.,
Hammersmith, W. 6.
'Phone: Hammersmith 226.

OXY-ACETYLENE
WELDING PLANTS.
MANUFACTURERS OF COMPLETE OUTFITS
FOR AIRCRAFT WELDING.
WELDING WORK OF ALL DESCRIPTION.

McGOWAN, WILD & Co.
HURST STREET, BIRMINGHAM.
ASK FOR CATALOGUE "B" PHONE: MID. 1816.

Your
Painting & Varnishing
cannot be done effectively
without the installation of a
Spraying Plant.

Phone: Central 5463. Wire: "Blast," or write
THE MIDLAND FAN CO., LD.,
212, ASTON ROAD, BIRMINGHAM.



COAN
CASTS
CLEAN
CRANK
CASES

ALUMINIUM CASTINGS
SAND or DIE
of every description
2 H.P. to 600 H.P.
Best Metal. Quick deliveries.

CONTRACTOR TO H.M. GOVERNMENT
TELEGRAMS KRANKASES ISLING, LONDON.
TELEPHONES 3846 City [illegible]

ROBERT W. COAN
The Aluminium Foundry
219 GOSWELL RD. LONDON EC

MISCELLANEOUS ADVERTISEMENTS.

All Advertisements for this column should arrive at its office by 12 a.m., Saturday, to ensure insertion.

Special PREPAID Rate:—

18 WORDS 1/6

Solid Setting, First Line Display Caps, 1/-, 1d. per word after.

Situations wanted ONLY, 18 Words, 1/3.

PROPELLERS.

THE INTEGRAL PROPELLER CO., LTD., guarantee highest efficiency in their design and manufacture of Propellers for any type of engine or machine.—THE INTEGRAL PROPELLER CO., LTD., Edgware Road, The Hyde, Hendon, N.W. 9.
'Phone—Kingsbury 104.

PARTNERSHIP.

PILOT (20), late Lieut.; Public School education; employed in R.A.F. as a test pilot, assistant designer, and ferry pilot; careful steady pilot; desires a post as a Pilot and Assistant Designer, and the privilege of working himself up from the bottom; reasonable draughtsman and knowledge engines; living salary required.—Box 11664, c/o FLIGHT, 36, Gt. Queen Street, Kingsway, W.C. 2.

PARTNERSHIPS.—Alan Martin, Morgan & Co., Ltd., Investment Partnerships and Company Registration Agents, invite correspondence from firms proposing to extend and requiring their services. Book "Why every Business Man should adopt Limited Liability: Its Facilities and Protection," the most explanatory and easily understood book on the subject published. One shilling, post free.—10, Lower John Street, Regent Street, London, W. 1.

THE Inventor of an Upright Reversible Propeller would like a Partner with means, or would sell.—J. CRANIDGE, The Avenue, Bentley, Doncaster.

EDUCATIONAL.

BRITISH CORRESPONDENCE SCHOOL OF AERONAUTICS (Estab. 1908).—Engineering Course, 17/6. Advanced Courses in Design, Engines, Draughtsmanship, 42/-. Diplomas granted.—PENNINGTONS, 254, Oxford Road, Manchester.

PROGRESSIVE CORRESPONDENCE COURSES in Aeronautics, Mathematics, Physics, and Engineering Subjects. Courses for Matriculation, Intermediate, Final B.Sc., A.M.I.C.E., A.M.I.Mech.E., A.M.I.E.E.—S. T. G. ANDREWS, B.Sc. (Eng.), M.I.AE.E., Dept. A3, 80, Shakespeare Crescent, Manor Park, E. 12.

PATENT AGENTS.

PATENTS; Trade Marks; Inventors advised free.—KING'S PATENT AGENCY, LTD., 165, Queen Victoria Street, London. Registered Patent Agents.

PAGE, WHITE & VAUGHAN (late Page & Rowlingson), Chartered Patent Agents (Consulting Engineer, Mr. S. E. Page, A.M.Inst.C.E.), 27, Chancery Lane, London, W.C. 2. Tel.: 332 Central.

SITUATIONS VACANT.

SENIOR Draughtsman wanted immediately for Experimental Dept.; must have good shop and drawing experience and technical knowledge.—Write, giving age, experience, and salary required, to Box 651, SAMSON CLARK & Co., LTD., 58, Gt. Portland Street, W. 1.

MESSRS. HANDLEY PAGE LTD., require the service of an Experimental Engineer in charge of their wind channel and aerodynamic testing work; applicants must have had similar experience at the N.P.L. or elsewhere, be able to initiate and carry through research work, and be well acquainted with aeronautical technology.—Full details as to past experience, age, salary required, must be stated in writing to "EXPERIMENTS," c/o Messrs. HANDLEY PAGE LTD., Cricklewood, London.

WOOD PARTS

FOR AEROPLANES, Etc.

ALSO FOR

MODEL AEROPLANES and TOYS.

In Large Quantities Only.

W. G. EVANS & SONS

2, Stanhope St., Euston Road,
PHONE—MUSEUM 2458. London, N.W. 1.

Magnetos Repaired

for all kinds of Aircraft.

FELLOWS Aircraft Magneto

(Contractors to H.M. War Office.)

FELLOWS MAGNETO CO., LTD.,
Cumberland Avenue, Park Royal, N.W. 10
TELEPHONE—WILLESDEN 1560, 1561.

FOR

SOLDERING AND TINNING

USE

"Baker's Preparation"

THE LIQUID FLUX

Instant Action.

Makes a clean strong joint, that will withstand any amount of vibration and strain. "Tins," and "cleans" the iron. Does not splutter or injure the hands.

Sold in 1/3—12 oz. tins and Stone Bottles, by Accessory Dealers, and bulk by the Sole Manufacturers:—

Sir WM. BURNETT & CO., Ltd.
Millwall, E. 14.

Why Waste your Chips?

Turn them into POWER by using the

Ruston Patent Refuse Suction Gas Producer

which with a **Gas Engine** will give you the Power to drive your Sawmills — at **practically** no cost. —

WRITE FOR CATALOGUE

RUSTON & HORNSBY, Ltd.
LINCOLN.

HUNDREDS OF HIGH-CLASS SECOND-HAND

CARS

ARE ADVERTISED IN

"AUTO"

EACH WEEK.

The "AUTO" (Yellow Cover) is the only National Motoring Weekly published at ONE PENNY. Get it at any Bookstall or Newsagent.

MODELS AND PARTS.

The Model Aeroplane Manufacturing Company

(LATE T. W. K. CLARKE & CO.),
HAMPTON WICK.

Superb Flying Models. Model Accessories.

Send 3d. for list F.120 (illustrated)

A. E. JONES, Ltd.

During the Xmas Holidays do not forget to call at the Noted Shop for Model Aeroplanes and Accessories.

52, HIGH ST., NEW OXFORD ST.,
(Facing Tottenham Court Road), W.C. 2.
'PHONE—GERRARD 6731.

DID you fly a Sopwith Camel? If so, would you not like to obtain a Scale Model in copper of the machine, with working controls? £12 12s. each; they also make very acceptable presents this coming season.—Write, WINITHSON COMPANY, 3, Bank Broadway, Kingston Hill, Surrey.

MODEL PETROL MOTORS.—List 3d. ½ h.p.; tooled or rough; interesting; water-cooled or air-cooled.—LITTLEOVER, Aerials, Derby.

MACHINES AND ENGINES FOR SALE.

FOR SALE.—Sopwith Camel Aeroplane, fitted with 130 h.p. Clerget Engine; brand new; ready for flight; price £250.—Apply Box 4859, c/o FLIGHT, 36, Gt. Queen Street, Kingsway, W.C. 2.

FOR SALE.—124 Aeroplane Aluminium and Celluloid Wind Screens; 300 Aeroplane Wind Screens, Triplex Glass and Frames; 82 Oil and Petrol Tanks (Avro type), 20 gallons; 10 Oil Tanks (H6 type); two Gravity Oil Tanks (H6 type). Above are all new. What offers?—Reply, Box 11674, c/o FLIGHT, 36, Gt. Queen Street, Kingsway, W.C. 2.

AVROS, with 130 h.p. Clerget, 100 h.p. Mono or 110 h.p. Le Rhone engines, for two or three passengers to suit customers; D.H.6's, with 80 h.p. Renault engines; also D.H.9, with 230 h.p. Puma engine; all machines tested and delivered to purchaser's ground (anywhere in Great Britain) by air.—Apply by letter, "FLIGHT," BIRCHALL'S Advertising Offices, Liverpool.

In consequence of civil aviation control.
STAG-LANE AERODROME, EDGWARE.
Situate on the main Edgware Road, adjoining Burnt Oak Farm, and opposite the Bald-faced Stag P.H.

WEATHERALL AND GREEN are instructed by the London Provincial Aviation Co. to SELL by AUCTION, on the PREMISES as above, on WEDNESDAY, January 14th, 1920, and following day, at One o'clock precisely.

the EQUIPMENT of the FLYING SCHOOL
and
SURPLUS STOCK of CONTRACT MATERIAL,

comprising three L. and P. FUSELAGE-TYPE AEROPLANES fitted with 50 h.p. Gnome engines, 15 CAUDRON TYPE BIPLANES without engines, 25-50 h.p. GNOME ENGINES, 110 h.p. LE RHONE, brand new 120 h.p. six-cylinder BEARDMORE, 160 h.p. BEARDMORE, 150 h.p. six-cylinder N.A.G., 4 h.p. De Dion engine, 4½ h.p. National horizontal engine for gas or petrol, a 14-20 h.p. DE TROITER five-seater TOURING CAR, an 8 h.p. DE DION two-seater CAR, dynamo, magnetos, valves, carburettors, and other spare parts; also a large quantity of MISCELLANEOUS STORES, including wire strainers, eye bolts, nuts and bolts, files, engineers' vices, manganese steel sheeting, aluminium sheeting, scrap steel, brass and bronze, brass rod, drawn steel tubing, wheels, new and old tyres and tubes, propellers, spars and struts, portable hangars, w.c. pans, cisterns, &c.

May be viewed on January 12th and 13th from nine to one and two to four o'clock.

Catalogues of the Auctioneers, 22, Chancery Lane, W.C. 2. Tele.: Holborn 584 (three lines).

SITUATIONS WANTED.

ANY Job at Living Wage.—Advertiser, 4½ years overseas, R.A.S.C., M.T., garage, workshops experience, pre-war overhauls, heavy and light; books, accounts, manage, accept responsibility, stores, carpentry, drive, electric lighting, motor boats; A1 referreferences, 14 years' clean licence, married, good personality.—B.E. 34/38, c/o FLIGHT, 36, Gt. Queen Street, Kingsway, W.C. 2.

DRAUGHTSMAN, Aeronautical, seeks position; 4 years' experience; age 22.—Apply, F. G. COBB, 41, Caroline Place, Bayswater, London, W.

CARS FOR SALE.

A.C. SPARE PARTS.—We are now in a position to supply the majority of replacements for our cars direct from stock.—All communications to AUTO-CARRIERS (1911) LTD., Service Dept., Hercules Road, Lambeth, S.E. 1. 'Phone—Hop 311.

CONSULTING ENGINEER.

W. CECIL ENGLAND, late R.A.F., Consulting Aeroplane, Motor and General Engineer, Rangoon, Burma, India.

MISCELLANEOUS AND TRADE.

AERO FABRIC, ETC. Planes built to specifications. Highest workmanship and material.—C. G. SPENCER & SONS, LTD., 56a, Highbury Grove London, N. 5.

EX-PILOTS R.A.F. AND OTHERS.—Do you want a picture painted of your old machine with special marks and gadgets complete? If so, communicate with ASHBY, 68, Essendine Mansions, Maida Vale.

PILOTS of Whitehead built aircraft during the War will hear of something to their advantage by communicating with Mr. J. A. WHITEHEAD, Richmond, Surrey.

WANTED, Photographs taken from aeroplanes of seaside and other places of interest.—AERO-PHOTO PRODUCTION CO., 18/19, Ironmonger Lane, E.C. 2.

FOR SALE.—"Flight," vols. 7-11, ess 6 issues; "Aeronautics," Nov., 1914 to June, 1918, less 4 issues. Offer.—H. AYLES, "Stanhurst," Epsom.

BESSONNEAU Hangars Wanted.—Write sizes and full particulars to E., 18, Bryanstone Road, N. 8

PUBLICATIONS.

BOOKS ON AERONAUTICS and all other subjects. Technical Books a speciality. Second-hand at Great Reductions. New at Discount Prices Sent on approval. State wants. Catalogue free. Books Purchased.—W. & G. FOYLE, 121-123, Charing Cross Road, London, W.C. 2.

How to Fly and Instruct on an "Avro."

By F. DUDLEY HOBBS, B.A., King's College, Cambridge, Lieut. 2nd Life Guards (S.R.), and R.A.F. With a Foreword by Brig.-General J. G. HEARSON, R.A.F., Director of Training. With Illustrations. 8vo. 3*s*. 6*d*. net.

"The author shows that he can lay claim to intimacy with the best and most scientific methods of teaching flying at present known."
—*Sunday Times.*

LONGMANS, GREEN & CO.,
39, Paternoster Row, London, E.C. 4.

Development of Trade.

If you contemplate erecting a

New Works or Factory

in an ideal position with the advantage of

CHEAP POWER
GOOD WATER SUPPLY
HEALTHY SURROUNDINGS
SIDING ACCOMMODATION
EFFICIENT TRANSPORT FACILITIES

Write Great Central Railway Company's Estate Agent, 12, Paton Street, Piccadilly, Manchester, stating your requirements.

SAM FAY, *General Manager.*

1D. The AUTO 1D.

-MOTOR JOURNAL
"Yellow Cover"

ALL THE LATEST DEVELOPMENTS IN MOTORING WEEK BY WEEK

Subscription Rates :—

United Kingdom.	s.	d.	Abroad.	s.	d.
3 Months, Post Free	1	9	3 Months, Post Free	3	6
6 ,, ,,	3	6	6 ,, ,,	7	0
12 ,, ,,	7	0	12 ,, ,,	14	0

OR OF ALL NEWSAGENTS AND BOOKSTALLS

7/= (At Home.)

Ensures your receipt of
The AUTO
-MOTOR JOURNAL
regularly each week,
.... post free, for ....

14/= (Abroad.)

One Year

Publishing Offices: 36, Gt. Queen Street, Kingsway, W.C. 2.

THE NEW "WEB" NUT.

Half the weight with equal strength. The cavities permit oxidisation which - - prevents the nut working loose. - :
Much easier to tighten or slacken than - - - the ordinary nut. - - -

Write for further particulars to :—

HERRTAGE, HOLYOAKE & Co.,
Motor and General Engineers,
127-128, Fleet Street, London, E.C. 4.

FLIGHT BUYERS' GUIDE & TRADE DIRECTORY.

CLASSIFIED LIST OF LEADING MAKERS OF ALL GOODS PERTAINING TO AVIATION (for Details see Advertisers' Announcements).

For Index to Advertisers *see* page xlviii.

ACETYLENE WELDING PLANT AND BLOWPIPES—

Dissolved Acetylene Co., Ltd., 268, South Lambeth Road, S.E. Brixton 2171.
Hoggett, Young & Co., Essex Road, N. 1. Central 1890; "Weldoxacet," Isling. London.
Imperial Light Ltd., 123, Victoria Street, London, S.W. 1. Victoria 3540 (4 lines); "Edibrac," Phone, London.
McGowan, Wild & Co., Hurst Street, Birmingham. Midland 1816

AEROPLANE MANUFACTURERS—

Aircraft Manufacturing Co., Ltd., Hendon, N.W. 9. Kingsbury 220.
Aircraft Steel Construction Co., 39, Victoria St., London, S.W. 1. Victoria 6613: "Aviador," Vic. London.
Alliance Aircraft Co. Ltd., 45, Castle Street East, W. 1.; also Cambridge Road, Hammersmith. Museum 5000.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. Gosforth 500. "Armstrong, Aviation," Newcastle-on-Tyne.
Austin Motor Co., Ltd., 479, Oxford St., W. 1. Mayfair 6230; "Austinette," Wesdo, London.
Bath Aircraft, Ltd., Flight Works, Lower Bristol Road, Bath. Weston, Bath 55; "Flight," Bath.
Beardmore, Wm., & Co., Ltd., Dalmuir.
Bleriot Aeronautics, Addlestone, Surrey Weybridge 353; "Bleriot," Weybridge.
Boulton & Paul, Ltd., Norwich. Norwich 851; "Aviation," Norwich.
British Aerial Transport Co., Ltd., Head Office: 38, Conduit St., London, W. 1. Mayfair, 637, 638; "Batigram," Reg. London. Works: Hythe Rd., Willesden, London, N.W. 10. Willesden 2272, 2273; "Aerhrirans," Phone, London.
British & Colonial Aero Co.: Filton, Bristol. Bristol 3906; "Aviation," Bristol.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W. 2. Hampstead 4647, 4648; "Caudroplan," Crickle, London.
Burton Aircraft & Mfg. Co., Ltd., Park Street, Burton-on-Trent.
Central Aircraft Co., 179, High Road, Kilburn, N.W. 6. Hampstead 4403, 4404; "Aviduction," Phone, London.
Cole, Wm., & Sons, Ltd., Hammersmith Road, W. 6. Hammersmith 1413—4.
Curtiss Aeroplane and Motor Corporation, The, New York City, U.S.A. Cable Address: "Curtisaero"—Western Union Code.
Eastbourne Aviation Co., Ltd., Eastbourne. Eastbourne 1176; "Aircraft," Eastbourne.
English Electric Co., Ltd., Thornbury Works, Bradford. Bradford 3700 (7 lines); "Dynamo," Bradford; "Phedyna," London.
Glendower Aircraft Co., Ltd., Sussex Place, South Kensington, S.W. 3. Kensington 7066, 7067. "Glenacelle," Southkens, London.
Gosport Aircraft Co., Head Office, Gosport; Works, Gosport. Gosport 217. "Flight," Gosport; "Flying," Southampton.
Grahame-White Company, Ltd., Hendon, N.W. 9. Kingsbury 120. London Office: 12, Regent Street, Pall Mall, S.W. 1. Regent 2084.
Handley Page, Ltd., 110, Cricklewood Lane, N.W. 2. Hampstead 7500; "Hydrophid," Crickle, London.
Martinsyde, Ltd., Brooklands, Byfleet. Woking 551, Byfleet 171; "Martinsyde," Weybridge.
Nieuport & General Aircraft Co., Ltd., Cricklewood, N.W. 2. Willesden 2455; "Nieuscout," Crickle, London.
Petters, Ltd., Yeovil. Yeovil 129; "Aircraft," Yeovil.
Regent Carriage Co., Ltd., New King's Road, Fulham, S.W. 6. Putney 2240.
Roe, A. V., Ltd., Manchester. City, 8530, 8531. Manchester; "Triplane," Manchester. Hamble, near Southampton: Hamble 18; "Roe," Hamble. 166, Piccadilly, London, W. 1: Gerrard 3186; "Senalpirt," Phone; Code A.B.C., 5th Ed.
Sopwith Aviation and Engineering Co., Ltd., Kingston-on-Thames. Kingston 1988; "Sopwith," Kingston.
Supermarine Aviation Works, Ltd., The, Southampton. Woolston 37; "Supermarin," Southampton.
Vickers, Ltd., Basil St., Knightsbridge, S.W. 3. Kensington 6810; "Vickerfyta," Knights, London.

AIRSHIPS AND BALLOONS—

Airships, Ltd., Hendon, N.W. 9. Kingsbury 220.
North British Rubber Co., Ltd., Castle Mills, Edinburgh. Central 3880; "Weba," Edinburgh.
Spencer & Sons, 56A, Highbury Grove, N. 5. Dalston 1893; "Aeronaut," London.

AIR TRANSPORT, COMMERCIAL—

Aircraft Travel & Transport Ltd., 25-22, Old Queen Street, S.W. 1. Victoria 7937.
British Aerial Transport Co., Ltd., Head Office: 38, Conduit St., London, W. 1. Mayfair 637, 638; "Batigram," Reg. London. Works: Hythe Rd., Willesden, London, N.W. 10. Willesden 2272, 2273; "Aerbrirans," Phone, London.
Central Aircraft Co., 179, High Road, Kilburn, N.W. 6. Hampstead 4403-4404 & 835, Harrow 609-610; "Aviduction," Phone, London.

ALUMINIUM PRESS WORK—

Aluminium Plant and Vessel Co., Point Pleasant, Wandsworth, S.W. 18. Putney 2353; "Anaclastic," Wands. London.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497.

ALUMINIUM SHEETS AND STRIPS—

Combined Metals & Reinforced Casting Co., Ltd., Point Pleasant Works, Wandsworth, S.W. 18. Putney 2405; "Overturned," Phone, London.

ANTI-FRICTION METAL—

Billington & Newton, Ltd., Longport, Staffs. Burslem 304; "Bronze," Longport.

BALL BEARINGS—

Hoffmann Mfg. Co., Ltd., The, Chelmsford, Essex.

BANKS—

London County Westminster and Parr's Bank, Ltd., 41, Lothbury, E.C. 2.

BEARINGS—

Billington & Newton, Ltd., Longport. Staffs. Burslem 304; "Bronze," Longport.
Y.E.S., Ltd., Up. Wortley Road, Leeds. Central 3927; "Yes," Leeds.

BENT TIMBER PARTS—

Hopton & Sons, George St., Euston Rd., N.W. 1. Museum 496; "Hoptons," London.
Williams, T., & Sons, Bristol.

BLOW AND BRAZING LAMPS—

Pinchbeck Bros., 24, Garlick Hill, London, E.C. 4.

BUILDINGS—

Dawnay, A., & Son, Steelworks Rd., Battersea, S.W. 11. Battersea 1094, 1095; "Dawnay," Battsquare, London.
Hope, H. & Sons, Ltd., 55, Lionel St., B'ham. B'ham 999; "Conservatory," B'ham.

CARBURETTORS—

Aluminium Plant & Vessel Co., Ltd., Point Pleasant, Wandsworth, London, S.W. 18. Putney 2353; "Anaclastic," Wands., Lond.
Bloctube Carburettor Works, The, Danemere St., Putney, S.W. 15. Putney 242; "Tublocarb," Put., London
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road. S.W. 1. Victoria 4670.
Zenith Carbr. Co., Ltd., Newman Street, Oxford St., W. 1. Regent 4812 (2 lines).

CASEIN—

Nieuwhof, Surie & Co., Ltd., 5, Lloyd's Av., E.C. 3. Avenue 34 & 35; "Suricodon," Fen., London.

CASTINGS, DIE AND SAND—

Aerators, Ltd., Edmonton, N. 18. Tottenham 37.
Aluminium Plant & Vessel Co., Ltd., Point Pleasant, Wandsworth, S.W. 18. Putney 2353; "Anaclastic," Wands., London.
Clifford, Charles, & Son, Ltd., Fazeley St., B'ham. Central 3634 (4 lines); "Clifford," Birmingham.
Coan, R. W., 219, Goswell Rd., London, E.C. 1. City 3846; "Krankases," Isling., London
Combined Metals & Reinforced Casting Co. Point Pleasant, Wandsworth, S.W. 18. Putney 2405; "Overturned," Phone, London.
London Die Casting Foundry, Ltd., Tremlett Grove, 112, Junction Rd., N. Hornsey 2294.

(*Continued on* p. liii.)

CASTINGS, DIE AND SAND—continued.

Snercold Engineering Co., Ltd., Hampton Wick. Kingston 1153 and 1154; "Snercold," Kingston-on-Thames.
Y.E.S. Ltd., Up. Wortley Rd., Leeds. 25004 Leeds; "Yes," Leeds.

CLOTHING—

Burberry, Haymarket, 1. Regent 2165-6-7; "Burberry," Charles, London.
Gamage, Ltd., Holborn, E.C. 1. Holborn 2700.
Gieves, Ltd., 21, Old Bond St., W. 1. Mayfair 6504.
Radio Electric Clothing Co., 17, Gt. Chapel Street, Oxford Street, W. 1. Regent 4278

COPPER AND BRASS Rods, Tubes, Sheets, Wire—

Burton Aircraft & Mfg. Co., Ltd., Burton-on-Trent. Phone 554; "Planes," Burton.
Clifford, Charles, & Son, Ltd., Fazeley St. Mills, Birmingham. Central 3634 (4 lines); "Clifford," Birmingham.
S. Sansum & Co., Alexandra St., Wolverhampton. Phone 1115.

COVERING & DOPING—

Aero Coverings, Ltd., Piccadilly, W. 1. Gerrard 2312
Central Aircraft Co., 179, High Road, Kilburn, N.W. 6. Hampstead 4403-4404 & 835, Harrow 609-610; "Aviduction," Phone, London.

DOPES—

British Cellulose & Chemical Manfg. Co., Ltd., 8, Waterloo Place, S.W. 1. Regent 4045 (3 lines). "Cellutate," London.
British Emaillite Co., Ltd., 30, Regent St., S.W. 1. Gerrard 280; "Ridleypren," Piccy, London. London Wall 5359, 3662; "Ajawb," London.
Cellon, Ltd., 22, Cork St., London, W. 1. Gerrard 440 (2 lines); "Ajwab," London.
Titanine, Ltd., Empire House, 175, Piccadilly, W. 1. Gerrard 3212; "Tetrafree," Piccy, London.

DYNAMOMETERS—

Walker, W. G., & Co., Emery Hill St., Victoria St., S.W. 1. Victoria 1682.

ELECTRICAL APPLIANCES—

Chloride Electrical Storage Co., Ltd., Clifton Junction, Manchester.
General Electric Co., Ltd., Queen Victoria St. E.C. 4. London Wall 3600
Gent & Co., Ltd., Leicester. 'Phone: 151 (2 lines); "Lodestone," Leicester.
Marconi's Wireless Telegraph Co., Ltd., Marconi House (Aircraft Dept.), Strand, W.C. 2. City 8710 (10 lines); "Expanse," Cable, London.
Radio Electric Clothing Co., 17, Gt. Chapel St., W. 1.
Rotax Motor Accessories Co., Ltd., Willesden Junction. Willesden 2480; "Rodynalite," Phone, London.
Vandervell & Co., Ltd., Messrs., Warple Way. Acton Vale, W. 3. Chiswick 2000.

ENGINES AND PARTS—

Austin Motor Co., Ltd., Northfield, Birmingham.
Beardmore Aero Eng., Ltd., 112, Great Portland St, W. 1. Gerrard 238.
British Anzani Eng. Co., Scrubbs Lane, Willesden Jn., N.W. 10. Willesden 2214.
Dudbridge Ironworks (Salsom), 87, Victoria St., S.W. 1. Victoria 7026; "Aeroflight," Vic, London.
Gnome Engine Co., The Hyde, Hendon, N.W. 9. Kingsbury 220.
Grahame-White Company, Ltd., Hendon, N.W. 9. Kingsbury 120. London Office: 12, Regent St., Pall Mall, S.W. 1. Regent 2084
Green Engine Co., Ltd., Twickenham. Richmond 1293.
Gwynnes, Ltd., Hammersmith, London, W. Hammersmith 1910; "Gwynne," London.
James, Talbot & Davison, Fremantle Rd., Lowestoft. Lowestoft 281; "Motors," Lowestoft.
Napier & Sons, Ltd., Acton, W.
Rolls-Royce, Ltd., 14 & 15, Conduit St., W. 1. Gerrard 1654, 1655, 1656; "Rolhead," London.
Siddeley-Deasy Motor Car Co., Ltd., Coventry.
Sunbeam Motor Car Co., Ltd., Wolverhampton.
Vickers, Ltd., Basil St., Knightsbridge, S.W. 3. Kensington 6810; "Vickerfyta," Knights, London.
Walton Motor Engines, Walton-on-Thames.

FLIGHT BUYERS' GUIDE AND TRADE DIRECTORY—*continued.*

(*Continued from* p. lii.)

FABRICS AND YARNS—

Crawley, Gates & Co., 115, Fore St., E.C. 2. Central 1625; "Spheroidal," Cent., London.
James North Hardy & Son, Ltd., 54, Portland St., Manchester. Central 6471; "Hardson," Manchester.
North British Rubber Co., Ltd., Castle Mills, Edinburgh.
Victoria Rubber Co., Ltd., Edinburgh.

FELTING AND ROOFING—

Anderson, D., & Sons, Ltd. (Roofing), Belfast.
Messenger Bros., Ltd., Hounslow. Hounslow 6; "Messenger," Hounslow.

FLUXES—

Auto-Controller Co., The, 314, Vienna Road, Bermondsey.
Burnett, Sir W., & Co., Ltd., Millwall, E.
Sanitary & Water Fittings Mfg. Co., The, 24, Garlick Hill, E.C. 4. City 3689; "Pincheries," Phone, London.

FLYING SCHOOLS—

Bournemouth Aviation Co., Bournemouth.
Cambridge School of Flying, 2, Downing St., Cambridge. Camb. 5.
Central Aircraft Co., 179, High Road, Kilburn, N.W. 6. Hampstead 4403-4404 & 835, Harrow 609-610; "Aviduction," Phone, London.

GALVANIZING—

Galvanizing & Equipment Co., Ltd., The, 29A, Portpool Lane, Gray's Inn Road. Holborn 5141.

HEATING, DUST REMOVING AND VENTILATING—

Kinnell & Co., Ltd., Southwark St., S.E. 1. Hop 372; "Kinnell," London.
Midland Fan Co., Ltd., 46, Aston Road, Birmingham. Central 5463; "Blast," Birmingham.

INSTRUMENTS (Speed), WATCHES, &c.—

British Wright Co., Ltd., 33, Chancery Lane, W.C. 2. Holborn 1308.
General Aeronautical Co., Ltd., 30, Regent St., S.W. 1. Gerrard, 280; "Ridleypren," London.
Goldsmiths & Silversmiths Co., 112, Regent Street, W. 1. Gerrard 9091 (3 lines).
Short & Mason, Ltd., Walthamstow, E. 17. Walthamstow 180; "Aneroid," Phone, London.
Simms Motor Units, Ltd., Percy Blgs., Gresse St., Rathbone Place, W. 1. Museum 2460, 2461; "Simotunit," London.
Smith, S., & Sons, Gt. Portland St., W. 1. Mayfair 6350 (6 lines).
Smith, S., & Sons, Strand, W.C. 2. Gerrard, 2830.
Wheeler, T., 217, Goswell Road, E.C. City 419; "Scienoid," Isling, London.

INSURANCE—

Aviation and General Insurance Co., Ltd., 56, St. James's St., S.W. 1.
Aviation Insurance Association, 1, Royal Exchange Avenue, E.C. 3. London Wall 9944.
Bray, Gibb & Co., Ltd., 166, Piccadilly, W. 1.

LUBRICATING OILS—

Dick, W. B., & Co., 90, Fenchurch Street, E.C.3. Avenue 7854 (2 lines); "Dicotto," Fen, London.
Wakefield, C. C., & Co., Ltd., Cheapside, E.C. 2. Central 11305-13466; "Cheery," Cent., London.

MACHINE TOOLS, LATHES, CHUCKS—

Brookman & Co., Drillsom Works, Loughborough, Leicestershire. Loughborough 108; "Drillsom," Loughborough.
Burton, Griffiths & Co., Ltd., Ludgate Square, Ludgate Hill, E.C. 4. City 1409 (4 lines); "Hibon," Cent., London.
Pratt & Co., 7, Laurence Pountney Hill, E.C. 4.
Wadkin & Co., Leicester. Leicester 3614-3615. "Woodworker," Leicester.

MAGNETOS—

British Lighting and Ignition Co., Ltd., Tottenham Court Road, W. 1.
Fellows & Co., Cumberland Avenue, Park Royal, N.W. 10. Willesden 1560-1561.
Simms Motor Units, Ltd., Percy Blgs., Gresse St., Rathbone Place, W. 1. Museum 2460, 2461; "Simotunit," London.

MANGANESE BRONZE—

Billington & Newton, Ltd., Longport, Staffs. Burslem 304; "Bronze," Longport.

METAL ALLOYS—

Billington & Newton, Ltd., Longport, Staffs. Burslem 304; "Bronze," Longport.
Duralumin (Vickers, Ltd.), Broadway, S.W. 1. Victoria 6900.

METAL PARTS AND FITTINGS—

A.G.S. Mfg. Co., 4 & 5, Norfolk St., W.C. 2. Central 1446; "Agstropar," Estrand, London.
Aluminium Plant & Vessel Co., Ltd., Point Pleasant, Wandsworth, S.W. 18. Putney 2352; "Anaclastic," Wands., London
Bolton, Thomas, & Sons, Ltd., 57, Bishopsgate, E.C.
Brown Bros., Ltd., Great Eastern St., E.C. 2. London Wall 6300; "Imbrowned," Bethroad.
Central Aircraft Co., 179, High Road. Kilburn, N.W. 6. Hampstead 4403-4404 & 835, Harrow 609-610; "Aviduction," Phone, London.
Cole, W., & Son, Hammersmith Rd., W. 6. Hammersmith 1413; "Imota," London.
Combined Metals & Reinforced Casting Co., Ltd. Point Pleasant, Wandsworth, S.W. 18. Putney 2405; Overturned," Phone, London.
East London Rubber Co., Ltd., 29 & 31, Great Eastern St., E.C. 2. London Wall 120.
Grahame-White Company, Ltd., Hendon, N.W. 9. Kingsbury 120.
London Office: 12, Regent St., Pall Mall, S.W. 1. Regent 2084.
Central 2341; "Fanlights," B'ham.
Jacobs, W. A. & R. J., Leonard St., Gt. Eastern St., E.C. 2. London Wall 231; "Electary," Finsquare, London.
London Aluminium Co., Ltd., Westwoood Rd., Aston, Birmingham. East 497.
Meteor Mfg. Co., Ltd., 72, Gray's Inn Road, London, W.C. 1. Holborn 4632.
Monk Engineering Co., High St., Coventry. Coventry 807; "Assistance," Coventry.
Moss, W., High St., New Oxford St., W.C. 2. Gerrard 6731; "Airobilmos," Phone, London.
Rubery, Owen & Co., Ltd., Darlaston. Darlaston 87; "Roofs," Darlaston.
Snercold Engineering Co., Ltd., Hampton Wick. Kingston 1153 and 1154; "Snercold," Kingston-on-Thames.
Thompson Bros. (Bilston), Ltd., Bilston. "Thompson Bros.," Bilston.
Woodside Engineering Co., Ltd., North Woodside Road, Glasgow. "Fuselage," Glasgow.

MISCELLANEOUS—

Bowden Wire, Ltd., Willesden Junction (Wires, Levers, &c.), N.W. 10. Willesden 2400 (3 lines).
British Oxygen Co., Ltd. (Hydrogen Gas), Elverton St., Westminster, S.W. 1. Victoria 4706 (2 lines), 6717 (2 lines).
Brown Bros., Great Eastern St., E.C. 2. London Wall 6300; "Imbrowned," Bethroad, London.
Frood, Herbert, Co., Chapel-en-le-Frith.

(*Continued on* p. liv.)

MODELS—

Clarke, T. W. K., & Co., Ltd., Hampton Wick. Kingston 869; "Flyers," Kingston-on-Thames.
Jones, A. E., Ltd., 52, High St., New Oxford St., W.C. 1.

MOTOR CARS & MOTOR BICYCLES—

Arrol-Johnston, Ltd., Dumfries. Dumfries 281-282; "Mocar," Dumfries.
Auto-Carriers (1911), Ltd., 181-182, Hercules Rd., Westminster Bridge Road, London, S.E. 1.
Humber, Ltd., Coventry.
Motor Body Mfg. Co., Ltd. (Prop., Aircraft Mfg. Co., Ltd.), 25-27, Old Queen St., S.W. 1. Victoria 7932.

NAME PLATES, &c.—

British Metal (Kingston), Ltd., Kingston-on-Thames. Kingston 879.
Endolithic Manfg. Co., Ltd., 60, Aldersgate St. E.C. 1.

OFFICE FURNITURE AND APPLIANCES—

Aircraft Mfg. Co., Ltd., Hendon, N.W. 9. Kingsbury 220.
Central Aircraft Co., 179, High Road, Kilburn, N.W. 6. Hampstead 4403-4404 & 835, Harrow 609-610; "Aviduction," Phone, London.
General Electric Co., Ltd., The, 67, Queen Victoria St., E.C. 4. London Wall ~600.

PARACHUTES—

E. R. Calthorpe's Aerial Patents, Ltd., Eldon St. House, Eldon St., E.C. 2. London Wall 3266-67; "Savemalive," Ave, London.
North British Rubber Co., Ltd., Castle Mills, Edinburgh. Central 3880; "Weba," Edinburgh.
Spencer, C. G., & Sons, Ltd., 56a, Highbury Grove, N. 5. Dalston 1893; "Aeronaut, London."

PETROL—

Anglo-American Oil Co., Ltd. (Pratt's), Queen Anne's Gate, S.W. 1.
Shell Marketing Co., Ltd., 39-41, Parker Street, Kingsway, W.C. 1. Regent 6110-5; "Shelzine," Westcent, London.

PETROL GAUGES—

Simms Motor Units, Ltd., Percy Bldgs., Gresse St., Rathbone Place, W. 1. Museum 2460, 2461 "Simotunit," London.

PHOSPHOR BRONZE AND GUNMETAL—

Billington & Newton, Ltd., Longport, Staffs. Potteries 304.
Clifford, Charles, & Son, Ltd., Fazeley Street Mills, Birmingham. Central 3634 (4 lines); "Clifford," Birmingham.
Keeling, A. D., Ltd., Caroline Street, Birmingham. Central 440 (3 lines); "Nickel," Birmingham.
Y.E.S., Ltd., Up. Wortley Road, Leeds. 25004 Leeds; "Yes," Leeds.

PISTON RINGS AND GUDGEON PINS—

Allen & Simmonds, Ltd., Reading.
British Piston Ring Co., Coventry. Coventry 1214, 1215; "Pistorings," Coventry.

POWER PRESSES—

Bradley & Craven, Ltd., Wakefield. Central 3; "Craven," Wakefield

---

NOW READY.

560 Pages Crown 8vo. Price 12/6 net (postage 6d.)

1919-20 EDITION.

THE AVIATION POCKET BOOK

By R. Borlase Matthews, A.M.Inst.C.E., F.R.Ae.S., &c.

☞ The new edition has been revised, rewritten and enlarged. In its new form it embodies an encyclopedia of the most modern practice, and presents a complete collection of useful notes, Formulæ, Rules, Tables, and Data relating to Aeronautics.

London:
Crosby Lockwood & Son, 7, Stationers' Hall Court, E.C.

Make C.A.V. Your Mascot
and your Lighting and Starting troubles will disappear.
BRITISH THROUGHOUT.

TOOLS
R. MATHER & SON, SHEFFIELD.

FLIGHT BUYERS' GUIDE AND TRADE DIRECTORY—*continued.*

(*Continued from* p. liii.)

PRESS TOOLS—

Bradley & Craven, Ltd., Wakefield.
Central 3; "Craven," Wakefield
Jacobs, W. A. & R. J., Ltd., 94 & 96, Leonard St., E.C. 2.
London Wall 231.
"Electary," Finsquare, London.

PROPELLERS—

Falcon Airscrew Co., 113, Cottenham Road, Holloway, N. 19.
Hornsey 910; "Davis,' Hornsey 910.
General Aeronautical Co., 30, Regent St., S.W. 1.
Gerrard 280; "Ridleypren," London.
Grahame-White Company, Ltd., Hendon, N.W. 9.
Kingsbury 120.
London Office: 12, Regent St., Pall Mall, S.W. 1.
Regent 2084.
Integral Propeller Co., Ltd., The Hyde, Hendon, N.W. 9.
Kingsbury 220.
Oddy, W., & Co., Globe Rd., Leeds.
Leeds 20547 & 20548; "Airscrews," Leeds.

RADIATORS AND RADIATOR REPAIRS—

Allin & Newbold, Ltd., Letchworth.
Letchworth 61.
Baynes & Partners, Ltd., Church Rd., Mitcham.
Mitcham 1551; "Radspark," Mitcham.
Doherty Motor Components, Ltd., Earl St., Coventry. Coventry 228; "Circulate," Coventry.
Midland Motor Radiator Co., Aston Rd., Birmingham. Central 705; "Radiator," Birmingham.
Serck Radiators, Ltd., Warwick Road, Greet, Birmingham.
Victoria 531 (3 lines); "Nerleak," Birmingham.

RIGGING FOR AIRCRAFT—

Cradock, Geo., & Co., Ltd., Wakefield.

SCRAP METALS—

Keeling, A. D., Ltd., Caroline St., Birmingham.
Central 440 (3 lines); "Nickel," Birmingham.

SHEET METAL WORK, STAMPINGS AND PRESSINGS—

Aircraft Mfg. Co., Ltd., Hendon, N.W. 9.
Kingsbury 220.
Allin & Newbold, Ltd., Newall Works, Letchworth, Herts.
Letchworth 61; "Allnew," Letchworth.
Aluminium Plant & Vessel Co., Ltd., Point Pleasant, Wandsworth, London, S.W. 18.
Putney 2353; "Anaclastic," Wands., London.
Grahame-White Company, Ltd., Hendon, N.W. 9.
Kingsbury 120.
London Office: 12, Regent St., Pall Mall, S.W. 1.
Regent 2084.
Jacobs, W. A. & R. J., Ltd., 94 & 96, Leonard St., E.C. 2.
London Wall 231; Central 5938.
"Electary," Finsquare, London.
Rubery, Owen & Co., Ltd., Darlaston.
Darlaston 87; "Roofs," Darlaston.
Snercold Engineering Co., Ltd., Hampton Wick.
Kingston 1153 and 1154; "Snercold," Kingston-on-Thames.

SPARKING PLUGS—

Apollo Mfg. Co., Ltd., Moseley St., B'ham.
Brown Bros., Ltd., Gt. Eastern St., E.C. 1.
London Wall 6300; "Imbrowned," Bethroad, London.
Lodge Sparking Plug Co., Ltd., Rugby.
Phone 235; "Igniter," Rugby.
Simms Motor Units, Ltd., Percy Blgs., Gresse St., Rathbone Place, W. 1.
Museum 2460, 2461; "Simotunit," London.
Sphinx Manufacturing Co., Bradford Street, Birmingham.

SPRAYING PLANT—

Midland Fan Co., Ltd., 46, Aston Rd., Birmingham.
Central 3463; "Blast," Birmingham.

SPRINGS AND SHOCK ABSORBERS—

Terry, Herbert, & Sons, Ltd., Redditch.
Redditch 61 (3 lines); "Springs," Redditch.

STEAM JOINTINGS—

"Powerite" Steam Jointing Co., Ltd., The, 16–17, Devonshire Square, E.C. 2.

STEEL—

Allen, E., & Co., Ltd., Sheffield.
Sheffield 4607; "Allen," Sheffield.
Jonas & Colver, Ltd., Sheffield.
4660 (Private Branch Exchange); "Jonas," Sheffield.
Monk Bridge Iron & Steel Co., Ltd., Leeds.
Leeds 20564, 20565; "Monkbridge," Leeds.
Richard Mather & Son, Shoreham St. Works, Sheffield.
Sheffield 4349.

STEEL TUBING & STEEL PRESS WORK PARTS—

Accles & Pollock, Ltd., Oldbury, Birmingham.
Oldbury 111; "Accles," Oldbury.
Oriental Tube Co., Ltd., West Bromwich.
45 & 166 West Bromwich; "Tubes," West Bromwich.

TANKS & COWLS—

Aircraft Mfg. Co., Ltd., Hendon, N.W. 9.
Kingsbury 220.
Allin & Newbold, Ltd., Newall Works, Letchworth, Herts.
Letchworth 61; "Allnew," Letchworth.
Aluminium Plant & Vessel Co., Ltd., Point Pleasant, Wandsworth, London, S.W. 18.
Putney 2353; "Anaclastic," Wands., London.
Grahame-White Company, Ltd., Hendon, N.W.
Kingsbury 120.
London Office: 12, Regent St., Pall Mall, S.W. 1.
Regent 2084.
Midland Motor Radiator Co., Aston Road, B'hâm.
Central 705; "Radiator," Birmingham.
Snercold Engineering Co., Ltd., Hampton Wick.
Kingston 1153 and 1154; "Snercold," Kingston-on-Thames.

TAPES, WEBS, CORDS, AND SMALLWARES—

James North Hardy & Son, Ltd., 54, Portland St., Manchester.
Central 6471; "Hardson," Manchester.

TAPS & DIES—

Chelsea Precision Tools, Ltd., Canada House, Norfolk Street, W.C. 2.
Central 2292 (3 lines); "Agstropar, Estrand."
Codes: A B C, 5th Edition.

TIMBER—

Fox, Elliott & Co., G.W. Docks, Plymouth.
Plymouth 1217; "Baltic," Plymouth.
Hopton & Sons, George St., Euston Rd., N.W. 1, and Market Harboro', Leicestershire.
Museum 496; Market Harboro' 13; "Hoptons," Eusquare, London; "Hoptons,' Mkt. Harboro'.
Owen, Joseph, & Son, Boro' High Street, S.E.
Hop 3811; "Bucheron," London.

TIME RECORDERS—

Gent & Co., Ltd., Leicester.
'Phone: 151 (2 lines); "Lodestone," Leicester.
Gledhill-Brook Time Recorder, 26, Victoria St., S.W. 1.
Victoria 1310.

TOOLS, ENGINEERS', HAND—

Burton, Griffiths & Co., Ltd., Ludgate Square, Ludgate Hill, E.C. 4.
City 1409 (4 lines); "Hibon," Cent., London.
Mather, Richard, & Son, Shoreham Street Works, Sheffield.
Sheffield 4349.

TRANSPORT & SHIPPING—

McGregor, Gow & Holland, Ltd., 1 and 4, Fenchurch Avenue, E.C. 3.
Avenue 5304.

TYRES & WHEELS—

General Aeronautical Co., Ltd., 30, Regent St., S.W. 1.
Gerrard 280; "Ridleypren," Piccy. London.
North British Rubber Co., Ltd., Castle Mills, Edinburgh.
Central 3880; "Weba," Edinburgh.
Palmer Tyre, Ltd., Shaftesbury Avenue, W.C. 2.
Gerrard 1214; "Tyricord," Westcent, London.

UNDERCARRIAGES—

Central Aircraft Co., 179, High Road, Kilburn, N.W. 6.
Hampstead 4403-4404 & 835, Harrow 609-610; "Aviduction," Phone, London.
Thompson Bros., (Bilston) Ltd., Bilston.
Bilston 10: "Thompson Bros.," Bilston.

VARNISHES AND COLOURS—

British Emaillite Co., Ltd., The, 5, Hythe Rd., Willesden, N.W. 10. Willesden 2346 and 2347, "Ridleypren," London.
Naylor Bros., Ltd., Southall. Southall 30.
Ryland, Llewellyn, Ltd., Balsall Heath, B'ham.
Mid 527; "Llewellyn Ryland." B'ham.
Wilkinson, Heywood & Clark, Poplar, E. 14.
East 1360; "Starson," London.

WELDING REPAIRS—

Allin & Newbold, Ltd., Letchworth.
Letchworth 61.
Aluminium Plant & Vessel Co., Ltd., Point Pleasant, Wandsworth, London, S.W. 18.
Putney 2353; "Anaclastic," Wands., London.
Central Aircraft Co., 179, High Road, Kilburn, N.W. 6.
Hampstead 4403-4404 & 835, Harrow 609-610; "Aviduction," Phone, London

WIND SHIELDS—

Auster, Ltd., Long Acre, W.C. 2. Regent 5910.
Triplex Safety Glass Co., 1, Albemarle St., W. 1.
Regent 1340; "Shatterlys," Piccy, London.

WIRES AND CABLES (Aeroplanes)—

Brown Bros., Ltd., Great Eastern St., E.C. 2.
London Wall 6300; "Imbrowned," Bethroad, [London.
Bruntons, Musselburgh.
Clifford & Sons, Ltd., Birmingham.
Cradock, Geo., & Co., Ltd., Wakefield.

WOODWORKING MACHINERY—

Wadkin & Co., Leicester. Leicester 3614 and 3615; "Woodworker," Leicester.

Standard Aircraft Metal Parts

(A.G.S. PARTS)

FROM STOCK.

A.G.S. M'FG. CO., LTD.

Works:
LACLAND PLACE, CHELSEA,
LONDON, S.W. 10.

Head Office: 4-5, NORFOLK STREET, STRAND, LONDON, W.C. 2.
Telephone: 2293 Central (3 lines). 'Grams and Cables: Agstropar, Estrand. Code A B C, 5th Edition.

Telephone: CITY 3115. Telegrams: VANDUARA, CENT, LONDON

AERONAUTICAL & ELECTRICAL

TAPES, WEBS, CORDS & THREADS.

DELIVERY FROM STOCK.

JOHN MACLENNAN & Co.,

(Contractors to H.M. Government)

30, NEWGATE ST., LONDON, E.C.1.

AND AT GLASGOW.

CONTRACTORS TO H.M. ADMIRALTY, WAR OFFICE, AND FOREIGN GOVERNMENTS.

THE BRITISH CAUDRON CO. Ltd.

SOLE BUILDING AND SELLING RIGHTS FOR

Caudron Aeroplanes and Hydro-Aeroplanes

— FOR —

THE BRITISH EMPIRE AND DEPENDENCIES.

HEAD OFFICE—BROADWAY, CRICKLEWOOD, N.W. 2.

CABLE AND TELEGRAPHIC ADDRESS—"CAUDROPLAN, CRICKLE, LONDON." PHONE—4647-4648 HAMPSTEAD.

THOMPSON BROS. LTD. BILSTON

TRADE MARK

Tubular Framework.
Undercarriages.
Tail Units Etc.

Thompson Bros. (BILSTON) Ltd.
Aircraft Department Bilston.
Contractors to H.M. Air Ministry.

S.B.A.C.

RAVARNETTE AEROPLANE LINENS.

The famous fabrics produced by . . .

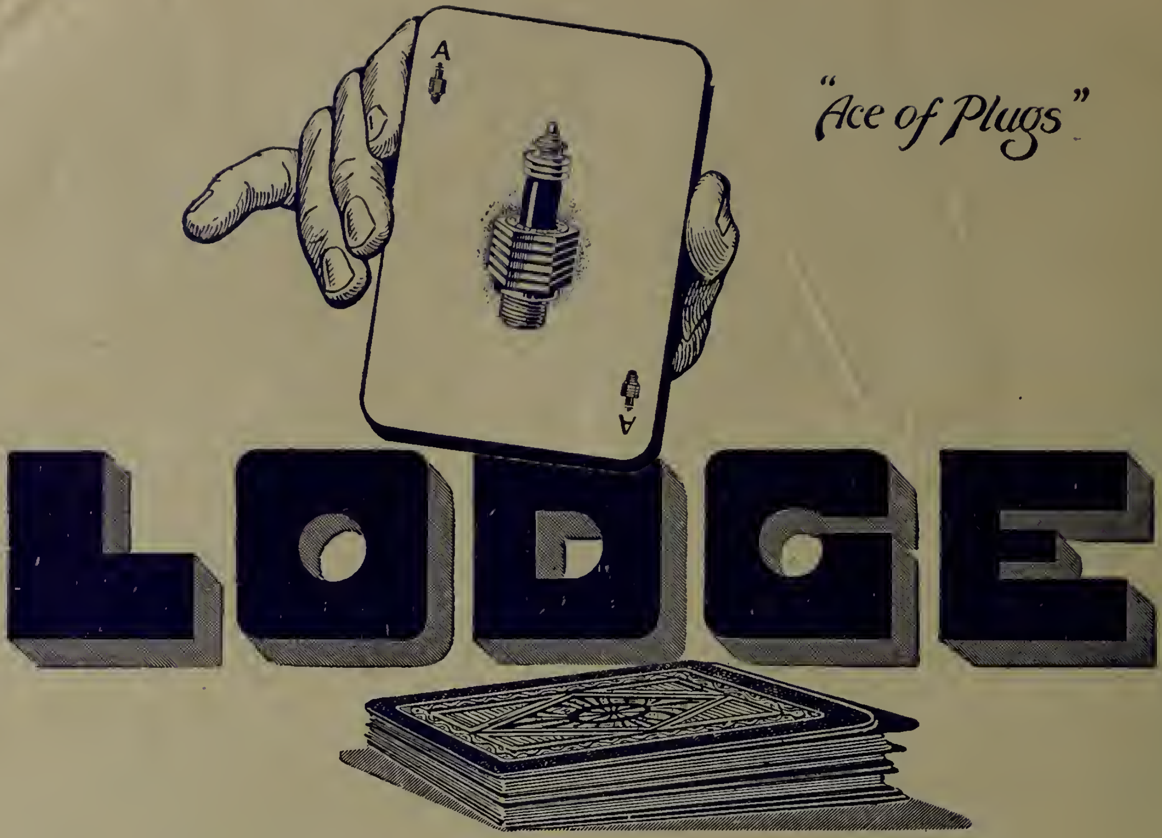
THE RAVARNETTE WEAVING CO., LTD., LISBURN, Near BELFAST,

. . . are unsurpassed for excellence.

Selling Agents . . .

CRAWLEY, GATES & Co., 115, FORE ST., LONDON, E.C. 2.

Telegrams :—"Spheroidal Cent., London." *Telephone* :—Central 1625.



LODGE PLUGS LTD.——————RUGBY.

By using a Gledhill-Brook 'Clipper' Recorder you are able to get ALL time checked accurately with a minimum of labour and expense.

It is the most up-to-date Recorder on the market. Stampings may be obtained at any time, independent of the interval of time between each.

Over-stampings are impossible as the patent Clipping device ensures this.

Model "C" prints the time and day.

Model "FC" prints the time, day, date and month.

ALL Models stamp the EXACT minute.

——— Catalogues Free ———

GLEDHILL-BROOK TIME RECORDERS, Ltd.,

EMPIRE WORKS,
HUDDERSFIELD.

44, HILL STREET,
BIRMINGHAM.

26 VICTORIA STREET,
LONDON S.W. 1.

All ENGLISH Throughout.

Printed and Published by the Proprietors, the St. Martin's Publishing Co., Ltd., 36, Great Queen Street, London, W.C. 2. H.D.
Agents for the Colonies: GORDON & GOTCH, LTD., London, Melbourne, Sydney, Brisbane, Perth, Launceston (Tas.), Wellington (N.Z.), Dunedin (N.Z.).
Canada—132, Bay Street, Toronto. South Africa—CENTRAL NEWS AGENCY, LTD.
Entered at the New York Post Office as second-class matter.

UNIVERSITY OF ILLINOIS-URBANA
Q.629.1305FLI C001
FLIGHT INTERNATIONAL$ LONDON
11 1919 JY-D
3 0112 008561471